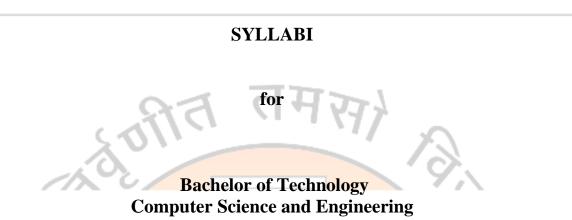
# SCHEME OF EXAMINATION

and



Offered by

# University School of Engineering and Technology

1<sup>st</sup> SEMESTER TO 8<sup>th</sup> SEMESTER



Guru Gobind Singh Indraprastha University Dwarka, Delhi – 110078 [INDIA]

<u>www.ipu.ac.in</u>

## BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) FIRST SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	PERS		•			
ETMA-101Applied Mathematics-I314						
ETPH-103		Applied Physics-I	2	1	3	М
ETME-105		Manufacturing Processes	3	0	3	М
ETEE-107		Electrical Technology	3	0	3	М
ETHS-109		Human Values and Professional Ethics-I#	1	1	1	
ETCS-111	1	Fundamentals of Computing	2	0	2	
ETCH-113	- X 1	Applied Chemistry	2		3	М
PRACTICAI	L/VIVA VOC	E	_	C>		
ETPH-151	77.0	Applied Physics Lab-I		2	1	
ETEE-153		Electrical Technology Lab		2	1	М
ETME-155		Workshop Practice		3	2	М
ETME-157		Engineering Graphics Lab		3	2	
ETCS-157		Fundamentals of Computing Lab		2	1	
ETCH-161		Applied Chemistry Lab		2	1	
		NCC/NSS*#				
TOTAL			16	18	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

#### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) SECOND SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	PERS					
ETMA-102		Applied Mathematics-II	3	1	4	М
ETPH-104		Applied Physics-II	2	1	3	
ETEC-106		Electronic Devices	3	0	3	М
ETCS-108		Introduction to Programming	3	0	3	М
ETME-110	5	Engineering Mechanics	2		3	
ETHS-112		Communication Skills	2	10	3	
ETEN-114	12-0	Environmental Studies	2	1	3	
PRACTICAL/	VIVA VOCE			1		1
ETPH-152		Applied Physics Lab-II		2	1	
ETCS-154		Programming Lab		2	1	М
ETEC-156		Electronic Devices Lab		2	1	М
ETME-158		Engineering Mechanics Lab		2	1	
ETEN-160		Environmental Studies Lab		2	1	
		NCC/NSS*#				
TOTAL	1		17	15	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

### BACHELOR OF TECHNOLOGY (COMPUTER SCIENCE AND ENGINEERING) THIRD SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAP	PERS					
ETMA 201		Applied Mathematics – III	3	1	4	
ETCS 203		Foundation of Computer Science	3	1	4	М
ETEC 205		Switching Theory and Logic Design	3	1	4	
ETEE 207		Circuits and Systems	3	1	4	
ETCS 209	11	Data Structure	3	1	4	М
ETCS 211	12	Computer Graphics and Multimedia	3	1	4	
PRACTICAL	VIVA-VOCA			C.		
ETEC 253		Switching Theory and Logic Design Lab	0	2	1	
ETCS 255		Data Structure Lab	0	2	1	
ETEE 257		Circuits and Systems Lab	0	2	1	
ETCS 257		Computer Graphics and Multimedia Lab	0	2	1	
		NCC/NSS*#	-	-	-	
TOTAL			18	14	28	

M: Mandatory for award of degree

\*NCC/NSS can be completed in any semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

#NUES(Non University Examination System)

#### BACHELOR OF TECHNOLOGY (COMPUTER SCIENCE AND ENGINEERING) FOURTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	PERS					
ETMA 202		Applied Mathematics – IV	3	1	4	
ETCS 204		Computer Organization and Architecture	3	1	4	М
ETCS 206		Theory of Computation	3	1	4	М
ETCS 208		Database Management Systems	3	1	4	М
ETCS 210	64	Object Oriented Programming	3	0	3	
ETEC 212		Communication Systems	3	1	4	
PRACTICAL	/VIVA VOCE			1		
ETMA 252		Applied Mathematics Lab	0	2	1	
ETCS 260		Computer Organization and Architecture Lab	0	2	1	
ETCS 256		Database Management Systems Lab	0	2	1	
ETCS 258		Object Oriented Programming Lab	0	2	1	
ETEC 256		Communication Systems Lab	0	2	1	
ETSS 250		NCC/NSS*#	-	-	1	
TOTAL	-1		18	15	29	

M: Mandatory for award of degree

\*NCC/NSS can be completed in any semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

**NOTE:** 4 weeks Industrial / In-house Workshop will be held after fourth semester. However, Viva-Voce will be conducted in the fifth semester.

#NUES(Non University Examination System)

## BACHELOR OF TECHNOLOGY (COMPUTER SCIENCE AND ENGINEERING) FIFTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAP	PERS		-			
ETCS301		Algorithms Design and Analysis	3	1	4	М
ETCS303		Software Engineering	3	1	4	М
ETCS 307		Java Programming	3	1	4	
ETMS 311		Industrial Management	3	0	3	
ETEC-303	X	Digital Communication	3		4	
ETHS 301	1	Communication Skills for Professionals	2	0	1	
PRACTICAL/	VIVA VOCE					
ETCS 351		Algorithms Design and Analysis Lab	0	2	1	
ETCS 353		Software Engineering Lab <sup>^</sup>	0	2	1	
ETCS 357		Java Programming Lab	0	2	1	
ETCS 359		Viva Industrial Training / In-house Workshop*	0	0	1	
ETEC-357		Digital Communication Lab <sup>@</sup>	0	2	1	
ETHS 351		Communication Skills for Professionals Lab	0	2	1	
TOTAL			17	14	26	

M: Mandatory for award of degree

\*Viva-Voce for evaluation of Industrial Training / In-house Workshop will be conducted in this semester.

@A few lab experiments must be performed using any circuit simulation software e.g. PSPICE/MATLAB/ETAP/Lab View.

^Using UML 2.0

# BACHELOR OF TECHNOLOGY (COMPUTER SCIENCE AND ENGINEERING) SIXTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAPE	ERS	-		_		
ETCS 302		Compiler Design	3	1	4	М
ETCS304		Operating Systems	3	1	4	М
ETCS 306		Computer Networks	3	1	4	М
ETCS 308		Web Technology	3	0	3	
ETCS310		Artificial Intelligence	3	1	4	
ETEE-310	64	Microprocessor and Microcontroller	3	1	4	
PRACTICAL/V	IVA VOCE			10		
ETCS 352	1	Operating Systems (Linux Programming and Administration) Lab	0	2	1	
ETCS 354		Computer Networks Lab	0	2	1	
ETCS 356		Web Technology Lab	0	2	1	
ETEE-358		Microprocessor and Microcontroller Lab	0	2	1	
TOTAL			18	13	27	

M: Mandatory for award of degree

**Note:** Minimum of 4-6 weeks of industrial training related to CSE will be held after 6<sup>th</sup> semester; however, viva-voce will be conducted in 7<sup>th</sup> Semester (ETCS 459).

**Imp:**- Elective Paper will be floated in 7<sup>th</sup> Semester, if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 7<sup>h</sup> Semester is done before  $15^{th}$  April every year before end of  $6^{th}$  semester.

#### BACHELOR OF TECHNOLOGY (COMPUTER SCIENCE AND ENGINEERING) SEVENTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits
THEORY PAP	ERS				
ETCS401		Information Security	3	1	4
ETCS403		Software Testing and Quality Assurance	3	0	3
ETEC405		Wireless Communication	3	0	3
ELECTIVE (SI	ELECT ANY	<b>FWO, ONE FROM EACH GROUP</b> )			
GROUP-A		NO VIEN	h.		1
ETCS407	51	Complexity Theory	3	0	3
ETCS409		Intellectual Property Rights	3	0	3
ETEC-401		Embedded Systems	3	0	3
ETCS413		Data Mining and Business Intelligence	3	0	3
ETCS415		Advanced Computer Architecture	3	0	3
ETCS 410		Natural Language Processing	3	0	3
GROUP-B					
ETIT 415		Digital Signal Processing	3	0	3
ETCS 421		Simulation and Modelling	3	0	3
ETCS 423		Advanced DBMS	3	0	3
ETCS 427		Parallel Computing	3	0	3
ETIT 401		Advanced Computer Networks	3	0	3
ETEE-429		Control System	3	0	3
ETHS-419		Sociology and Elements of Indian History for Engineers	3	0	3
PRACTICAL	/VIVA VOCE				
ETCS 451		Information Security Lab	0	2	1
ETCS 453		Software Testing and QA Lab	0	2	1
ETEC 463		Wireless Communication Lab	0	2	1
ETCS 457		Lab based on Elective I or II	0	2	1
ETCS 459		Summer Training / Industrial Workshop/ Certification	0	0	1
ETCS 461		Minor Project+	0	6	3
TOTAL			15	15	24

**Imp:-** Elective Paper will be floated if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 8<sup>th</sup> Semester is done before 15<sup>th</sup> November every year before end of seventh semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

+ The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.

#### BACHELOR OF TECHNOLOGY (COMPUTER SCIENCE AND ENGINEERING) EIGHTH SEMESTER EXAMINATION

Paper Code	Paper ID	Paper	L	T/P	Credits
HEORY PAPE	RS				
ETIT-402		Mobile Computing	3	1	4
ETCS-402		Machine Learning	3	0	3
ETHS-402		Human Values and Professional Ethics-II	1	0	1
ELECTIVE (SE	ELECT ANY	TWO, ONE FROM EACH GROUP)			
GROUP A	(		$\frown$		
ETIT-418	$\Delta$	Digital Image Processing	3	0	3
ETCS408	<u>いてい</u>	Microelectronics	3	0	3
ETEC-406		Ad Hoc and Sensor Networks	3	0	3
ETIT 410		Soft Computing	3	0	3
ETIC-414		VLSI Design	3	0	3
ETIT 430		Distributed Systems	3	0	3
ETCS412		Object Oriented Software Engineering	3	0	3
ETCS 414		Computer Vision	3	0	3
ETCS416		Software Project Management	3	0	3
GROUP B		· · · · · ·	•		
ETCS-404		Human Computer Interaction	3	0	3
ETIT-416		Information Theory and Coding	3	0	3
ETCS-418		Web Intelligence and Big Data	3	0	3
ETCS-420		Service Oriented Architecture	3	0	3
ETCS-422		Multiagent Systems	3	0	3
ETCS-424		Principles of Programming Languages	3	0	3
ETCS-426		Telecommunication Networks	3	0	3
ETCS-428		Selected Topics of Recent Trends in Computer Science and Engineering**	3	0	3
PRACTICAL/V	VIVA VOCE				
ETIT-452		Mobile Computing Lab	0	2	1
ETCS-454		Machine Learning Lab	0	2	1
ETCS-456		Lab based on Elective – I	0	2	1
ETCS-458		Lab based on Elective - II	0	2	1
ETCS-460		*Major Project	0	12	8
OTAL		·	13	21	26

\*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to major project should be delivered one month after staring of Semester. The progress will be monitored through seminars and progress reports.

\*\*Syllabus may be revised after 2 years.

NOTE:

1. The total number of the credits of the B.Tech. (CSE) Programme = 216.

2. Student shall be required to appear in examinations of all courses. However, to award the degree a student shall be required to earn a minimum of 200 credits, including mandatory papers (M).

#### FOR LATERAL ENTRY STUDENTS:

- 1. The total number of the credits of the B.Tech. (CSE) Programme = 162.
- 2. Each student shall be required to appear for examinations in all courses Third Semester onwards. However, for the award of the degree a student shall be required to earn a minimum of 150 credits, including mandatory papers (M).

# **NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF**

# **B.TECH AND M.TECH**

- 1. ET stands for Engineering and Technology.
- 2. PE stands for Power Engineering.
- 3. ME stands for Mechanical Engineering.
- 4. MT stands for Mechatronics.
- 5. AT stands for Mechanical and Automation Engineering.
- 6. EE stands for Electrical and Electronics Engineering.
- 7. EL stands for Electrical Engineering.
- 8. IT stands for Information Technology
- 9. CS stands for Computer Science and Engineering
- **10. CE** stands for Civil Engineering
- 11. EC stands for Electronics and Communications Engineering.
- 12. EN stands for Environmental Engineering
- 13. TE stands for Tool Engineering
- **14. MA** stands for Mathematics
- 15. HS stands for Humanities and Social Sciences
- 16. SS stands for Social Services

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#### **APPLIED MATHEMATICS-I**

Paper Code : ETMA-101	L	Т	С
Paper : Applied Mathematics-I	3	1	4

INSTRUCTIONS TO PAPER SETTERS:	MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This que	estion should have objective
or short answer type questions. It should be of 25 marks.	
2. Apart from Question No. 1, rest of the paper shall consist of four units as	per the syllabus. Every unit
should have two questions. However, student may be asked to attempt only	1 question from each unit.
Each question should be of 12.5 marks.	-

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

#### UNIT- I

Successive differentiation: Leibnitz theorem for  $n^{th}$  derivative (without proof). Infinite series: Convergence and divergence of infinite series, positive terms infinite series, necessary condition, comparison test (Limit test), D'Alembert ratio test, Integral Test, Cauchy's root test, Raabe's test and Logarithmic test(without proof). Alternating series, Leibnitz test, conditional and absolutely convergence. Taylor's and Maclaurin's expansion(without proof) of function ( $e^x$ , log(1+x), cos x, sin x) with remainder terms ,Taylor's and Maclaurin's series, Error and approximation.

#### UNIT- II

Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar curves.

Integration: integration using reduction formula for Application of integration: Area under the curve, length of the curve, volumes and surface area of solids of revolution about axis only .Gamma and Beta functions.

#### [T1],[T2][No. of hrs. 12]

[T1], [T2][No. of hrs. 12]

#### UNIT- III

Matrices: Orthogonal matrix, Hermitian matrix, Skew-Hermitian matrix and Unitary matrix. Inverse of matrix by Gauss-Jordan Method (without proof). Rank of matrix by echelon and Normal (canonical) form. Linear dependence and linear independence of vectors. Consistency and inconsistency of linear system of homogeneous and non homogeneous equations . Eigen values and Eigen vectors. Properties of Eigen values (without proof). Cayley-Hamilton theorem (without proof). Diagonlization of matrix. Quadratic form, reduction of quadratic form to canonical form.

# [T1], [T2][No. of hrs. 12]

#### UNIT-IV

Ordinary differential equations: First order linear differential equations, Leibnitz and Bernaulli's equation. Exact differential equations, Equations reducible to exact differential equations. Linear differential equation of higher order with constant coefficients, Homogeneous and non homogeneous differential equations reducible to linear differential equations with constant coefficients. Method of variation of parameters. Bessel's and Legendre's equations (without series solutions), Bessel's and Legendre's functions and their properties.

#### [T1],[T2][No. of hrs. 12]

#### Text:

- [T1] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
- [T2]. R. K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications.

#### **References:**

- [R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [R2] G.Hadley, "Linear Algebra" Narosa Publication
- [R3] N.M. Kapoor, "A Text Book of Differential Equations", Pitambar publication.
- [R4] Wylie R, "Advance Engineering mathematics", McGraw-Hill
- [R5] Schaum's Outline on Linear Algebra, Tata McGraw-Hill
- [R6] Polking and Arnold, "Ordinary Differential Equation using MatLab" Pearson.

С

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#### APPLIED PHYSICS – I

#### Paper Code: ETPH – 103 Т L Paper: Applied Physics - I 2 1

INSTRUCTIONS TO PAPER SETTERS:	MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus.	This question should have objective or
short answer type questions. It should be of 25 marks.	
2 Apart from Question No. 1 rest of the paper shall consist of four uni	ts as per the syllabus Every unit should

Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

#### UNIT I

Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings.

Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra.

## [T1], [T2](No. of Hrs. 8)

#### **UNIT II**

Polarization: Introduction, Uniaxial crystals, Double refraction, Nicol prism, Quarter and half wave plates, Theory of production of plane, circularly and elliptically polarized lights, Specific rotation, Laurents half shade polarimeter.

Laser: Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its principle, He-Ne laser.

Fibre optics: Introduction, Single mode fibre, Step index and graded index multimode fibres, Acceptance angle and numerical aperture.

# [T1], [T2](No. of Hrs. 8)

#### UNIT III

Theory of Relativity: Introduction, Frame of reference, Galilean transformation, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Mass energy relation

**Ultrasonics:** Introduction, Production of ultrasonics by magnetostriction and Piezoelectric methods, Applications. [T1], [T2](No. of Hrs. 8)

#### UNIT IV

Nuclear Physics: Introduction, Radioactivity, Alpha decay, Beta decay, Gamma decay, Q value, Threshold energy, Nuclear reactions, Nuclear fission: Liquid drop model, Nuclear fusion, Particle accelerators: Linear accelerator, Cyclotron, Radiation detectors: Ionization chamber, Geiger Mueller Counter.

#### [T1](No. of Hrs. 8)

#### **Text Books:**

Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009 [T1].

[T2]. A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013.

#### **Reference Books**

- A. Ghatak 'Optics', TMH, 5th Edition, 2013 [R1].
- G. Aruldhas 'Engineering Physics' PHI 1st Edition, 2010. [R2].
- [R3]. Fundamentals of Optics : Jenkins and White, Latest Edition
- C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I. [R4].
- Feynman "The Feynman lectures on Physics Pearson Volume 3 Millennium Edition, 2013 [R5].
- Uma Mukhrji 'Engineering Physics' Narosa, 3<sup>rd</sup> Edition, 2010. [R6].
- H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], 1<sup>st</sup> Edition, 2009. [R7].

# MANUFACTURING PROCESSES

Paper Code: ETME-105	L	Т	С			
Paper: Manufacturing Processes	3	0	3			
INSTRUCTIONS TO PAPER SETTERS:	MAXIMU	JM MAF	RKS: 75			
1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective o						
short answer type questions. It should be of 25 marks.						

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: The Objective of the paper is to facilitate the student with the basic Manufacturing processes.* Unit-I

**Introduction**: Introduction of Manufacturing processes and their classification, Basic Metals & Alloys : Properties and Applications. Properties of Materials: Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness and hardness. Ferrous Materials: Carbon steels, its classification based on % carbon as low, mild, medium & high carbon steel, its properties & applications. Wrought iron. Cast iron. Alloy steels: stainless steel, tool steel. Elementary introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching & tempering and case- hardening.

Non-Ferrous metals & alloys: Properties and uses of various non-ferrous metals & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys such as Duralumin.

#### **Casting Processes:**

Principles of metal casting, Pattern materials, types and allowance, composition and properties of moulding sand, foundry tools, concept of cores and core print, elements of gating system, description and operation of cupola, special casting processes e.g. die-casting; permanent mould casting; centrifugal casting; investment casting; casting defects.

# (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>) [No. of Hrs.12]

## UNIT-II

## **Smithy and Forging:**

Hot working and cold working, Forging tools and equipments, Forging operations, Forging types: Smith forging, Drop forging, Press forging, Machine forging; Forging defects; Extrusion, wire drawing, swaging.

# **BENCH WORK AND FITTING:**

Fitting shop tools, operation: Fitting; sawing; chipping; thread cutting (with taps and dies); Marking and marking tools.

#### (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>) [No. of Hrs. 12]

#### Unit-III

**Metal joining:** Welding principles, classification of welding techniques, Oxyacetylene Gas welding, equipment and field of application, Arc-welding, metal arc, Carbon arc welding, submerged arc welding and atomic hydrogen welding, TIG and MIG welding, Electric resistance welding: spot; seam; flash; butt and percussion welding, Flux: composition; properties and function, Electrodes, Types of joints and edge preparation, Brazing and soldering, welding defects.

# (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>)[No. of Hrs. 12]

(T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>)[No. of Hrs. 12]

#### Unit-IV

#### Sheet Metal Work:

Tools and equipments used in sheet metal work, metals used for sheets, standard specification for sheets, Types of sheet metal operations: shearing, drawing, bending. Other operations like spinning, stretch forming, embossing and coining.

**Powder Metallurgy:** Introduction of powder metallurgy process: powder production, blending, compaction, sintering.

#### **Text Books:**

- [T1]. Manufacturing Process by Raghuvanshi.(Dhanpat Rai and Co.)
- [T2]. Manufacturing Technology by P.N.Rao (TMH publications)

#### **Reference Books:**

- [R1]. Workshop Technology by Hazra-Chowdhary (Media Promoters and Publishers Pvt. Ltd.)
- [R2]. Production Engineering by R.K.Jain (Khanna Publishers)
- [R3]. Workshop Technology by Chapman (Elsevier Butterworth-Heinemann)
- [R4] Fundamentals of Modern Manufacturing by Mikell P. Groover (Wiley India Edition)
- [R5] Manufacturing Processes for Engineering Materials by Kalpakjian and Schmid (Pearson)

#### **ELECTRICAL TECHNOLOGY**

Paper Code: ETEE-107	L	Т	С
Paper : Electrical Technology	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

- 1. This is first introductory course in electrical technology to the students of all the branches of engineering in first year.
- 2. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 3. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To provide exposure to the students in respects of the basics of different aspects of electrical engineering with emphasis on constructional, measurement and applications of various types of instruments and equipments.

#### UNIT – I: DC Circuits

Introduction of Circuit parameters and energy sources (Dependent and Independent), Mesh and Nodal Analysis, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer and Millman's Theorems, Star-Delta Transformation and their Applications to the Analysis of DC circuits.

#### UNIT – II: A.C.Circuits

A.C. Fundamentals, Phasor representation, Steady State Response of Series and Parallel R-L, R-C and R-L-C circuits using j-notation, Series and Parallel resonance of RLC Circuits, Quality factor, Bandwidth, Complex Power, Introduction to balanced 3-phase circuits with Star- Delta Connections.

# **UNIT – III: Measuring Instruments**

Basics of measuring instruments and their types ,Working principles and applications of moving coil, moving iron (ammeter & voltmeter) and Extension of their ranges, dynamometer- type Wattmeter , induction-type Energy Meter , Two-wattmeter method for the measurement of power in three phase circuits, Introduction to digital voltmeter, digital Multimeter and Electronic Energy Meter.

#### **UNIT - IV: Transformer and Rotating Machines**

Fundamentals of Magnetic Circuits, Hysteresis and Eddy current losses, working principle, equivalent circuit, efficiency and voltage regulation of single phase transformer and its applications. Introduction to DC and Induction motors (both three phase and single phase), Stepper Motor and Permanent Magnet Brushless DC Motor. [T1],[T2],[R2][No. of Hrs. 12]

#### **Text Books:**

[T1] S.N Singh, "Basic Electrical Engineering" PHI India Ed 2012

[T2] Chakrabarti, Chanda, Nath "Basic Electrical Engineering" TMH India", Ed 2012.

#### **Reference Books:**

[R1] William Hayt "Engineering Circuit Analysis" TMH India Ed 2012

[R2] Giorgio Rizzoni "Principles and Application of Electrical Engineering" Fifth Edition TMH India.

# [T1],[T2][No. of Hrs. 14]

[T1],[T2],[R2][No. of Hrs. 11]

[T1],[T2][No. of Hrs. 11]

Maximum Marks: 75

#### **HUMAN VALUES & PROFESSIONAL ETHICS**

Paper Code: ETHS-109	L	Т	С
Paper : Human Values & Professional Ethics		1	1

Non-University Examination Scheme (NUES) Note: There will be no End-Term External University Examination. Marks are to be given on the basis of two internal sessional test of 30 marks each and one final Viva-voce project report Examination of 40 marks

# **Objectives:**

This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to a. ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a holistic perspective among students towards life, profession and b. happiness, based on the correct understanding of the Human reality and the rest of the Existence. Such a Holistic perspective forms the basis of value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, c. trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

# **UNIT-1: Introduction to Value Education**

1. Understanding the need, basic guidelines, content and process for value education.

2. Basic Human Aspirations: Prosperity and happiness

3. Methods to fulfil the human aspirations – understanding and living in harmony at various levels. [T1], [R1], [R4]

4. Practice Session – 1.

#### **UNIT-2: Harmony in the Human Being**

1. Co-existence of the sentient "I" and the material body – understanding their needs – Happiness & Conveniences.

2. Understanding the Harmony of "I" with the body - Correct appraisal of physical needs and the meaning of prosperity.

- 3. Programme to ensure harmony of "I" and Body-Mental and Physical health and happiness.
- 4. Harmony in family and society: Understanding Human-human relationship in terms of mutual trust and respect.
- 5. Understanding society and nation as extensions of family and society respectively.
- 6. Practice Session -02

#### **UNIT-3: Basics of Professional Ethics**

- 1. Ethical Human Conduct based on acceptance of basic human values.
- 2. Humanistic Constitution and universal human order skills, sincerity and fidelity.
- 3. To identify the scope and characteristics of people friendly and eco-friendly production system, Technologies and management systems.
- 4. Practice Session 03.

#### **UNIT-4: Professional Ethics in practice**

- 1. Profession and Professionalism Professional Accountability, Roles of a professional, Ethics and image of profession.
- Engineering Profession and Ethics Technology and society, Ethical obligations of Engineering 2. professionals, Roles of Engineers in industry, society, nation and the world.
- Professional Responsibilities Collegiality, Loyalty, Confidentiality, Conflict of Interest, Whistle Blowing 3.
- 4. Practice Session 04

#### **Text Books:**

- Professional Ethics, R. Subramanian, Oxford University Press. [T1]
- Professional Ethics & Human Values: S.B. Srivasthva, SciTech Publications (India) Pvt. Ltd. New Delhi. [T2]
- Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education. [T3]

#### **References:**

- Success Secrets for Engineering Students: Prof. K.V. SubbaRaju, Ph.D., Published by SMARTstudent. [R1]
- Ethics in Engineering Mike W. Martin, Department of Philosophy, Chapman University and Roland [R2] Schinzinger, School of Engineering, University of California, Irvine.
- Human Values: A. N. Tripathy (2003, New Age International Publishers) [R3]

[T1],[R4]

#### No. of lectures: 04+1

[T1], [T2], [T3], [R3]

# No. of lectures: 05+1

[T2], [R1], [R2]

No. of lectures: 04+1

No. of lectures: 03+1

- [R4] Value Education website, http://www.universalhumanvalues.info[16]
- [R5] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press.
- [R6] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers" Manual by the same author.

**\*PRACTICAL SESSIONS OF 14 HOME ASSIGNMENTS** will be followed by the students pursuing this paper. (Ref: Professional Ethics & Human Values: S.B. Srivastava, SciTech Publications (India) Pvt. Ltd. New Delhi. )

#### CONTENT OF PRACTICE SESSION

#### Module 1: Course Introduction - Needs, Basic Guidelines, Content and Process of Value Education

**PS-1:** Imagine yourself in detail. What are the goals of your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcoming in your life? Observe and analyze them.

#### **Expected Outcome:**

The students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

**PS-2:**Now a days there is lot of voice about techno-genie maladies such as energy and natural resource depletion, environmental Pollution, Global Warming, Ozone depletion, Deforestation, etc. – all these scenes are man-made problems threatening the survival of life on the earth – what is root cause of these maladies and what is the way out in your opinion?

On the other hand there is rapidly growing danger because of nuclear proliferation, arm race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression and suicidal attempts, etc - what do you think the root cause of these threats to human happiness and peace – what could be the way out in your opinion?

#### **Expected Outcome:**

The students start finding out that technical education with study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all the problems and the sustained solution could emerge only through understanding of human values and value based living. Any solutions brought out through fear, temptation or dogma will not be sustainable.

**PS-3:1**.Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of following:

a)What is naturally acceptable to you in relationship - feeling of respect or disrespect?

b)What is naturally acceptable to you - to nurture or to exploit others? Is your living the same as your natural acceptance or different?

2.Out of three basic requirements for fulfillment of your aspirations, right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time and efforts you devote for each in your daily routine.

## **Expected Outcome:**

- 1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify the right or wrong, and referring to any external source life text or instrument or any other person cannot enable them to verify with authenticity, it will only develop assumptions.
- 2. The students are able to see that their practice in living is not in harmony with their natural acceptance at most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
- 3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of the problems in their family and the lack of physical facilities in most of the cases; while they have given higher priority to earning of physical facilities in their life ignoring relationship and not being aware that right understanding is the most important requirement for any human being.

#### Module 2: Understanding harmony in human being - Harmony in myself!

Modified Scheme and Syllabus of B. Tech-CSE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

**PS-4:**Prepare the list of your desires. Observe whether the desires. Observe whether the desires are related with self "I" or body. If it appears to be related with the both, see which part of it is related to self "I" and which part is related to body.

#### **Expected Outcome:**

The students are able to see that they can enlist their desires and the desires are not vague, also they are able to relate their desires to "I" and "body" distinctly. If, any desire appears to be related with both, they are able to see that feeling is related to "I" while the physical facility is related to the body. They are also able to see that "I" and "body" are two realities, and most of their desires are related to "I" and not with the "Body"; while their efforts are mostly connected on the fulfillment of the need of the body assuming that it will meet the needs of "I" too.

#### **PS-5**:

- 1. {A}. Observe that any physical facilities you use, follows the given sequence with time; Necessary and tasteful unnecessary & tasteful unnecessary & tastefus.
  - {B}. In contrast, observe that any feelings in you are either naturally acceptable or not acceptable at all. If, naturally acceptable, you want it continuously and if not acceptable, you do not want it at any moment.
- 2. List Down all your activities. Observe whether the activity is of "I" or of "body" or with the participation both "I" and "body".
- 3. Observe the activities with "I". Identify the object of your attention for different moments (over a period say 5 to 10 minute) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

#### **Expected Outcome:**

- 1. The students are able to see that all physical facilities they use are required for limited time in a limited quantity. Also they are able to see that cause of feeling, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable eve for a single moment.
- 2. The students are able to see that activities like understanding, desires, thoughts and selection are the activities of "I" only; the activities like breathing, palpitation of different parts of the body are fully the activities of the body. With the acceptance of "I", while activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs, etc. are such activities that require the participation of both "I" and "body"
- 3. The students become aware of their activities of "I" and start finding their focus of attention at different moments. Also they are able see that most of their desires are coming from outsides (through preconditioning or sensation) and are not based on their natural acceptance.
- PS-6: 1.Chalk out the program to ensure that you are responsible to your body for the nurturing, protection and right utilization of the body.
  2.Find out the plants and shrubs growing in and your campus. Find out their use for curing different diseases.

#### **Expected Outcome:**

The students are able to list down activities related to a proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing the different diseases.

#### Module 3: Understanding harmony in the family and society - Harmony in Human - Human relationship

S.No.	Intention (Natural Acceptance)	S.No.	Competence
1.a.	Do I want to make myself happy?	1.b.	Am I liable to make myself always Happy?
2.a.	Do I want to make the other happy?	2.b.	Am I liable to make the other always happy?
3.a.	Does the other want to make him happy?	3.b.	Is the other able to make him always happy?
<b>4.a.</b>	Does the other want to make me happy? What is answer?	4.b.	Is the other able to make me always happy? What is answer?

**PS-7:** Form small groups in the class and in that group initiate the dialogue and ask the eight questions related to trust. The eight questions are-

Let each student answer the question for himself and everyone else. Discuss the difference between intention and competence.

#### **Expected Outcome:**

The students are able to see that the first four questions are related to our natural acceptance i.e. intention and the next four to our competence. They are able to note that the intention is always correct, only competence is lacking. We generally evaluate ourselves on the basis of our intention and other on the basis of their competence. We seldom look at our competence and other's intention as a result we conclude that I am a good person and other is a bad person.

#### **PS-8:**

1. Observe that on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasion you are disrespecting by way of under evaluation, over evaluation or otherwise evaluation. 2. Also observe whether your feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

#### **Expected Outcome:**

The students are able to see that respect is right evaluation and only right evaluation leads to fulfilment of relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect) like gender biasness, generation gap, caste conflicts, class struggle, and domination through poor play, communal violence, and clash of isms and so on so forth.

All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

#### **PS-9:**

1. Write a note in the form of a story, poem, skit, essay, narration, dialogue, to educate a child.

Evaluate it in a group.

2. Develop three chapters to introduce "social science", its needs, scope and content in the primary education of children.

#### **Expected Outcome:**

The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

#### Module 4: Understanding harmony in the nature and existence - Whole existence as Co - existence -

**PS-10:** Prepare the list of units (things) around you. Classify them into four orders. Observe and explain the mutual fulfilment of each unit with other orders.

#### **Expected Outcome:**

The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to their orders today and need to take appropriate steps to ensure right participation (in term of nurturing, protection and right utilization) in the nature.

**PS-11:** 

- 1. Make a chart for the whole existence. List down different courses of studies and relate them to different or levels in the existence.
- 2. Choose any one subject being taught today. Evaluate and suggest suitable modifications to make it appropriate and holistic.

#### **Expected Outcome:**

The students are confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are liable to make out how these courses can be made appropriate and holistic.

# Module 5: Implication of the above Holistic Understanding of Harmony at all Levels of Existence.

**PS-12:** Choose any two current problem of different kind in the society and suggest how they can be solved on the basis of the natural acceptance of human values. Suggest the steps you will take in present conditions.

#### **Expected Outcome:**

The students are liable to present sustainable solutions to the problem in society and nature. They are also able to see that these solutions are practicable and draw road maps to achieve them.

#### **PS-13:**

1. Suggest ways in which you can use your knowledge of engineering / technology / management for universal human order from your family to world family.

2. Suggest one format of humanistic constitution at the level of nation from your side.

#### **Expected Outcome:**

The students are able to grasp the right utilization of their knowledge in their streams of technology / engineering / management to ensure mutually enriching and recyclable production systems.

PS-14: The course is going to be over now. Evaluate your state before and after the course in terms of-

- Thoughts
- Behavior
- Work and
- Realization

Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

#### **Expected Outcome:**

The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for happy and prosperous society.

# **FUNDAMENTALS OF COMPUTING**

# Paper Code: ETCS-111LTCPaper: Fundamentals of Computing202

INSTRUCTIONS TO PAPER SETTERS:	Maximum Marks : 75
1. Question No. 1 should be compulsory and cover the entire syllabus.	This question should have objective
or short answer type questions. It should be of 25 marks.	
2. Apart from Question No. 1, rest of the paper shall consist of four	units as per the syllabus. Every unit

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the synabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

*Objective: The objective of the paper is to facilitate the student with applied working knowledge of computers. This is the first course of computing and does not assume any pre-requisite.* 

# UNIT-I

Five Component Model of a Computer, System and Application software (introduction) storage devices, primary (RAM, ROM, PROM, EPROM, cache) Memory and secondary (magnetic tape, hard disk, Compact disks) memory, peripheral devices, printers.

# UNIT-II

**UNIT-III** 

Operating Systems: DOS Internal, External commands, Windows (2000 and NT), Overview of architecture of Windows, tools and system utilities including registry, partitioning of hard disk, Overview of Linux architecture, File system, file and permissions, concept of user and group, installation of rpm and deb based packages.

# [T1], [T2][8 Hours]

[R2][R3] [8 Hours]

Basics of programming through flow chart, Networking Basics - Uses of a network and Common types of networks, Network topologies and protocols, Network media and hardware, Overview of Database Management System.

# [T1],[T2],[R1][8 Hours]

#### UNIT-IV

Libre / Open Office Writer : Editing and Reviewing, Drawing, Tables, Graphs, Templates

Libre / Open Office Calc : Worksheet Management , Formulas, Functions, Charts

Libre / Open Office Impress: designing powerful power-point presentation

# Text:

[T1] Peter Norton, Introduction to computers, Sixth Edition Tata McGraw Hill (2007).

[T2] Andrews Jean, A+Guide to Managing & Maintaining Your PC, Cengage Publication 6/e

#### **References:**

- [R1] Anita Goel, Computer Fundamentals, Pearson Education.
- [R2] Joiner Associates Staff, Flowcharts: Plain & Simple: Learning & Application Guide, Oriel Inc
- [R3] http://www.openoffice.org/why/
- [R4] http://www.libreoffice.org/get-help/documentation/

# [T1], [T2][8 Hours]

#### Paper Code: ETCH – 113 **Paper : Applied Chemistry**

### **INSTRUCTIONS TO PAPER SETTER:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Each unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Chemistry aspects that are required for his understanding of basic chemistry

#### UNIT I: FUELS

Definition, Classification & Calorific value of fuels (gross and net), Dulong's formula (Numericals), Determination of calorific value of fuels using bomb's calorimeter (Numericals), Determination of calorific value of fuels using Boy's Gas Calorimeter (Numericals), Cracking – Thermal & catalytic cracking, Octane & Cetane numbers with their significance. High & Low temperature carbonization, Manufacture of coke (Otto – Hoffmann oven) Proximate and ultimate analysis of Coal (Numericals) Combustion of fuels (Numericals).

#### **UNIT II: THE PHASE RULE & CATALYSIS**

Definition of various terms, Gibb's Phase rule & its derivation, Application of phase rule to One component system- The water system, Application of phase rule to Two component system- The Lead-Silver system (Pattinson's process).

Catalyst and its characteristics, Types of catalysts, Concept of promoters, inhibitors and poisons. Theories of catalysis: Intermediate compound formation theory, adsorption or contact theory. Application of catalysts for industrially important processes Enzyme catalysis: Characteristics, Kinetics & Mechanism of enzyme catalysed reaction ( Michaelis-Menten equation), Acid-Base catalysis: Types, Kinetics & Mechanism, Catalysis by metals salts (Wilkinson's Catalyst), Auto-catalysis, Heterogeneous catalysis (Langmuir-Hinshelwood mechanism.

#### **UNIT III: WATER**

Introduction and specifications of water, Hardness and its determination by EDTA method (Numericals), Alkalinity and its determination (Numericals), Reverse Osmosis, Electrodialysis, Disinfection by break-point chlorination. Boiler feed water, boiler problems- scale, sludge, priming & foaming: causes & prevention, Boiler problems- caustic embrittlement & corrosion: causes & prevention, Water Softening by Internal Treatment: carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water Softening by External Treatment: Lime-Soda Process (Numericals) Zeolite & Ion-Exchange Process.

#### **UNIT IV: CORROSION & ITS CONTROL**

Causes, effects & consequences; Chemical or Dry corrosion & its mechanism (Pilling-Bedworth Rule) Electrochemial or Wet Corrosion & Its mechanism, Rusting of Iron Passivity, Galvanic series, Galvanic Corrosion, Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion. Factors Influencing Corrosion: Nature of metal and nature of corroding environment; Protective measures: Galvanization, Tinning Cathodic Protection, Sacrificial Anodic protection, Electroplating, Electroless plating, Prevention of Corrosion by Material selection & Design.

#### **Text Books:**

[T1] P. C. Jain & Monika Jain, Engineering Chemistry, Latest edition, Dhanpat Rai Publishing Co., 2002.

[T2] P. Mathew, Advance Chemistry, 1 & 2 Combined Editions, Cambridge University Press, 2003.

#### **Reference Books:**

- P. W. Atkins and J. De Paula, Atkins' Physical Chemistry, Oxford, 2010. [R1]
- [R2] T. Engel and P. Reid, *Physical Chemistry*, Pearson Education, 2013.
- K. Qanungo, Engineering Chemistry, PHI Learning Private Limited, New Delhi, 2009. [R3]
- [R4] O. G. Palanna, *Engineering Chemistry*, Tata McGraw Hill Education Private Limited, 2012.
- D. A. Jones, *Principles and Prevention of Corrosion*, Prentice Hall, 2<sup>nd</sup> Edition, 1996. [R5]
- H. K. Chopra and A. Parmar, Engineering Chemistry- A Text Book, Narosa Publishing House, 2012. [R6]
- S. Chawla, Engineering Chemistry-All India Edition, Dhanpat Rai & Co., 2003. [R7]
- R. Gadi, S. Rattan and S. Mohapatra, *Environmental Studies*, S.K. Kataria & Sons, 2<sup>nd</sup> Edition 2009. [R8]

# 21

#### **MAXIMUM MARKS: 75**

С

3

[T1,T2][No. of hrs. 08]

[T1,T2][No. of hrs. 08]

[T1,T2][No. of hrs. 08]

#### [T1,T2][No. of hrs. 08]

Т

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L

2

#### **APPLIED PHYSICS LAB – I**

#### Paper Code: ETPH-151 Paper : Applied Physics Lab – I

P C 2 1

#### LIST OF EXPERIMENTS

- 1. To determine the wavelength of sodium light by Newton's Rings.
- 2. To determine the wavelength of sodium light by Fresnel's biprism.
- 3. To determine the wavelength of sodium light using diffraction grating.
- 4. To determine the refractive index of a prism using spectrometer.
- 5. To determine the dispersive power of prism using spectrometer and mercury source.
- 6. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
- 7. To find the wavelength of He-Ne laser using transmission diffraction grating.
- 8. To determine the numeral aperture (NA) of an optical fibre.
- 9. To plot a graph between the distance of the knife-edge from the center of the gravity and the time period of bar pendulum. From the graph, find
  - (a) The acceleration due to gravity
    - (b) The radius of gyration and the moment of inertia of the bar about an axis.
- 10. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil).
- 11. To verify inverse square law.
- 12. To determine Planck's constant.

### **Text Books:**

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand

**Note**: Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.

#### ELECTRICAL TECHNOLOGY LAB

### Paper Code: ETEE 153 Paper: Electrical Technology Lab

L	Р	С
0	2	1

#### LIST OF EXPERIMENTS

- 1. To Design the circuit for a given load and selection of its various Components and instruments from the safety point of view
- Study and applications of CRO for measurement of voltage, frequency and phase of signals. 2.
- 3. Connection of lamp by (1)Single Switch Method.(2) Two-way Switch Method. OR Performance comparison of of fluorescent Tube & CFL Lamp. 4. To Verify Thevenin's & Norton's Theorem OR To Verify Superposition & Reciprocity Theorem. OR To Verify Maximum Power Transfer Theorem. To Measure Power & Power Factor in a Single-Phase A.C Circuit using Three Ammeters or three 5. Voltmeters.
- To Measure Power & Power Factor in a Balanced Three Phase Circuit using Two Single Phase 6. Wattcmeters.
- 7. To study of Resonance in a series R-L-C or Parallel R-L-C Circuits.
- To perform open circuit and short circuit test on 1-phase transformer.
   Starting, Reversing and speed control of DC shunt Motor
- 10. Starting, Reversing and speed control of 3-phase Induction Motor
- 11. To Study different types of Storage Batteries & its charging system.
- 12. To Study different types of earthing methods including earth leakage circuit breaker (GFCI)

#### Note:- Any 8-10 Experiments out of the list may be chosen.

WORKSHOP PRACTICE

#### Paper Code: ETME-155 L Р С **Paper: Workshop Practice** 0 3 2 LIST OF EXPERIMENTS Sheet Metal Shop 1. To study the tools and machineries used in sheet metal shop. 2. To make a tray using sheet metal tools. 3. To make a Funnel using sheet metal tools. 4. To make a cylindrical mug in sheet metal shop. Foundry Shop 5. To make a mould in Foundry Shop. 12 Carpentry Shop 6. To make a half lap T-joint in Carpentry Shop. 7. To make a half cross lap joint in Carpentry Shop. 8. To make a pattern using Carpentry Tools.

#### Welding Shop

9. To study arc and gas welding equipments and tools.

10. To make Lap Joint, T-Joint and Butt Joint in Welding shop.

#### **Fitting Shop**

11. To make V-Section and T-Slot in fitting shop.

#### Machine Shop

12. To study basic operations on lathe, shaper, milling, drilling and grinding machines..

13. To perform step turning, knurling and threading operations on lathe.

14. To prepare a simple job on shaper.

Note:- Any 8-10 Experiments out of the list may be chosen.

#### **ENGINEERING GRAPHICS**

Paper Code: ETME-157	L	Р	С
Paper: Engineering Graphics Lab	0	3	2

#### LIST OF EXPERIMENTS

## UNIT - I

**General**: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications,

**Projections of Point and Lines**: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

# $(T_1, T_2, R_1, R_2, R_3)$

### <u>Unit - II</u>

**Planes other than the Reference Planes**: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

**Projections of Plane Figures**: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

 $(T_1, T_2, R_1, R_2, R_3)$ 

<u>Unit - III</u>

**Projection of Solids:** Simple cases when solid are placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.  $(T_1, T_2, R_1, R_2, R_3)$ 

# <u>Unit-IV</u>

Isometric Projection of plain surface and bodies. Text Books:

[T1] Engineering drawing by N.D.Bhatt (Charotar Publications).

[T2] Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications)

### **Reference Books:**

[R1] Engineering Drawing by Venugopalan, (New Age International).

[R2] Engineering Drawing by P.S.Gill (S.K. Kataria & Sons)

[R3] Engineering Graphics by K.C.John (PHI)

Note:- Any 8-10 Experiments out of the list may be chosen.

# $(T_1, T_2, R_1, R_2, R_3)$

#### FUNDAMENTAL OF COMPUTING LAB

## Paper Code: ETCS 157 Paper: Fundamental of Computing Lab

#### L P 0 2

# LIST OF EXPERIMENTS

I

For program development an IDE e.g. CodeBlock<sup>[a]</sup>, Eclipse CDT <sup>[b]</sup>, Netbeans<sup>[c]</sup> is recommended

- 1. Dismantling a PC Part -1
- 2. Dismantling a PC Part -2
- 3. Internal and External commands of DOS
- 4. System utilities of windows including regedit
- 5. Installation of any rpm or debianlinux distribution with emphasis on drive partitioning
- 6. Installation of rpm and deb based packages
- 7. Understanding of File system of Linux
- 8. Creating user and group (through CLI)
- 9. Understanding and working knowledge of .Libre / Open Office Writer : Editing and Reviewing, Drawing, Tables, Graphs, Templates
- 10. Understanding and working knowledge of Libre / Open Office Calc
- 11. Understanding and working knowledge Libre / Open Office Impress
- 12. Understanding of flow chart development through Dia \*
- 13. Two Mini Projects based on the skills learned in experiments 1-12
  - [ Dia ] <u>http://projects.gnome.org/dia/</u>

Note:- Any 8-10 Experiments out of the list may be chosen.

С

1

#### APPLIED CHEMISTRY LAB

## Paper Code - ETCH-161 Paper : Applied Chemistry Lab

#### Р С 2 1

#### LIST OF EXPERIMENTS

1.	Determination of alkalinity of water sample.
2.	Determination of hardness of water sample by EDTA method.
3.	Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide and sodium chloride.
4.	Determine the amount of oxalic acid and Sulphuric acid in one litre of solution, given standard sodium hydroxide and Potassium Permanganate.
5.	Determine the amount of copper in the copper ore solution, provided hypo-solution (Iodometric Titration).
6.	Determine the amount of chloride ions present in water using silver nitrate (Mohr's Precipitation Method).
7.	Determine the strength of $MgSO_4$ solution by Complexometric titration.
8.	Determine the surface tension of a liquid using drop number method.
9.	Determine the viscosity of a given liquid (density to be determined).
10.	Determine the cell constant of conductivity cell and titration of strong acid/strong base conductometrically.
11.	To determine (a) $\lambda$ max of the solution of KMnO <sub>4</sub> . (b) Verify Beer's law and find out the concentration of unknown solution by spectrophotometer.
12.	Determination of the concentration of iron in water sample by using spectrophotometer.
13.	Determination of the concentration of Iron (III) by complexometric titration.
14.	Proximate analysis of coal.
15.	Determination of eutectic point and congruent melting point for a two component system by method of cooling curve.

(At least 8 to 10 experiments are to be performed)

#### **Suggested Books:**

- <u>A. I. Vogel</u>, <u>G. H. Jeffery</u>, *Vogel's Text Book of Quantitative Chemical Analysis*, Published by Longman Scientific & Technical, 5<sup>th</sup> Edition, 1989. 1.
- S. Chawla, *Essentials of Experimental Engineering Chemistry*, Dhanpat Rai & Co., 3<sup>rd</sup> Edition, 2008. S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria & Sons, 2<sup>nd</sup> Edition, 2003. 2.
- 3.
- O. P. Pandey, D. N. Bajpai and S. Giri, Practical Chemistry, Published by S. Chand, 2005. 4.
- 5. M. S. Kaurav, Engineering Chemistry with Laboratory Experiments, Published by PHI Learning Private Limited, 2011.
- S. K. Bhasin and Sudha Rani, Laboratory Manual on Engineering Chemistry, Published by Dhanpat Rai 6. Publishing Company, 2006.

Note:- Any 8-10 Experiments out of the list may be chosen.

#### APPLIED MATHEMATICS-II

Paper Code	: ETMA-102	L	Т	С
Paper: APPLIE	D MATHEMATICS-II	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

#### Unit –I

Partial differentiation and its Applications: Partial derivatives of first and second order. Euler's theorem for homogeneous functions (without proof). Derivatives of Implicit Functions, total derivatives. Change of variables. Jacobian. Taylor's theorem for function of two variables(without proof). Error and approximation. Extreme values of function of several variables(maxima, minima, saddle points). Lagrange method of undetermined multipliers. Partial differential equations: Formulation, solution of first order equations, Lagranges equations, Charpit's method.

#### [T2][No. of 12hrs.]

Unit-II Laplace Transformation: Definition, Laplace transformation of basic functions, existence condition for Laplace transformation, Properties of Laplace transformation(Linearity, scaling and shifting). Unit step function, Impulse Function, Periodic Functions. Laplace transformation of derivatives, Laplace transformation of integrals, differentiation of transforms, Integration of transforms, Convolution theorem ,inverse Laplace transformation. Solution of ordinary Differential equations.

#### [T1, T2][No. of 12hrs.]

#### **Unit-III**

Complex Function: Definition, Derivatives, Analytic function, Cauchy's Riemann equation (without proof). Conformal and bilinear mappings, Complex Integration: Complex Line integration, Cauchy's integral theorem and integral formula(without proof). Zeros and Singularities, Taylor's and Laurent's series (without proof). Residues, Residue theorem (without proof). Evaluation of real definite integrals: Integration around the unit circle, Integration around a small semi circle and integration around rectangular contours.

#### Unit-IV

Multiple integrals: Double integrals, Change of order of integration, Triple integrals. Vector Calculus: Scalar and vector functions, Gradient, Divergence and curl. Directional derivatives, Line Integrals. Surface integrals, volume integrals. Green's theorem, Stoke's theorem and Gauss divergence theorem (without proof).

[T1, T2][No. of 12hrs.]

[T1,T2][No. of 12hrs.]

#### Text:

- [T1]. E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [T2] Michael Greenberg, "Advance Engineering mathematics", Pearson.

#### **References:**

- [R1] R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications
- [R2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
- [R3] S. Ponnusamy, "Foundation of Complex Analysis" Narosa Publication
- [R4] G.B. Thomas and R. N. Finny "Calculus and Analytic Geometry" Addison Wesley/ Narosa
- Wylie R, "Advance Engineering mathematics", McGraw-Hill [R5]
- M. Spiegel, "Schaum's Outline on Laplace Transform, Tata McGraw-Hill [R6]

Maximum Marks: 75

#### <u>APPLIED PHYSICS – II</u>

Paper Code: ETPH-104	L	Т	С
Paper : APPLIED PHYSICS – II	2	1	3

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

#### UNIT I

**Electromagnetic Theory** : Gradient, Divergence, Curl, Gauss' law, Ampere's Law, Continuity equation, Maxwell's equations (differential and integral forms), Significance of Maxwell's equations, Poynting Theorem, Electromagnetic wave propagation in dielectrics and conductors.

#### [T1], [T2][No. of Hrs. 8]

#### UNIT II

**Statistical Physics:** Black body radiation, Planck's radiation formula, Wien's and Rayleigh-Jeans Laws, Distribution laws: Qualitative features of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics & their comparison (without derivation).

**Quantum Mechanics:** Postulates of Quantum mechanics, de-Broglie hypothesis, Davisson Germer experiment, Wave function and its physical significance, Wave Packet, Phase and group velocities, Uncertainty principle, Schrodinger equation for free particle, Time dependent Schrodinger equation, Particle in a box (1-D).

#### [T1][T2][No. of Hrs. 8]

[T1], [T2][No. of Hrs. 8]

#### UNIT III

**Crystal Structure:** Types of solids, Unit cell, Types of crystals, Translation vectors, Lattice planes, Miller indices, Simple crystal structures, Interplaner spacing, Crystal structure analysis: Bragg's law, Laue method, Point defects: Schottcky and Frankel defects.

#### UNIT IV

**Band Theory of Solids:** Introduction, Kronig-Penney model: E-k diagram, Effective mass of an electron, Intrinsic semiconductors: Electron concentration in conduction band, Hole concentration in valence band, Extrinsic semiconductor: p-type and n-type semiconductors, Fermi level, Hall Effect: Hall voltage and Hall coefficient.

#### [T1][T2][No. of Hrs. 8]

#### **Text Books:**

[T1]. Arthur Beiser 'Concepts of Modern Physics', [McGraw-Hill], 6<sup>th</sup> Edition 2009.

[T2]. A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6<sup>th</sup> Edition, 2013.

## **Reference Books**

- [R1]. Richard Wolfson 'Essential University Physics' Pearson, Ist edition, 2009.
- [R2]. H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], I<sup>st</sup> Edition, 2009.
- [R3]. C. Kittle, 'Mechanics', Berkeley Physics Course, Vol.- I. Latest Edition.
- [R4]. Irving Kaplan 'Nuclear Physics' Latest Edition.
- [R5]. John R. Taylor, Chris D. Zafirator and Michael A. Dubson, 'Modern Physics For Scientists and Engineers', PHI, 2<sup>nd</sup> Edition.
- [R6]. D.J. Griffith, 'Introduction to Electrodynamics', Prentice Hall, Latest Edition.

# MAXIMUM MARKS: 75

#### **ELECTRONIC DEVICES**

Paper	Code: ETEC-106
Paper	: Electronic Devices

#### MAXIMUM MARKS: 75

L

3

Т

0

С

3

#### **INSTRUCTIONS TO PAPER SETTERS:** 1. This is the first introductory course in Elect

- This is the first introductory course in Electronics Engineering to the students of all the branches of engineering during the first year.
- 2. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions from each unit. It should be of 25 marks.
- 3. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Objective of the paper is to facilitate the student with the basics of electronic aspects that are required for his understanding and applications in their respective field of study. The pre-requisites are, to have a basic understanding of Applied Physics and Mathematics.

#### Unit-I

Evaluation Of Electronics: Introduction & Application Of Electronics, Energy Band Theory Of Crystals, Energy Band Structures In Metals, Semiconductors And Insulators, Theory Of Semiconductors: Classification Of Semiconductors, Conductivity Of Semiconductors, Carrier Concentration In Intrinsic & Extrinsic Semiconductors, Properties Of Intrinsic And Extrinsic Semiconductors, Variation In Semiconductors Parameters With Temperature, Fermi-Dirac Function, Fermi Level In A Semiconductor Having Impurities, Band Structure Of Open-Circuited P-N Junction, Drift And Diffusion Currents, Carrier Life Time, Continuity Equation (Elementary Treatment Only)

#### [T1][T2][T3][No. Of Hours: 12]

#### Unit – II

**Theory of p-n junction Diode:** Diode Current Equation, Diode Resistance, Transition Capacitance, Diffusion Capacitance, (Elementary treatment only), Effect of Temperature on p-n Junction Diode, Switching Characteristics, Piecewise Linear Model, **Special Diodes:** Zener Diode, Varactor Diode, Tunnel Diode, Photodiode, Light Emitting Diodes, Schottky Barrier Diode, **Applications of Diodes:** Half-Wave Diode Rectifier, Full-Wave Rectifier, Clippers and Clampers (Elementary treatment only).

#### [T1][T2][T3][No. of Hours: 11]

# Unit – III

**Bipolar junction transistor:** Introduction of transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-moll's model.

# [T1][T2][T3][No. of Hours: 11]

#### Unit – IV

**Application of BJT:** CB, CE, CC configurations, hybrid model for transistor at low frequencies, Introduction to FETs and MOSFETs.

**Fundamentals of digital electronics:** Digital and analog signals, number systems, Boolean algebra, logic gates with simple applications, logic gates, karnaugh maps.

#### [T1][T2][T3][No. of Hours: 11]

- Text Books
- [T1] S. Salivahanan, N. Suresh Kr. & A. Vallavaraj, "Electronic Devices & Circuit", Tata McGraw Hill, 2008
- [T2] Millman, Halkias and Jit, "Electronic devices and circuits" McGraw Hill
- [T3] Boylestad & Nashelsky, "Electronic Devices & Circuits", Pearson Education, 10<sup>TH</sup> Edition.

#### **Reference Books**

- [R1] Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, VI Edition
- [R2] Robert T. Paynter, "Introducing Electronic Devices & Circuits", Pearson Education, VII Edition, 2006

# INTRODUCTION TO PROGRAMMING

Paper Code: ETCS-108	L	Т	С
Paper: Introduction to Programming	3	0	3

# INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

*Objective: The objective of the paper is to facilitate the student with the basics of programming aspects, using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the first course on programming and does not assume any prerequisite.* 

# UNIT I

Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC), Assembler, linker and loader, Structure of a simple Hello World Program in C, Overview of compilation and execution process in an IDE (preferably Code Block)

# UNIT II

Programming using C: Preprocessor Directive, C primitive input output using get char and put char, simple I/O Function calls from library, data type in C including enumeration, arithmetic, relational and logical operations, conditional executing using if, else, switch and break. Concept of loops, for, while and do-while, Storage Classes: Auto, Register, Static and Extern

# [T1], [T2], [R7][No. of hrs 8]

[T1],[T2], [R4][R5][No. of hrs 8]

UNIT III

Arrays (one and two dimensional), 2-d arrays used in matrix computation. Concept of Sub-programming, functions. Parameter transmission schemes i.e. call by value and call by reference, Pointers, relationship between array and pointer, Argument passing using pointers, Array of pointer, passing arrays as arguments

#### [T2], [R1], [R7][No. of hrs 8]

# UNIT IV

Structure and unions, Strings and C string library, File Handling in C Using File Pointers, fopen(), fclose(), Input and Output using file pointers, Character Input and Output with Files, String Input / Output Functions, Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files, Positioning the File Pointer

#### **Text Books:**

- [T1] Herbert Schildt, "C: The Complete Reference", OsbourneMcgraw Hill, 4th Edition, 2002.
- [T2] Forouzan Behrouz A. "Computer Science: A Structured Programming Approach Using C, Cengage Learning 2/e

# **Reference Books:**

- [R1] Kernighan & Ritchie, "C Programming Language", The (Ansi C version), PHI, 2/e
- [R2] K.R Venugopal, "Mastering C", TMH
- [R3] R.S. Salaria "Application Programming in C " Khanna Publishers4/e
- [R4] Yashwant Kanetkar "Test your C Skills", BPB Publications
- [R5] http://www.codeblocks.org/
- [R6] <u>http://gcc.gnu.org/</u>
- [R7] Programming in ANSI C, E. Balagurusamy; Mc Graw Hill, 6<sup>th</sup> Edition.

[T1], [T2], [R2] [R7] [No. of hrs 8]

#### ENGINEERING MECHANICS

Paper Code: ETME 110	L	Т	С
Paper: Engineering Mechanics	2	1	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

- Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or 1. short answer type questions. It should be of 25 marks.
- 2. Apart from Ouestion No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

# OBJECTIVE: THE OBJECTIVE OF THE PAPER IS TO GIVE THE BASIC PRINCIPLES OF MECHANIC APPLIED IN DIFFERENT DISCIPLINES OF ENGINEERING.

#### UNIT-I

Force system: Free body diagram, Parallel force system, concurrent force system, Equilibrium equations and applications in different force systems.

Friction: Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, Belt drive- derivation of equation  $T_1/T_2 = e^{\mu\theta}$  and its application, M.A, V.R and Efficiency of Screw Jack, Application of friction in pivot and collar bearing...

# [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### UNIT-II

Structure: Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section, graphical method.

**Distributed Force**: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertia.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### **Unit-III**

Kinematics of Particles: Rectilinear motion, plane curvilinear motion-rectangular coordinates, normal and tangential component.

Kinetics of Particles: Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum, conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### Unit-IV

Kinematics of Rigid Bodies: Concept of rigid body, type of rigid body motion, absolute motion, introduction to relative velocity, instantaneous center of velocity, Velocity polygons for four bar mechanism and single slider mechanism.

Kinetics of Rigid Bodies: Equation of motion, translatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### **Text Books:**

- Engg Mechanics by A.K.Tayal (Umesh Publications). [T1]
- [T2] Engg Mechanics by Basudeb Bhattacharya (Oxford university Press)

#### **Reference Books:**

- Engg Mechanics by Irving H. Shames (Pearson publications). [R1]
- Engg Mechanics by U.C.Jindal (Galgotia Publications). [R2]
- Engg Mechanics by Beer & Johnston( TMH). [R3]
- [R4] Engg Mechanics by K.L.Kumar (TMH).

Shear force and bending Moment Diagram.

Engg Mechanics by Sadhu Singh (Khanna Publishers). [R5]

#### **COMMUNICATION SKILLS**

P	Paper: Communication Skills	2	1	3
P	Paper Code: ETHS – 112	L	Т	С

#### INSTRUCTIONS TO PAPER SETTERS: 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enhance the language and communication competence of professional students with emphasis on English for Specific Purposes (ESP) through communication skills related activities.

#### UNIT-I

I. Basic Remedial Grammar (Errors in Parts of Speech, Tenses, Verbs and Modal; Reported Speech; Active and Passive Voice; Conditional clauses; Question Tags and Short Responses) [T1],[R2],[R3][No. of hrs 06]

#### **UNIT-II**

II. Vocabulary and usage (Synonyms and Antonyms; Suffixes and Prefixes; Homophones and Homonyms; Oneword substitution; Prepositions; Phrasal verbs and Idioms, Indianism)

# **UNIT-III**

**(A)** 

I. Types of writing (Expository, Descriptive, Narrative, Analytical and Argumentative)

II. Definition, description and explanation of scientific objects, instruments and processes etc.

III. Interpretation and use of charts, graphs and tables in technical writing.[T1],[R1]

**(B)** 

- I. Paragraph writing
- II. Precis writing
- III. Comprehension [T1],[R2],[R3]

#### **UNIT-IV**

- Reading different types of texts (speed and purpose)[T1] T
- II. Reading five essays [T2]
- III. E.M. FORSTER. What I Believe JAMES BRYCE, Some Hints on Public Speaking IV.
- V. L.A. HILL, Principles of Good Writing
- VI. A.P.J. ABDUL KALAM, Work Brings Solace
- VII. SALIM ALI, Man and Nature in India: The Ecological Balance

#### **TEXT BOOKS**

- [T1] Technical Communication: Principles and practice (OUP), (Meenakshi Raman and Sangeeta Sharma) **OXFORD UNIVERSITY PRESS**
- [T2] Communication Skills for Engineers, Murli Krishna, Pearson.
- Wren and Martin: High School English Grammar and Composition; S. Chand [T3]
- Exploration of Ideas; An Anthology of Prose: Orient Blackswan. [T4]

#### **REFERENCE BOOKS:**

- Professional Communication: Aruna Koneru, MCGRAW HILLS EDUCATION PVT. LTD [R1]
- Wren and Martin: High School English Grammar and Composition; S. Chand [R2]
- Advanced English Grammar and Composition: Gurudas Mukherjee & Inidbar Mukherjee; (ANE BOOKS [R3] PVT. LTD.)

# **MAXMIUM MARKS: 75**

[No. of hrs 10]

[T1],[R2],[R3][No. of hrs 06]

(Pg-123) (Pg-135)

(Pg-150) (Pg-207)

(Pg-213)

[No. of hrs 10]

#### **ENVIRONMENTAL STUDIES**

Paper Code: ETEN-114	L	Т	С
Paper : Environmental Studies	2	1	3

#### **INSTRUCTIONS TO PAPER SETTER:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Each unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each

**Objective:** The objective of this course is to make students environment conscious. They will be exposed through the fundamental concepts of environment and ecosystem so that they can appreciate the importance of individual and collective efforts to preserve and protect our environment. This course must raise various questions in student's mind that how our environment is inter dependent on various factors and how human being must care for their natural surroundings.

#### UNIT I: Environmental Studies: Ecosystems, Bio-diversity and its Conservation

#### (i) The Multidisciplinary Nature of Environmental Studies-

Definition, scope and importance of Environmental Studies. Biotic and a biotic component of environment, need for environmental awareness.

#### (ii) Ecosystems

Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structures and function of the following ecosystem:

(a) Forest ecosystem

(b) Grassland ecosystem

(c) Desert ecosystem

(d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

#### (iii) Bio-diversity and its Conservation

Introduction to biodiversity —definition: genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity : Habitat loss, Poaching of wildlife, man-wildlife conflicts, rare endangered and threatened species(RET) endemic species of India, method of biodiversity conservation: *In-situ* and *ex-situ* conservation.

#### [T1], [R3][No. of hrs. 08]

#### **UNITII: Natural Resources: problems and prospects**

(i) Renewable and Non-renewable Natural Resources

Concept and definition of Natural Resources and need for their management

- *Forest resources:* Use and over-exploitation, deforestation, case studies, timber extraction, mining, dams and their effects on forests and tribal people.
- *Water resources:* Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems, Water conservation, rain water harvesting, watershed management.
- *Mineral resources:* Uses are exploitation, environmental effects of extracting and using mineral resources, case studies.
- *Food resources:* World food problems, changes causes by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- *Energy resources:* Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Urban problems related to energy, case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

[T1], [R3][No. of hrs. 08]

#### **UNIT III: Environmental Chemistry and Pollution Control**

# (i) Chemistry of Environment

(a) Green Technology

Principles of Green technology, Zero Waste Technology, Green Chemistry & Its basic principles, Atom Economy, Green Methodologies. clean development mechanisms (CDM), concept of environmental impact assessment,

(b) Eco-Friendly polymers

Environmental degradation of polymers, Biodegradable, Photo-biodegradable polymers, Hydrolysis & Hydrobiodegradable, Biopolymers & Bioplastics: polylactic acid, polyhydroxybutyrate, polycaprolactone,. Concept of bioremediation.

#### (ii)Environmental Pollution

Definition, types, causes, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g) Nuclear hazards. Pollution case studies. Solid waste and its management: causes, effects and control measures of urban and industrial waste.

Chemical toxicology-Terms related to toxicity, impact of chemicals (Hg, As, Cd, Cr, Pb) on environment.

[T1], [R3][No. of hrs. 08]

#### UNIT IV: Disaster Management, Social Issues, Human Population and the Environment

#### Disaster Management

Disaster management: floods, earthquake, cyclone and land-slides, nuclear accidents and holocaust, case studies.

#### (ii) Social Issues, Human Population and the Environment

Sustainable development, Climate change, global warming, acid rain, ozone layer depletion, Environmental ethics: Issues and possible solutions, Consumerism and waste products, , Wasteland reclamation. Population growth, problems of urbanisation.

Environment Protection Act, 1986; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and Control of Pollution) Act, 1974; Wildlife Protection Act, 1972; Forest Conservation Act, 1980; Environmental management system standards-ISO 14000 series.

#### [T1][No. of hrs. 08]

#### **Text Books:**

- [T1] E. Barucha, *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press (India) Pvt. Ltd., 2005.
- [T2] S. Chawla, A Textbook of Environmental Studies, McGraw Hill Education Private Limited, 2012

#### **References Books:**

- [R1] G. T. Miller, *Environmental Science*, Thomas Learning, 2012
- [R2] W. Cunningham and M. A. Cunningham, *Principles of Environment Science: Enquiry and Applications*, Tata McGraw Hill Publication, N. Delhi, 2003.
- [R3] R. Rajagopalan, *Environmental Studies*: From Crisis to Cure, 2<sup>nd</sup> Edition, Oxford University Press, 2011.
- [R4] A.K. De, Environmental Chemistry, New Age Int. Publ. 2012,
- [R5] A. Kaushik and C.P. Kaushik, Perspectives in Environment Studies, 4<sup>th</sup> Edition, New Age International Publishers, 2013
- [R6] Environmental Engineering by Gerard Kiely, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2010.

#### APPLIED PHYSICS LAB – II

#### Paper Code: ETPH-152 Paper: Applied Physics Lab – II

Р	С		
2	1		

# LIST OF EXPERIMENTS

- 1. To determine the e/m ratio of an electron by J.J. Thomson method.
- 2. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave signals from two signal generators.
- 3. To determine the frequency of A.C. mains by using Sonometer.
- 4. To determine the frequency of electrically maintained tuning fork by Melde's method.
- 5. Computer simulation (simple application of Monte Carlo): Brownian motion, charging & discharging of a capacitor.
- 6. To study the charging and discharging of a capacitor and to find out the time constant.
- 7. To study the Hall effect.
- 8. To verify Stefan's law.
- 9. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
- 10. To study the I-V characteristics of Zener diode.
- 11. To find the thermal conductivity of a poor conductor by Lee's disk method.
- 12. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.

#### **Suggested Books:**

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand, Latest edition.

**Note**: Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.

# 2

#### **Electronic Devices**

# Paper Code:ETEC-156Paper:Electronic Devices Lab

# P C 2 1

# LIST OF EXPERIMENTS

- 1. Introduction to C.R.O, Function Generator Bread Board Kit & to generate different types of waveform with the help of Function Generator & to calculate their frequency, amplitude AC & DC voltage.
- 2. Identification & testing of Active & passive components
- 3. To plot V-I characteristics of a semiconductor diode & Calculate Static & Dynamic Resistance
- 4. To Study the Reverse characteristics of Zener diode
- 5. To Study the Rectifier circuit.
  - a) Half Wave Rectifier
  - b) Centre Tapped Rectifier.
    - c) Bridge Rectifier.
- 6. To Study the output waveforms of different Filter Ckts of Rectifier.
- 7. To Plot Input & Output characteristics CB transistor.
- 8. To Plot Input & Output characteristics of CE transistor.
- 9. Realization of basic gates.
- 10. Implementation of Boolean functions (two or three variables).
- 11. Few experiments mentioned above to be performed on P-spice.
- 12. To develop a working model of any electronic circuit.

Note:- Any 8-10 Experiments out of the list may be chosen.

# **ENGINEERING MECHANICS LAB**

# Paper Code: ETME-158 Paper: Engineering Mechanics Lab

#### **LIST OF EXPERIMENTS:**

1. To verify the law of Force Polygon

2. To verify the law of Moments using Parallel Force apparatus. (simply supported type)

3. To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.

wood, Aluminum) on an inclined plane.

4. To find the forces in the members of Jib Crane.

5. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.

6. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle

7. To determine the MA, VR,  $\Box \Box$  of Worm Wheel (2-start)

8. Verification of force transmitted by members of given truss.

9. To verify the law of moments using Bell crank lever

10. To find CG and moment of Inertia of an irregular body using Computation method.

Note:- Any 8-10 Experiments out of the list may be chosen.

С

1

Р

2

	PROGRAMMING LAB		
Paper (	Code : ETCS 154	Р	С
Paper	: Programming Lab	2	1
_	LIST OF EXPERIMENTS	_	
_	gram development an IDE e.g. CodeBlock <sup>[a]</sup> , Eclipse CDT <sup>[b]</sup> , Netbeans <sup>[c]</sup> is recommended	1	
1.	Write a program to find divisor or factorial of a given number.		
2.	Write a program to find sum of a geometric series		
3.	Write a recursive program for tower of Hanoi problem		
4.	Write a recursive program to print the first m Fibonacci number		
5.	Write a menu driven program for matrices to do the following operation		
	depending on whether the operation requires one or two matrices		
Ad	dition of two matrices		
	ptraction of two matrices		
Fin	ding upper and lower triangular matrices		
Tra	inspose of a matrix		
Pro	duct of two matrices.		
6.	Write a program to copy one file to other, use command line arguments.		1
7.	An array of record contains information of managers and workers of a company.		
	Print all the data of managers and workers in separate files.		
8.	Write a program to perform the following operators an Strings without using String		
	functions		
	To find the Length of String.		
	To concatenate two string.		
	To find Reverse of a string.		
	To Copy one sting to another string.		
9.	Write a Program to store records of an student in student file. The data must be stored		
	using Binary File.Read the record stored in "Student.txt" file in Binary code.Edit the	record	d stored in
	Binary File. Append a record in the Student file.		
10.	Write a programmed to count the no of Lowercase, Uppercase numbers and special		
	Characters presents in the contents of File.		
11.	Two Mini Projects based on the skills learned in experiments 1-10 [ These mini project	s mav	be done in
	a group not exceeding group size of 4 ]	2	
	[a] http://www.codeblocks.org/		

- [b] http://www.eclipse.org/cdt/
  [c] https://netbeans.org/features/cpp/

Note:- Any 8-10 Experiments out of the list may be chosen.

# ENVIRONMENTAL STUDIES LAB

#### Paper Code - ETEN-160 **Paper : Environmental Studies Lab**

# LIST OF EXPERIMENTS

- 1. Determination of pH, conductivity and turbidity in drinking water sample. 2.
  - Determination of pH and conductivity of soil/sludge samples.
- Determination of moisture content of soil sample. 3.
- 4. Determination of Total Dissolved Solids (TDS) of water sample.
- 5. Determination of dissolved oxygen (DO) in the water sample.
- 6. Determination of Biological oxygen demand (BOD) in the water sample.
- Determination of Chemical oxygen demand (COD) in the water sample. 7.
- 8. Determination of Residual Chlorine in the water sample.
- 9. Determination of ammonia in the water sample.
- 10. Determination of carbon dioxide in the water sample.
- 11. Determination of nitrate ions or sulphate ions in water using spectrophotometer.
- 12. Determination of the molecular weight of polystyrene sample using viscometer method.
- 13. Base catalyzed aldol condensation by Green Methodology.
- 14. Acetylation of primary amines using eco-friendly method.
- 15. To determine the concentration of particulate matter in the ambient air using High Volume Sampler.

**P.S.**: For better understanding of various aspects of environment visits to local areas, depending upon easy access and importance may be planned to any nearby river, forest, grassland, hills and students should write a report based on their observations.

**Suggested Books:** 

- <u>A. I. Vogel</u>, <u>G. H. Jeffery</u>, *Vogel's Text Book of Quantitative Chemical Analysis*, Published by Longman Scientific & Technical, 5<sup>th</sup> Edition, 1989. 1.
- dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments). 2.
- S. Chawla, *Essentials of Experimental Engineering Chemistry*, Dhanpat Rai & Co., 3<sup>rd</sup> Edition, 2008. 3.
- S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria & Sons, 2<sup>nd</sup> Edition, 2003. 4.
- W. Cunningham and M. A. Cunningham, Principles of Environment Science: Enquiry and Applications, 5. Tata McGraw Hill Publication, N. Delhi, 2003.
- A. Kaushik and C. P. Kaushik, Perspectives in Environment Studies, 4th Edition, New Age International 6. Publishers, 2013.

Note:- Any 8-10 Experiments out of the list may be chosen.

Р

2

### APPLIED MATHEMATICS-III

Paper Code: ETMA-201	L	T/P	С
Paper: Applied Mathematics-III	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of this course is to teach the students the applications of fourier series, fourier transform, difference equation and numerical methods to solve various engineering problems.

### UNIT-I

Fourier series: Definition, Euler's formula, conditions for Fourier expansion, functions having points of discontinuity, change of intervals, even and odd functions half range series, Harmonic analysis. Fourier Transforms: Definition, Fourier integral, Fourier transform, inverse Fourier transform, Fourier sine and cosine transforms, properties of Fourier transforms (linearity, scaling, shifting, modulation), Application to partial differential equations.

### UNIT-II

Difference equation: Definition, formation, solution of linear difference equation with constant coefficients, simultaneous difference equations with constant coefficients, applications of difference equations .Z- transform: Definition, Z- transform of basic functions, properties of Z-transform (linearity, damping, shifting, multiplication), initial value theorem, final value theorem, convolution theorem, convergence of Z- transform, inverse of Z- transform, Application to difference equations.

#### [T2][No. of hrs 11]

[T2][No. of hrs 11]

UNIT-III

Numerical Methods: Solution of algebraic and transcendental equations using bisection method, Regula-Falsi method and Newton – Raphson method. Solution of linear simultaneous equations using Gauss-Jacobi's iteration method and Gauss-Seidal's iteration methods.Finite differences: Forward differences, backward differences and Central differences. Interpolation: Newton's interpolation for equi-spaced values. Stirling's central differences interpolation formula, Divided differences and interpolation formula in terms of divided differences , Lagrange's interpolation formula for unequi-spaced values.

### UNIT-IV

Numerical Differentiation, maxima and minima of a tabulated function. Numerical Integration: Newton-Cote's quadrature formula, Trapezoidal rule, Simpson's one-third rule and Simpson's three-eighth rule .Numerical solution of ordinary differential equations: Picard's method, Taylor's method, Euler's method, modified Euler's method, Runge-Kutta method of fourth order.

#### [T1,T2][No. of hrs 11]

[T1,T2] [No. of hrs 11]

- Text Books:
- [T1] R.K. Jain and S.R.K. Iyengar," Numerical methods for Scientific and Engineering Computation", New Age Publishing Delhi-2014.
- [T2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications, 2014 Edition.

#### **Reference Books:**

- [R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [R2] P. B. Patil and U. P. Verma, "Numerical Computational Methods", Narosa
- [R3]. Partial Differential Equations" Schaum's Outline Series, McGraw Hill.
- [R4] Michael Greenberg, "Advance Engineering mathematics", Pearson.
- [R5] Schaum's Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw-Hill

# Maximum Marks : 75

# FOUNDATION OF COMPUTER SCIENCE

Paper Code: ETCS-203	L	Т	С
Paper: Foundation of Computer Science	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: Objective: To give basic knowledge of combinatorial problems, algebraic structures and graph theory.

#### UNIT- I

**UNIT-II** 

Formal Logic: Preposition, Symbolic Representation and logical entailment theory of Inferences and tautologies, Predicates, Quantifiers, Theory of inferences for predicate calculus, resolution. Techniques for theorem proving: Direct Proof, Proof by Contraposition, proof by contradiction.

#### [T1,T2][No. of hrs. 10]

[T1,T2][No. of hrs. 12]

Overview of Sets and set operations, permutation and combination, principle of inclusion, exclusion (with proof) and pigeonhole principle (with proof), Relation, operation and representation of a relation, equivalence relation, POSET, Hasse Diagrams, extremal Elements, Lattices, composition of function, inverse, binary and n-ary operations.

#### UNIT- III

Principle of mathematical induction, principle of complete induction, solution methods for linear and non-linear first-order recurrence relations with constant coefficients, Graph Theory: Terminology, isomorphic graphs, Euler's formula (proof) ,chromatic number of a graph, five color theorem(with proof), Euler &Hamiltonian paths. [T1,T2][No of hrs 11]

#### UNIT-IV

Groups, Symmetry, subgroups, normal subgroups, cyclic group, permutation group and cayles's theorem(without proof), cosets lagrange's theorem(with proof) homomorphism, isomorphism, automorphism, rings, Boolean function, Boolean expression, representation & minimization of Boolean function.

# [T1,T2][No of hrs 11]

#### **Text Books:**

- [T1] Norman L. Biggs, "Discrete Mathematics", Oxford, second edition.
- [T2] Keneth H. Rosen, "Discrete Mathematics and Its Applications", TMH, seventh edition.

#### **Reference Books:**

- [R1] Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI, 1996.
- [R2] C.L. Liu, "Elements of Discrete Mathematics", TMH, 2000.
- [R3] J. P. Trembly& P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1997.

#### Maximum Marks: 75

#### SWITCHING THEORY AND LOGIC DESIGN

Paper Code: ETEC-205	L
Paper: Switching Theory and Logic Design	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

T/P

1

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.

#### UNIT- I

Number Systems and Codes:- Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.

**Switching Theory:** - Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions-Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.

**Combinational Logic Circuits:**- Review of basic gates- Universal gates, Adder, Subtractor ,Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

#### UNIT- II

Integrated circuits: - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.

Sequential Logic Circuits: - Latches and Flip Flops- SR, , D, T and MS-JK Flip Flops, Asynchronous Inputs. Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters , Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

### [T2,T3][No. of hrs. 10]

[T2,T3][No. of Hrs. 14]

### UNIT- III

**Synchronous Sequential Circuits**:- State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and merger chart methods-concept of minimal cover table.

#### UNIT- IV

[T1][No. of hrs. 10]

[T1][No. of hrs. 10]

Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.

**Fault Detection and Location:** Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

### **Text Book:**

- [T1] Zyi Kohavi, "Switching & Finite Automata Theory", TMH, 2<sup>nd</sup> Edition
- [T2] Morris Mano, Digital Logic and Computer Design", Pearson
- [T3] R.P. Jain, "Modern Digital Electronics", TMH, 2<sup>nd</sup> Ed,

#### **Reference Books:**

- [R1] A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
- [R2] Taub ,Helbert and Schilling, "Digital Integrated Electronics", TMH

C 4

#### **CIRCUITS & SYSTEMS**

Paper Code: ETEE 207	L	T/P	С
Paper: Circuits & Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Q. No.1 rest of the paper shall consist of four units as per the syllabus, every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The purpose of this course is for each student to learn and further explore the techniques of advanced circuit analysis. The concepts and analytical techniques gained in this course (e.g., signals, Laplace transformation, frequency response) will enable students to build an essential foundation of many fields within electrical engineering, such as control theory, analog electronic circuits, signal processing.

# UNIT-I

Introduction to signals, their classification and properties, different types of systems, LTI systems and their properties, periodic waveforms and signal synthesis, properties and applications of Laplace transform of complex waveform.

#### UNIT-II

System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuits for impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform.

#### [T1,T2][No. of Hours: 12]

[T1,T2][No. of Hours: 10]

# UNIT-III

Graph theory: concept of tree, tie set matrix, cut set matrix and application to solve electric networks.

Two port networks – Introduction of two port parameters and their interconversion, interconnection of two 2-port networks, open circuit and short circuit impedances and ABCD constants, relation between image impedances and short circuit and open circuit impedances. Network functions, their properties and concept of transform impedance, Hurwitz polynomial.

#### [T1,T2][No. of Hours: 10]

#### Unit IV

Positive real function and synthesis of LC, RC, RL Networks in Foster's I and II, Cauer's I& II forms, Introduction of passive filter and their classification, frequency response, characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section.

#### [T1,T2][No. of Hours: 10]

#### **Text Books:**

[T1] W H Hayt "Engineering Circuit Analysis" TMH Eighth Edition

[T2] D. R. Choudhary, "Networks and Systems" New Age International, 1999.

#### **Reference Books**

- [R1] S Salivahanan "Circuit Theory" Vikas Publishing House 1<sup>st</sup> Edition 2014
- [R2] Valkenburg, "Network analysis" PHI, 2000.
- [R3] Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design" Umesh publication, 2000.
- [R4] Kuo, "Network analysis and synthesis" John Weily and Sons, 2<sup>nd</sup> Edition.
- [R5] Allan H Robbins, W.C.Miller "Circuit Analysis theory and Practice" Cengage Learning Pub 5<sup>th</sup> Edition 2013
- [R6] Bell "Electric Circuit" Oxford Publications 7<sup>th</sup> Edition

#### Maximum Marks: 75

#### **DATA STRUCTURES**

Paper Code: ETCS-209	L	Т	С
Paper: Data Structures	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand the programming and the various techniques for enhancing the programming skills for solving and getting efficient results.

#### **UNIT – 1:**

Introduction to programm ing methodologies and design of algorithms. Abstract Data Type, array, array organization, sparse array. Stacks and Stack ADT, Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.

#### UNIT – II:

Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expression trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

#### UNIT – III:

Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B\* and B+ Trees. Graphs, Graph representation, Graph traversal. [T1,T2][No. of hrs. 12]

#### UNIT – IV:

Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (only 2-way merge sort). Searching – List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

#### [T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

#### **Text Books:**

- [T1] R. F. Gilberg, and B. A. Forouzan, "Data structures: A Pseudocode approach with C", Thomson Learning.
- [T2] A.V. Aho, J. E. Hopcroft, J. D. Ulman "Data Structures and Algorithm", Pearson Education.

#### **Reference Books:**

- [R1] S. Sahni and E. Horowitz, "Data Structures", Galgotia Publications.
- [R2] Tanenbaum: "Data Structures using C", Pearson/PHI.
- [R3] T.H. Cormen, C.E. Leiserson, R.L. Rivest "Introduction to Algorithms", PHI/Pearson.
- [R4] A.K.Sharma, "Data Structures", Pearson
- [R5] Ellis Horowitz and Sartaz Sahani "Fundamentals of Computer Algorithms", Computer Science Press.

# Maximum Marks: 75

#### **COMPUTER GRAPHICS & MULTIMEDIA**

Paper Code: ETCS-211	
Paper: Computer Graphics & Multimedia	

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand various aspects of media and to learn the concept of sound, images and videos.

#### UNIT- I

Introduction, Applications areas, Components of Interactive Computer Graphics System. Overview of Input devices, Output devices, raster scan CRT displays, random scan CRT displays. DDA and Bresenham's Line Drawing Algorithms, Bresenham's and Mid Point Circle Drawing Algorithms. Homogeneous Coordinate System for 2D and 3D, Various 2D, 3D Transformations (Translation, Scaling, Rotation, Shear).

# [T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 11]

UNIT- II

Clipping Algorithms, Sutherland-Cohen line Clipping Algorithm Bezier Curves, B-Spline Curves. Parallel Projection, Perspective Projection, Illumination Model for diffused Reflection, Ambient light, Specular Reflection Model, Reflection Vector.

#### UNIT-III

Shading Models, Flat shading, Gourard Shading, Phong Model. Visible surface detection, Back Face Detection, Depth Buffer (Z-Buffer, A-Buffer) Method. Overview of multimedia: Classification, basic concepts of sound/audio MIDI: devices, messages, software. , Authoring tools, Video and Animation: controlling animation, display and transmission of animation

#### [T1,T2][No of hrs 10]

[T1,T2][No of hrs 11]

UNIT- IV

Data Compression: storage space, coding requirements, Basic compression techniques: run length code, Huffman code, Lempel-Ziv JPEG: Image preparation, Lossy sequential DCT, expanded lossy DCT, Lossless mode, Hierarchical mode. MPEG, Media synchronization, Media Integration, Production Standards.

#### **Text Books:**

[T1] Donald Hearn and M.Pauline Baker, "Computer Graphics C version", Second Edition, Pearson Education.

[T2] Ralf Steinmetz & Klara Nahrstedt, "Multimedia Computing Communication & Applications", Pearson Education.

#### **Reference Books:**

- [R1] C, Foley, VanDam, Feiner and Hughes, "Computer Graphics Principles & practice", 2nd Edition
- [R2] R. Plastock and G. Kalley, Schaum's Series, "Theory and Problems of Computer Graphics", McGraw Hill, 2<sup>nd</sup> edition.
- [R3] Fred Halsall, "Multimedia Communications Applications, Networks, Protocols & Standards", Pearson Education.
- [R4] David F. Rogers, "Procedural elements for computer graphics", McGraw-Hill.

#### Maximum Marks: 75

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4

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3

#### SWITCHING THEORY AND LOGIC DESIGN LAB

Paper Code: ETEC-253	L	T/P	С
Paper: Switching Theory and Logic Design Lab	0	2	1

#### **List of Experiments:**

- 1. Realize all gates using NAND & NOR gates
- 2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
- 3. Realize a BCD adder
- 4. Realize a Serial Adder
- 5. Realize a four bit ALU
- 6. Realize Master-Save J K Flip-Flop, using NAND/NOR gates
- 7. Realize Universal Shift Register
- 8. Realize Self-Starting, Self Correcting Ring Counter
- 9. Realize Multiplexer and De-Multiplexer
- 10. Realize Carry Look ahead Adder / Priority Encoder
- 11. Simulation of PAL and PLA
- 12. Simulation Mealy and Moore State machines

# NOTE: - At least 8 Experiments out of the list must be done in the semester

12

### CIRCUITS AND SYSTEMS LAB

#### Paper Code: ETEE 257 Paper: Circuits and Systems Lab

L T C 0 2 1

#### List of Experiments

- 1. Study the transient response of series RLC circuit for different types of waveforms on CRO and verify using MATLAB
- 2. Study the time response of a simulated linear system and verify the unit step and square wave response of first order and second order, type 0,1 system
- 3. Using MATLAB determine current in various resistors connected in network using mesh current and node voltage analysis.
- 4. To determine Z and Y parameters of the given two port network.
- 5. To determine ABCD parameters of the given two port network.
- 6. To verify Reciprocity Theorem for the given two port network.
- 7. To determine Hybrid parameters of the given two port network.
- 8. To design Cascade Connection and determine ABCD parameters of the given two port network.
- 9. To design Series-Series Connection and determine Z parameters of the given two port network.
- 10. To design Parallel-Parallel Connection and determine Y parameters of the given two port network.
- 11. To design Series-Parallel Connection and determine h parameters of the given two port network
- 12. Study the frequency response of different filter circuits.

# DATA STRUCTURES LAB

### Paper Code: ETCS-255 Paper: Data Structures Lab

L T/P C 0 2 1

# List of Experiments :

- 1. Perform Linear Search and Binary Search on an array. Description of programs:
  - a. Read an array of type integer.
  - b. Input element from user for searching.
  - c. Search the element by passing the array to a function and then returning the position of the element from the function else return -1 if the element is not found.
  - d. Display the position where the element has been found.
- 2. Implement sparse matrix using array.
- Description of program:
  - a. Read a 2D array from the user.
  - b. Store it in the sparse matrix form, use array of structures.
  - c. Print the final array.
- 3. Create a linked list with nodes having information about a student and perform
  - I. Insert a new node at specified position.
  - II. Delete of a node with the roll number of student specified.
  - III. Reversal of that linked list.

4. Create doubly linked list with nodes having information about an employee and perform Insertion at front of doubly linked list and perform deletion at end of that doubly linked list.

5. Create circular linked list having information about an college and perform Insertion at front perform Deletion at end.

6. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linked list.

7. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display the queue elements.

8. Create a Binary Tree (Display using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.

9. Implement insertion, deletion and display (inorder, preorder and postorder) on binary search tree with the information in the tree about the details of a automobile (type, company, year of make).

10. To implement Insertion sort, Merge sort, Quick sort, Bubble sort, Bucket sort, Radix sort, Shell sort, Selection sort, Heap sort and Exchange sort using array as a data structure.

# **COMPUTER GRAPHICS & MULTIMEDIA LAB**

Paper Code: ETCS-257	L	Т	С
Paper: Computer Graphics & Multimedia Lab	0	2	1

# **List of Experiments:**

- 1. Study of Fundamental Graphics Functions.
- 2. Implementation of Line drawing algorithms: DDA Algorithm, Bresenham's Algorithm
- 3. Implementation of Circle drawing algorithms: Bresenham's Algorithm, Mid Point Algorithm.
- 4. Programs on 2D and 3D transformations
- 5. Write a program to implement cohen Sutherland line clipping algorithm
- 6. Write a program to draw Bezier curve.
- 7. Using Flash/Maya perform different operations (rotation, scaling move etc..) on objects
- 8. Create a Bouncing Ball using Key frame animation and Path animation.

# APPLIED MATHEMATICS-IV

Paper Code: ETMA-202	L	T/P	С
Paper: Applied Mathematics-IV	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of this course is to teach the students about the difference equation, probability, curve fitting etc. and other numerical methods to solve various engineering problems.

# UNIT – I

Partial Differential Equation: linear partial differential equations with constant coefficient, homogeneous and non homogeneous linear equations. Method of separation of variables. Laplace equation, wave equation and heat flow equation in Cartesian coordinates only with initial and boundary value.

# [T1][No. of Hrs. 11]

**UNIT II** Probability Theory: Definition, addition law of probability, multiplication law of probability, conditional probability, Baye's theorem, Random variable: discrete probability distribution, continuous probability distribution, expectation, moments, moment generating function, skewness, kurtosis, binomial distribution, Poisson distribution, normal distribution.

# [T1,T2][No. of Hrs. 12]

UNIT-III

Curve Fitting: Principle of least square Method of least square and curve fitting for linear and parabolic curve, Correlation Coefficient, Rank correlation, line of regressions and properties of regression coefficients. Sampling distribution: Testing of hypothesis, level of significance, sampling distribution of mean and variance, Chi-square distribution, Student's T- distribution, F- distribution, Fisher's Z- distribution.

# [T1,T2][No. of Hrs. 12]

Linear Programming: Introduction, formulation of problem, Graphical method, Canonical and Standard form of LPP, Simplex method, Duality concept, Dual simplex method, Transportation and Assignment problem.

### [T1][No. of Hrs. 10]

Text Books:

UNIT IV

- [T1] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
- [T2] N.M. Kapoor, "Fundamentals of Mathematical Statistics", Pitambar Publications

# **References Books:**

- [R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [R2] Miller and Freund, "Probability and statistics for Engineers", PHI
- [R3] Gupta and Kapoor, "Fundamentals of Mathematical Statistics" Sultan Chand and Sons
- [R4] G. Hadley, "Linear Programming", Narosa.
- [R5] Schaum's Outline on Probability and Statistics" Tata McGraw-Hill
- [R6] Gupta and Manmohan, "Problems in Operations Research", Sultan Chand and Sons.
- [R7] R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications.

# **COMPUTER ORGANIZATION & ARCHITECTURE**

Paper Code: ETCS-204	L	T/P	С
Paper: Computer Organization & Architecture	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand the architecture and organization of computer in depth.

# UNIT- I

# Basic Computer Organization and Register transfer language:

Over view of basic digital building blocks, Basic structure of a digital computer: Von-Neuman architecture, Introduction to types of buses, Bus and memory transfer, Bus architecture using multiplexer and tri-state buffer, register transfer language, Micro operation: arithmetic, logical, shift micro operation with hardware implementation, Arithmetic Logic Shift Unit.

Levels of programming languages: Machine language, Assembly language, High level language, programme development steps: compiling and assembling programmes.

[T1,T2][No. of hrs. 10]

## UNIT-II

### **Computer Design and Instruction set architecture**

Instruction codes, General computer registers with common bus system, addressing modes, computer instructions: Memory Reference, Register reference, Input-Output Instructions, Instruction cycle, Input-Output configuration and interrupt cycle.

Internal architecture of 8085 microprocessor: Pin diagram, 8085 instruction set.

[T1,T2][No. of hrs. 12]

# **UNIT-III**

#### **CPU Design:**

Hardwired Control Unit, Timing and control, Micro Programmed Control Unit: Control memory and address sequencing.

Pipelining: Introduction to Flynn's classification, arithmetic pipeline, instruction pipeline, pipeline conflict and hazards.

Computer arithmetic: Unsigned, Signed 1's, 2's compliment notations, addition, subtraction, multiplication and division (Hardware implementation), introduction to floating point notation: IEEE 754 standard.

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

### **UNIT-IV**

Memory & Input/output organization: Memory Hierarchy, Main Memory (RAM and ROM Chips), Virtual memory, Cache memory and mappings.

Input/Output interface: I/O bus and interface modules, I/O bus Vs memory bus, Isolated Vs Memory mapped I/O, Bus arbitration, modes of transfer.

# **Text Books:**

- M. Morris, Mano, "Computer System Architecture", PHI 3<sup>rd</sup> Edition 2007. [T1]
- Carl Hamacher, "Computer Organization", McGraw Hill, 5th Edition 2002. [T2]

#### **Reference Books:**

- W. Stallings, "Computer organization and Architecture", PHI, 7th ed, 2005. [R1]
- R. Gaonker, "MicroProcessor Architecture, Programming and Application with the 8085, 5<sup>th</sup> Edition [R2]
- [R3] J. D. Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 2006.
- [R4] J. P. Hayes, "Computer Architecture and Organization", McGraw Hill, 1988.
- J. L Hennessy and D. A. Patterson, "Computer Architecture: A quantitative approach", Morgon [R5] Kauffman, 1992.

# Maximum Marks: 75

# **THEORY OF COMPUTATION**

Paper Code: ETCS-206	L	T/P	С
Paper: Theory of Computation	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand fundamental requirements for building algorithms of any language.

# UNIT- I

Overview: Alphabets, Strings & Languages, Chomsky Classification of Languages, Finite Automata, Deterministic finite Automata (DFA) & Nondeterministic finite Automata (NDFA), Equivalence of NDFA and DFA, Minimization of Finite Automata, Moore and Mealy machine and their equivalence, Regular expression and Kleen's Theorem(with proof), Closure properties of Regular Languages, Pumping Lemma for regular Languages(with proof).

### UNIT- II

Context free grammar, Derivation trees, Ambiguity in grammar and its removal, Simplification of Context Free grammar, Normal forms for CFGs: Chomsky Normal Form & Greibach Normal Form, Pumping Lemma for Context Free languages, Closure properties of CFL(proof required), Push Down Automata (PDA), Deterministic PDA, Non Deterministic PDA ,Equivalence of PDA and CFG, Overview of LEX and YACC.

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

#### UNIT- III

Turing machines, Turing Church's Thesis, Variants and equivalence of Turing Machine, Recursive and recursively enumerable languages, Halting problem, Undecidability, Examples of Undecidable problem.

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

### UNIT- IV

Introduction to Complexity classes, Computability and Intractability, time complexity, P, NP, Co-NP, Proof of Cook's Theorem, Space Complexity, SPACE, PSPACE, Proof of Savitch's Theorem, L ,NL ,Co-NL complexity classes.

#### **Text Books:**

- [T1] Hopcroft, John E.; Motwani, Rajeev; Ullman, Jeffrey D "Introduction to Automata Theory, Languages, and Computation", Third Edition, Pearson.
- [T2] Sipser, Michael, "Introduction to the theory of Computation", Third Edition, Cengage.

#### **References Books:**

- [R1] Martin J. C., "Introduction to Languages and Theory of Computations", Third Edition, TMH.
- [R2] Papadimitrou, C. and Lewis, C.L., "Elements of the Theory of Computation", PHI.
- [R3] Daniel I.A. Cohen, "Introduction to Computer Theory", Second Edition, John Wiley.

# Maximum Marks: 75

# uage.

# DATABASE MANAGEMENT SYSTEMS

Paper (	Code: ETCS-208
Paper:	Database Management Systems

#### INSTRUCTIONS TO PAPER SETTERS:

#### Maximum Marks: 75

T/P

1

L

3

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The concepts related to database, database techniques, SQL and database operations are introduced in this subject. This creates strong foundation for application data design.

**UNIT-I : Introductory Concepts of DBMS:** Introduction and application of DBMS, Data Independence, Database System Architecture – levels, Mapping, Database users and DBA, Entity – Relationship model, constraints, keys, Design issues, E-R Diagram, Extended E-R features- Generalization, Specialization, Aggregation, Translating E-R model into Relational model.

# [T1, T2][No. of Hrs. 10]

**UNIT-II : Relational Model:** The relational Model, The catalog, Types, Keys, Relational Algebra, Fundamental operations, Additional Operations-, SQL fundamentals, DDL,DML,DCL PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Integrity – Triggers.

#### [T2, R3][No. of Hrs. 10]

**UNIT-III:** Functional Dependencies, Non-loss Decomposition, First, Second, Third Normal Forms, Dependency Preservation, Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

#### [T2, R1, R3][No. of Hrs. 10]

**UNIT-IV: Transaction Management:** ACID properties, serializability of Transaction, Testing for Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Database recovery management.

**Implementation Techniques:** Overview of Physical Storage Media, File Organization, Indexing and Hashing, B+ tree Index Files, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Materialized views, Database Tuning.

# [T1, T2, R2][No. of Hrs. 12]

#### **Text Books:**

- [T1] Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 5<sup>th</sup> Edition, Tata McGraw Hill, 2006
- [T2] Elmsari and Navathe, "Fundamentals of Database Systems", 6th Ed., Pearson, 2013

#### **References Books:**

- [R1] C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8<sup>th</sup> Edition, Pearson Education, 2006.
- [R2] J. D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.
- [R3] Vipin C. Desai, "An Introduction to Database Systems", West Publishing Co.,

С

4

#### **OBJECT ORIENTED PROGRAMMING**

Paper Code: ETCS-210	L	T/P	С
Paper: Object Oriented Programming	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To learn object oriented concepts to enhance programming skills.

#### UNIT – 1:

Objects, relating to other paradigms (functional, data decomposition), basic terms and ideas (abstraction, encapsulation, inheritance, polymorphism). Review of C, difference between C and C++, cin, cout, new, delete operators.

#### [T1,T2][No. of hrs. 11]

# UNIT – II:

Encapsulation, information hiding, abstract data types, object & classes, attributes, methods. C++ class declaration, state identity and behavior of an object, constructors and destructors, instantiation of objects, default parameter value, object types, C++ garbage collection, dynamic memory allocation, metaclass/abstract classes.

#### [T1,T2][No. of hrs. 11]

# UNIT – III:

Inheritance, Class hierarchy, derivation – public, private & protected; aggregation, composition vs classification hierarchies, polymorphism, categorization of polymorphic techniques, method polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic function – template function, function name overloading, overriding inheritance methods, run time polymorphism.

## [T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

#### UNIT – IV:

Standard C++ classes, using multiple inheritance, persistant objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithm.

#### **Text Books:**

- [T1] Rumbaugh et. al. "Object Oriented Modelling & Design", Prentice Hall
- [T2] A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH

#### **Reference Books:**

- [R1] A.K. Sharma, "Object Oriented Programming using C++", Pearson
- [R2] G. Booch "Object Oriented Design & Applications", Benjamin, Cummings.
- [R3] E.Balaguruswamy, "Objected Oriented Programming with C++", TMH
- [R4] S. B. Lippman & J. Lajoie, "C++ Primer", 3<sup>rd</sup> Edition, Addison Wesley, 2000.
- [R4] R. Lafore, "Object Oriented Programming using C++", Galgotia.
- [R5] D. Parasons, "Object Oriented Programming with C++", BPB Publication.
- [R6] Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication.

#### Maximum Marks: 75

#### COMMUNICATION SYSTEMS

Paper Code: ETEC-212	L	T/P	С
Paper: Communication Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: This is the first course which introduces the concepts of communication systems, channels and various analog modulation methods. Further, an insight into the behavior of noise is dealt.

#### UNIT I

Introduction: Overview of Communication system, Communication channels, Mathematical Models for **Communication Channels** 

Introduction of random Variables: Definition of random variables, PDF, CDF and its properties, joint PDF, CDF, Marginalized PDF, CDF, WSS wide stationery, strict sense stationery, non stationery signals, UDF, GDF, RDF, Binomial distribution, White process, Poisson process, Wiener process.

#### [T1, T2][No. of Hrs. 11]

**UNIT II** 

Amplitude Modulation: Need for modulation, Representation of Band Pass signals and systems: Hilbert Transform, In-phase, Quad-phase representations, Power relation, modulation index, Bandwidth efficiency, AM: modulation and demodulation, DSB-SC: Modulation and demodulation, SSB: modulation and demodulation, VSB: modulation and demodulation.

# [T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs. 11]

#### **UNIT III**

Angle Modulation Systems: Frequency Modulation, Types of Frequency Modulation, Generation of NBFM, WBFM, Transmission BW of FM Signal, Phase Modulation, Relationship between PM& FM.

Radio Receivers: Functions & Classification of Radio Receivers, Tuned Radio Frequency (TRF) Receiver, Superheterodyne Receiver, Basic Elements, Receiver Characteristics, Frequency Mixers, AGC Characteristics.

#### UNIT IV

Noise Theory: Noise, Types of noise, Addition of Noise due to several sources in series and parallel, Generalized Nyquist Theorem for Thermal Noise, Calculation of Thermal Noise for a Single Noise Source, RC Circuits & Multiple Noise sources. Equivalent Noise Bandwidth, Signal to Noise Ratio, Noise-Figure, Noise Temperature, Calculation of Noise Figure

Performance of Communication Systems: Receiver Model, Noise in DSB-SC Receivers, Noise in SSB-SC Receivers, Noise in AM receiver (Using Envelope Detection), Noise in FM Receivers, FM Threshold Effect, Threshold Improvement through Pre-Emphasis and De-Emphasis, Noise in PM system - Comparison of Noise performance in PM and FM, Link budget analysis for radio channels.

#### [T1, T2][No. of Hrs. 11]

# **Text Books**

- John G. Proakis & Masoud Salehi, "Communication System Engineering", Pearson Education. [T1]
- Haykin, S., "Communication Systems", John Wiley (2009) 4th ed. [T2]

#### **Reference Books**

- [R1] Taub, H., "Principles of Communication Systems", McGraw-Hill (2008) 3rd ed.
- Kennedy, G., "Electronic Communication Systems", McGraw-Hill (2008) 4th ed. [R2]
- V. Chandra Sekar "Analog Communication", Oxford University Press, Incorporated, 2010 [R3]
- John G Proakis, M.Salehi and G.Bauch "Modern Communication System Using MATLAB" Cengage [R4] Learning, 3<sup>rd</sup> edition, 2013
- J. C. Hancock, "An Introduction to the Principles of Communication Theory", TMH, 1998. [R5]
- [R6] Peebles, "Probability and Stochastic Process" Prentice Hall; 3 edition

#### Maximum Marks: 75

# APPLIED MATHEMATICS LAB

#### Paper Code: ETMA-252 Paper: Applied Mathematics Lab

# L T/P C 0 2 1

### List of Experiments:-

- 1. Solution of algebraic and transcendental equation.
- 2. Algebra of matrices: Addition, multiplication, transpose etc.
- 3. Inverse of a system of linear equations using Gauss-Jordan method.
- 4. Numerical Integration.
- 5. Solution of ordinary differential equations using Runge-Kutta Method.
- 6. Solution of Initial value problem.
- 7. Calculation of eigen values and eigen vectors of a matrix.
- 8. Plotting of Unit step function and square wave function.

It is expected that atleast 12 experiments be performed, including the above specified 8 experiments which are compulsory. The remaining experiments may be developed by faculty and students based on applications of Mathematics in Real Life problem.

### **Text Books:**

- 1. B.S. Grewal., "Numerical Methods in Engg. And Science", Khanna Publications
- P. Dechaumphai & N. Wansophark, "Numerical Methods in Engg.: Theories with Matlab, Fortran, C & Pascal Programs", Narosa Publications

### **Reference Books:**

- 1. P.B. Patil & U.P. Verma, "Numerical Computational Methods", Narosa Publications
- 2. John C. Polking & David Arnold, "Ordinary Differential Equations using MATLAB", Pearson Publications
- 3. Rudra Pratap, "Getting Started With MatLab" Oxford University Press
- 4. Byrom Gottfried, "Programming With C" Shaum's Outline
- 5. Santosh Kumar, "Computer based Numerical & Statistical Techniques", S. Chand Publications.

# **COMPUTER ORGANISATION AND ARCHITECTURE LAB**

Paper Code: ETCS-260	L	T/P	С
Paper: Computer Organisation and Architecture Lab	0	2	1

# List of Experiments:

Based on 80	85 simulator			

- 1. To draw and explain
  - i. Block diagram and pin diagram of 8085.
  - ii. Instruction set of 8085.
- 2. Write a program to perform :
  - i. Addition of two 8 bit numbers without carry.
  - ii. Addition of two 8 bit numbers with carry
- 3. Write a program to perform:
  - i. Subtraction of two 8 bit numbers without borrows.
  - ii. Subtraction of two 8 bit numbers with borrows.
- 4. Write a program to find 1's complement of an 8 bit number.
- 5. Write a program to find 2's complement of an 8 bit number.
- 6. Write a program to perform Multiplication of two 8 bit numbers.
- 7. Write a program to find to find the smallest and largest number from the given series.
- 8. Write a program to find sum of series of n consecutive numbers.
- 9. Write a program to find factorial of a number.
- 10. Write a program to reverse an 8 bit number.
- 11. Write a program to sort array in ascending/ descending order.
- 12. Write a program to perform division of two 8 bit numbers.

The instructor is advised to develop lab programs based on the learning concepts of architecture and insight into operating systems.

### NOTE: - At least 8 Experiments from the syllabus must be done in the semester

### DATABASE MANAGEMENT SYSTEMS LAB

Paper C	ode: ETCS-256
Paper: 1	Database Management Systems Lab

L	T/P	С
0	2	1

#### LAB BASED ON DBMS

Lab includes implementation of DDL, DCL, DML i.e SQL in Oracle.

# List of Experiments:

- 1. Design a Database and create required tables. For e.g. Bank, College Database
- 2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- 3. Write a SQL statement for implementing ALTER, UPDATE and DELETE
- 4. Write the queries to implement the joins
- 5. Write the queries for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()
- 6. Write the queries to implement the concept of Integrity constrains
- 7. Write the queries to create the views
- 8. Perform the queries for triggers
- 9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints

# **TEXT BOOK:**

1. SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications

#### **OBJECT ORIENTED PROGRAMMING LAB**

Paper Code: ETCS-258	L	T/P	С
Paper: Object Oriented Programming Lab	0	2	1

#### List of Experiment:

- 1. Write a program for multiplication of two matrices using OOP.
- 2. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialized real and imag to two different values.
- 3. Write a program to find the greatest of two given numbers in two different classes using friend function.
- 4. Implement a class string containing the following functions:
  - Overload + operator to carry out the concatenation of strings.
  - Overload = operator to carry out string copy.
  - Overload <= operator to carry out the comparison of strings.
  - Function to display the length of a string.
  - Function tolower() to convert upper case letters to lower case.
  - Function toupper() to convert lower case letters to upper case.
- 5. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
- 6. Write a program to define the function template for calculating the square of given numbers with different data types.
- 7. Write a program to demonstrate the use of special functions, constructor and destructor in the class template. The program is used to find the bigger of two entered numbers.
- 8. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space ,line feed ,new line and carriage return from a text file and store the contents of the file without the white spaces on another file.
- 9. Write a program to read the class object of student info such as name, age ,sex ,height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.
- 10. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

#### COMMUNICATION SYSTEMS LAB

Paper Code: ETEC-256	L	T/P	С
Paper: Communication Systems Lab	0	2	1

#### **List of Experiments:**

- 1. Generation of DSB-SC AM signal using balanced modulator.
- 2. To study amplitude demodulation by linear diode detector
- 3. Generation of SSB AM signal.
- 4. To study envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
- 5. To generate FM signal using voltage controlled oscillator.
- 6. To generate a FM Signal using Varactor & reactance modulation.
- 7. Detection of FM Signal using PLL & foster seelay method.
- 8. To study Super heterodyne AM receiver and measurement of receiver parameters viz.sensitivity, selectivity & fidelity.
- 9. To study Pre-emphasis and De-emphasis in FM.
- 10. Generation of Phase modulated and demodulated signal.

Simulations study of some of the above experiments using P-spice or Multisim softwares

# ALGORITHMS DESIGN AND ANALYSIS

Paper Code: ETCS-301	L	T/P	С
Paper: Algorithms Design and Analysis	3	1	4

# INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

**Objective**: The objective of this paper is to teach the students various problem solving strategies like divide and conquer, Greedy method, Dynamic programming and also the mathematical background for various algorithms. After doing this course, students will be able to select an appropriate problem solving strategies for real world problems. This will also help them to calculate the time, complexity and space complexity of various algorithms.

# UNIT – I

Asymptotic notations for time and space complexity, Big-Oh notation,  $\Theta$  notation,  $\Omega$  notation, the little-oh notation, the little-omega notation, Recurrence relations: iteration method, recursion tree method, substitution method, master method (with proof), subtract and conquer master method(with proof), Data Structures for Disjoint Sets, Medians and Order statistics. Complexity analysis, Insertion sort, Merge Sort, Quick sort. Strassen's algorithm for Matrix Multiplications.

### UNIT – II

**Dynamic Programming:** Ingredients of Dynamic Programming, emphasis on optimal substructure, overlapping substructures, memorization. Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems, 0-1 knapsack problem, Binomial coefficient computation through dynamic programming. Floyd Warshall algorithm.

#### [T1][T2][R1] [R3][No. of Hrs. 10]

[T1][T2][R4] [No. of Hrs. 10]

[T1][R1][R2][No. of Hrs. 10]

### UNIT – III

**Greedy Algorithms:** Elements of Greedy strategy, overview of local and global optima, matroid, Activity selection problem, Fractional Knapsack problem, Huffman Codes, A task scheduling problem. Minimum **Spanning Trees:** Kruskal's and Prim's Algorithm, Single source shortest path: Dijkstra's and Bellman Ford Algorithm(with proof of correctness of algorithms).

### UNIT – IV

**String matching:** The naïve String Matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm.

**NP-Complete Problem:** Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP –hard ,Case study of NP-Complete problems (vertex cover problem, clique problem).

### [T1][R1] [No. of Hrs.: 10]

### **Text Books:**

- [T1] T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "Introduction to Algorithms", 3<sup>rd</sup> Ed., PHI, 2013.
- [T2] Jon Klenberg, Eva Tardos, "Algorithm Design", Pearson Publications, 2014

#### **Reference Books:**

- [R1] Sara Basse, "introduction to Design & analysis", Pearson
- [R2] Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Computer Algorithms/C++ "Second Edition, Universities Press.
- [R3] A. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Publication, 2013.
- [R4] Richard Neapolitan, "Foundations of Algorithms", Fifth Edition, Jones & Bartlett Learning

#### SOFTWARE ENGINEERING

Paper Code: ETCS-303	L	T/P	С
Paper: Software Engineering	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To improvise the concept to build any software.

#### UNIT – I

#### Introduction:

Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM.

Software Metrics:

Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

## [T1][R1][R2][No. of Hrs.: 10]

#### UNIT – II

Software Project Planning:

Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management.

Software Requirement Analysis and Specifications:

Problem Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioural and non-behavioural requirements, Software Prototyping.

[T1][R1][R2][No. of Hrs.: 11]

#### UNIT – III

Software Design:

Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.

Software Reliability:

Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calendar time Component, Reliability Allocation.

[T1][R1][R2] [No. of Hrs.: 12]

#### UNIT - IV

Software Testing:

Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards.

Software Maintenance:

Management of Maintenance, Maintenance Process, Maintenance Models, Reverse Engineering, Software Reengineering, Configuration Management, Documentation.

# **TEXT BOOKS:**

- R. S. Pressman, "Software Engineering A practitioner's approach", 3<sup>rd</sup> ed., McGraw Hill Int. Ed., 1992. [T1]
- K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2001 [T2]

#### **Reference:**

- R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997. [R1]
- P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991. [R2]
- [R3] Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.
- James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons [R4]
- I. Sommerville, "Software Engineering", Addison Wesley, 1999. [R5]

# [T1][R1][R2] [No. of Hrs.: 11]

#### JAVA PROGRAMMING

Paper Code: ETCS-307	L	T/P	С
Paper: Java Programming	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To learn object oriented concepts and enhancing programming skills.

#### UNIT I

Overview and characteristics of Java, Java program Compilation and Execution Process Organization of the Java Virtual Machine, JVM as an interpreter and emulator, Instruction Set, class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection. Security Promises of the JVM, Security Architecture and Security Policy. Class loaders and security aspects, sandbox model

# [T1,R2][No. of Hrs.: 11]

#### UNIT II

Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays, Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances, Class Member Modifiers Anonymous Inner Class Interfaces and Abstract Classes, inheritance, throw and throws clauses, user defined Exceptions, The String Buffer Class, tokenizer, applets, Life cycle of applet and Security concerns.

#### UNIT III

# [T1,T2][No. of Hrs.: 12]

Threads: Creating Threads, Thread Priority, Blocked States, Extending Thread Class, Runnable Interface, Starting Threads, Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.

AWT Components, Component Class, Container Class, Layout Manager Interface Default Layouts, Insets and Dimensions, Border Layout, Flow Layout, Grid Layout, Card Layout Grid Bag Layout AWT Events, Event Models, Listeners, Class Listener, Adapters, Action Event Methods Focus Event Key Event, Mouse Events, Window Event

#### UNIT IV

Input/Output Stream, Stream Filters, Buffered Streams, Data input and Output Stream, Print Stream Random Access File, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server. Remote Method invocation, Java Native interfaces, Development of a JNI based application.

Collection API Interfaces, Vector, stack, Hashtable classes, enumerations, set, List, Map, Iterators.

[T1][R1][No. of Hrs.: 10]

[T2][No. of Hrs.: 11]

#### **Text Books:**

- [T1] Patrick Naughton and Herbertz Schidt, "Java-2 the complete Reference", TMH
- [T2] Sierra & bates, "Head First Java", O'Reilly

#### **Reference Books:**

- [R1] E. Balaguruswamy, "Programming with Java", TMH
- [R2] Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley.
- Decker & Hirshfield, "Programming.Java", Vikas Publication. [R3]

#### INDUSTRIAL MANAGEMENT

Paper Code: ETMS-311	L	T/P	С
Paper: Industrial Management	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The course provides a broad introduction to some aspects of business management and running of business organization.

#### UNIT I

**Industrial relations-** Definition and main aspects. Industrial disputes and strikes. Collective bargaining. **Labour Legislation-** Labour management cooperation/worker's participation in management. Factory legislation. International Labour Organization.

# [T1,T2][No. of Hrs. 10]

# UNIT II

**Trade Unionism-** Definition, Origin, Objectives of Trade Unions. Methods of Trade unions. Size and finance of Indian Trade unions-size, frequency distribution, factors responsible for the small size. Finance-sources of income, ways of improving finance.

#### UNIT III

#### [T1,T2][No. of Hrs. 10]

**Work Study-**Method study and time study. Foundations of work study. Main components of method study. Time study standards. Involvement of worker's unions. Work Sampling. Application of work study to office work.

#### [T1,T2][No. of Hrs. 10]

#### UNIT IV

**Quality Management-** What is Quality? Control Charts. Quality is everybody's job. Taguchi Philosophy. Service Quality. What is Total Quality Management (TQM)? Roadmap for TQM. Criticism of TQM. Six Sigma.

#### [T1,T2][No. of Hrs. 10]

#### **Text Books:**

- [T1] Sinha, P.R.N., Sinha I.B. and Shekhar S.M.(2013), Industrial Relations, Trade Unions and Labour Legislation. Pearson Education
- [T2] Chary, S.N. (2012), Production and Operations Management. Tata McGraw Hill Education.

#### **Reference Books:**

- [R1] Srivastava, S.C. (2012), Industrial Relations and Labour Laws, Vikas Publishing
- [R2] Shankar R (2012), Industrial Engineering and Management. Galgotia Publications
- [R3] Telsang, M. (2006), Industrial Engineering and Production Management. S.Chand
- [R4] Thukaram, Rao (2004), M.E. Industrial Management. Himalaya Publishing House.

Paper Code: ETEC-303	L	T/P	С
Paper: Digital Communication	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enable the students

- 1. To distinguish between analog and digital communication.
- 2. To understand the concept of digital communication system.
- 3. To understand the concept of random variables and random process.
- 4. To learn the digital modulation techniques.

### UNIT- I Introduction to Digital Communication:

Line coding: NRZ, RZ, Manchester encoding, differential Manchester encoding, AMI coding, high density bipolar code, binary with n-zero substitution codes,

Review of Sampling theorem, uniform and non-uniform quantization, companding, µ-Law and A-Law compressors, Concept and Analysis of PCM, DPCM, DM and ADM modulators and demodulators, M-ary waveforms, S/N ratio for all modulation, probability of error for PCM in AWGN Channel and other modulation techniques, Duo Binary pulse.

#### **UNIT- II Random Signal Theory:**

Probability, Concept of Random variable (Stationary, Non stationary, WSS, SSS), Random process, CDF, PDF, Joint CDF, Joint PDF, marginal PDF, Mean, Moments, Central Moment Auto-correlation & Cross-correlation, covariance functions, ergodicity, power spectral density, Gaussian distribution, Uniform distribution, Rayleigh distribution, Binomial distribution, Poission distribution, Weiner distribution, Wiener-Khinchin theorem, Central limit theorem.

#### **UNIT- III Designing of Receiver:**

Analysis of digital receiver, Prediction Filter, Design and Property of Matched filter, Correlator Receiver, Orthogonal Signal, Gram-Schmidt Orthogonalization Procedure, Maximum likelihood receiver, Coherent receiver design, Inter Symbol Interference, Eye Pattern.

#### **UNIT- IV Digital modulation schemes:**

Coherent Binary Schemes: ASK, FSK, PSK, QPSK, MSK, G-MSK. Coherent M-ary Schemes, Incoherent Schemes (DPSK and DEPSK), Calculation of average probability of error for different modulation schemes, Power spectra of digitally modulated signals, Performance comparison of different digital modulation schemes. Review of 2 Latest Research Paper.

#### **Text Books:**

- [T1] Simon Haykin, "Communication Systems" John Wiley & Sons, Inc 4th Edition.
- [T2] Taub Schilling, "Principles of Communication Systems" TMH, 2nd Edition

#### **Reference Books:**

- [R1] George Kennedy, "Communication System" TMH 4th Edition
- [R2] B. P. Lathi, "Modern Digital and Analog Communication System" Oxford University Press 3rd Edition.
- [R3] Digital Communications by John G.Proakis; McGraw Hill.

# [T1, T2, R2][No. of Hours: 11]

[T1, T2, R2] [No. of Hours: 11]

[T1, T2, R1, R2] [No. of Hours: 11]

# [T1, R2][No. of Hours: 11]

# COMMUNICATION SKILLS FOR PROFESSIONALS

Paper Code: ETHS-301	L	T/P	С
Paper: Communication Skills for Professionals	2	0	1

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

#### UNIT I

**Organizational Communication:** Meaning, importance and function of communication, Process of communication, Communication Cycle - message, sender, encoding, channel, receiver, decoding, feedback, Characteristics, Media and Types of communication, Formal and informal channels of communication, 7 C's of communication, Barriers to communication, Ethics of communication (plagiarism, language sensitivity)

**Soft Skills:** Personality Development, Self Analysis through SWOT, Johari Window, Interpersonal skills -Time management, Team building, Leadership skills. Emotional Intelligence.Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self esteem.

#### [T1,T2][No. of Hrs. 08]

#### UNIT II

**Introduction to Phonetics:** IPA system (as in Oxford Advanced Learner's Dictionary), Speech Mechanism, The Description of Speech Sounds, Phoneme, Diphthong, Syllable, Stress, Intonation, Prosodic Features; Pronunciation; Phonetic Transcription - Conversion of words to phonetic symbols and from phonetic symbols to words. British & American English (basic difference in vocabulary, spelling, pronunciation, structure)

**Non-Verbal Language**: Importance, characteristics, types – Paralanguage (voice, tone, volume, speed, pitch, effective pause), Body Language (posture, gesture, eye contact, facial expressions), Proxemics, Chronemics, Appearance, Symbols.

#### [T1,T2][No. of Hrs. 08]

[T1,T2][No. of Hrs. 08]

#### UNIT III

**Letters at the Workplace** – letter writing (hard copy and soft copy): request, sales, enquiry, order, complaint. Job Application -- resume and cover letter

Meeting Documentation-- notice, memo, circular, agenda and minutes of meeting.

**Report Writing** - Significance, purpose, characteristics, types of reports, planning, organizing and writing a report, structure of formal report. Writing an abstract, summary, Basics of formatting and style sheet (*IEEE Editorial Style Manual*), development of thesis argument, data collection, inside citations, bibliography; Preparing a written report for presentation and submission. Writing a paper for conference presentation/journal submission.

#### UNIT IV

**Listening and Speaking Skills**: Importance, purpose and types of listening, process of listening, difference between hearing and listening, Barriers to effective listening, Traits of a good listener, Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

**Presentations:** Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

Group Discussion: Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

**Interview Skills:** Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

#### [T1,T2][No. of Hrs. 07]

#### **Text Books:**

- [T1] Anna Dept. Of English. Mindscapes: English for Technologists & Engineers PB. New Delhi: Orient Blackswan.
- [T2] Farhathullah, T. M. Communication Skills for Technical Students. Orient Blackswan, 2002.

#### **References Books:**

- [R1] Masters, Ann and Harold R. Wallace. Personal Development for Life and Work, 10th Edition.Cengage Learning India, 2012.
- [R2] Institute of Electrical and Electronics Engineers. IEEE Editorial Style Manual. IEEE, n.d. Web. 9 Sept. 2009.
- [R3] Sethi and Dhamija. A Course in Phonetics and Spoken English. PHI Learning, 1999.
- [R4] Khera, Shiv. You Can Win. New York: Macmillan, 2003.

#### **ALGORITHMS ANALYSIS AND DESIGN LAB**

Paper Code: ETCS-351	L	T/P	С
Paper: Algorithms Analysis and Design Lab	0	2	1

#### List of Experiments:

- 1. To implement following algorithm using array as a data structure and analyse its time complexity.
  - a. Merge sort
  - b. Quick sort
  - c. Bubble sort
  - d. Bucket sort
  - e. Radix sort
  - f. Shell sort
  - g. Selection sort
  - h. Heap sort
- 2. To implement Linear search and Binary search and analyse its time complexity.
- 3. To implement Matrix Multiplication and analyse its time complexity.
- 4. To implement Longest Common Subsequence problem and analyse its time complexity.
- 5. To implement Optimal Binary Search Tree problem and analyse its time complexity.
- 6. To implement Huffman Coding and analyse its time complexity.
- 7. To implement Dijkstra's algorithm and analyse its time complexity.
- 8. To implement Bellman Ford algorithm and analyse its time complexity.
- 9. To implement naïve String Matching algorithm, Rabin Karp algorithm and Knuth Morris Pratt algorithm and analyse its time complexity.

## SOFTWARE ENGINEERING LAB

Paper Code: ETCS-353	L	T/P	С
Paper: Software Engineering Lab	0	2	1

#### **Tool Required: Rational Rose Enterprise Edition**

#### List of Experiments:

- 1. Write down the problem statement for a suggested system of relevance.
- 2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
- 3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
- 4. To perform the user's view analysis for the suggested system: Use case diagram.
- 5. To draw the structural view diagram for the system: Class diagram, object diagram.
- 6. To draw the behavioral view diagram : State-chart diagram, Activity diagram
- 7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram
- 8. To perform the implementation view diagram: Component diagram for the system.
- 9. To perform the environmental view diagram: Deployment diagram for the system.
- 10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system.
- 11. 10 Perform Estimation of effort using FP Estimation for chosen system.
- 12. 11 To Prepare time line chart/Gantt Chart/PERT Chart for selected software project.

#### **Text Books:**

- 1. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2005
- 2. Pankaj Jalote, "An Integrated Approach to Software Engineering", Second Edition, Springer.

#### JAVA PROGRAMMING LAB

#### Paper Code: ETCS-357 Paper: Java Programming Lab

# L T/P C 0 2 1

#### List of Experiments:

- 1. Create a java program to implement stack and queue concept.
- 2. Write a java package to show dynamic polymorphism and interfaces.
- 3. Write a java program to show multithreaded producer and consumer application.
- 4. Create a customized exception and also make use of all the 5 exception keywords.
- 5. Convert the content of a given file into the uppercase content of the same file.
- 6. Develop an analog clock using applet.
- 7. Develop a scientific calculator using swings.
- 8. Create an editor like MS-word using swings.
- 9. Create a servlet that uses Cookies to store the number of times a user has visited your servlet.
- 10. Create a simple java bean having bound and constrained properties.

#### DIGITAL COMMUNICATION LAB

Paper Code: ETEC–357 Paper: Digital Communication Lab	L 0	T/P 2	C 1	
List of Experiments: MATLAB/ LABVIEW based practical on:				
1. To Study Sampling Theorem.				
2. To Study of Pulse Code Modulation and Probability of error.				
3. To calculate S/N ratio and Probability of error of Differential Pulse Code Mode	ulation.			
4. To calculate S/N ratio and Probability of error of Delta Modulation.				
5. To calculate S/N ratio and Probability of error of Adaptive Delta Modulation.				
6 To calculate S/N ratio and Probability of error of Amplitude Shift Keying (ASI	K)			

- 6. To calculate S/N ratio and Probability of error of Amplitude Shift Keying (ASK).
- 7. To calculate S/N ratio and Probability of error of Phase Shift Keying (PSK).
- 8. To calculate S/N ratio and Probability of error of frequency Shift Keying (FSK).
- 9. To calculate S/N ratio and Probability of error Differential Phase Shift Keying Modulation (DPSK).
- 10. To calculate S/N ratio and Probability of error of Quadrature Phase Shift Keying Modulation (QPSK).
- 11. To calculate S/N ratio and Probability of error of QAM
- 12. Faculty can opt for practical of Digital Communication to be performed on Kit.

### **COMMUNICATION SKILLS FOR PROFESSIONALS LAB**

Paper Code: ETHS-351	L	T/P	С
Paper: Communication Skills for Professionals Lab	0	2	1

**Objective:** To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision .These activities will enhance students' communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

### Lab Activities to be conducted:

- 1. Listening and Comprehension Activities Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.
- 2. **Reading Activities** -- Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.
- 3. **Conversation Activities**-- Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.
- 4. **Making an Oral Presentation**–Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.
- 5. **Making a Power Point Presentation** -- Structure and format; Covering elements of an effective presentation; Body language dynamics.
- 6. **Making a Speech** -- Basics of public speaking; Preparing for a speech; Features of a good speech; Speaking with a microphone. Famous speeches may be played as model speeches for learning the art of public speaking. Some suggested speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawahar Lal Nehru, Atal Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.
- 7. **Participating in a Group Discussion** -- Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others' views / ideas; Arguing against others' views or ideas, etc.
- 8. **Participating in Mock Interviews** -- Job Interviews: purpose and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.

### Suggested Lab Activities:

- 1. Interview through telephone/video-conferencing
- 2. Extempore, Story Telling, Poetry Recitation
- 3. Mock Situations and Role Play; Enacting a short skit
- 4. Debate (Developing an Argument), News Reading and Anchoring.

### **Reference Books:**

- 1. Patnaik, Priyadarshi. *Group Discussion and Interview Skills: With VCD.* Cambridge University Press India (Foundation Books), 2012 edition.
- 2. Kaul, Asha. Business Communication. PHI Learning: 2009.
- 3. Hartman and Lemay. Presentation Success: A Step-by-Step Approach. Thomson Learning, 2000.

**Note:** The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.

Paper Code: ETCS-302	L	T/P	С
Paper: Compiler Design	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** This course aims to teach students the principles involved in compiler design. It will cover all the basic components of a compiler, its optimizations and machine code generation. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.

### UNIT- I

Brief overview of the compilation process, structure of compiler & its different phases, lexical analyzer, cross compiler, Bootstrapping, quick & dirty compiler, Shift-reduce parsing, operator- precedence parsing, top-down parsing, predictive parsing ,LL(1) and LL(k) grammar, bottom up parsing, SLR, LR(0), LALR parsing techniques.

### UNIT- II

Design and implementation of a lexical analyzer and parsing using automated compiler construction tools(eg. Lex, YACC, PLY), Syntax-directed translation schemes, implementation of syntax directed translations, intermediate code, postfix notation, three address code, quadruples, and triples, translation of assignment statements, Boolean expressions, control statements, Semantic Analysis, Type Systems, Type Expressions, Type Checker, Type Conversion

### [T2][R1][R3][R4][R5][No. of Hrs. 12]

[T1][T2][R1][No. of Hrs. 12]

### UNIT- III

Symbol table, data structures and implementation of symbol tables, representing scope information.

Run Time Storage Administration, implementation of a simple stack allocation scheme, storage allocation in block structured languages and non block structured languages, Error, Lexical-phase errors, syntactic-phase errors, semantic errors.

### UNIT-IV

The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis, Object programs, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

### [T1][T2] [No. of Hrs. 10]

[T1][T2]][R2][No. of Hrs. 10]

### **Text Books:**

- [T1] Alfred V. Aho & J.D. Ullman, "Compiler Principles , Techniques& Tools", Pearson
- [T2] Kenneth C. Louden, "Compiler Design", Cengage Publication

### **Reference Books:**

- [R1] Kakde O.G., "Complier Design", Laxmi Publication
- [R2] Trembley and Sorenson, "Theory and Practice of Compiler Writing", McGraw Hill
- [R3] Vinu V. DAS, "Compiler Design Using FLEX and YACC, PHI
- [R4] Jhon R. Levine, Tony Mason and Doug Brown, "Lex &Yacc", O'Reilly.pdf
- [R5] Andrew W. Appel, Maia Ginsburg, "Modern Compiler Implementation in C", Cambridge University Press

### **MAXIMUM MARKS: 75**

### **OPERATING SYSTEMS**

Paper Code: ETCS-304	L	T/P	С
Paper: Operating Systems	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** The goal of this course is to provide an introduction to the internal operation of modern operating systems. The course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

### UNIT I

**Introduction:** What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems, OS - A Resource Manager.

**Memory Organization & Management:** Memory Organization, Memory Hierarchy, Memory Management Strategies, Contiguous versus non- Contiguous memory allocation, Partition Management Techniques, Logical versus Physical Address space, swapping, Paging, Segmentation, Segmentation with Paging

**Virtual Memory:** Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Thrashing, Demand Segmentation, and Overlay Concepts.

### [T1] [T2][R2][R3] [No. of hrs. 10]

### UNIT II

Processes: Introduction, Process states, process management, Interrupts, Interprocess Communication

Threads: Introduction, Thread states, Thread Operation, Threading Models.

Processor Scheduling: Scheduling levels, pre emptive vs no pre emptive scheduling, priorities, scheduling objective, scheduling criteria, scheduling algorithms, demand scheduling, real time scheduling.

**Process Synchronization:** Mutual exclusion, software solution to Mutual exclusion problem, hardware solution to Mutual exclusion problem, semaphores, Critical section problems. Case study on Dining philosopher problem, Barber shop problem etc.

### [T1][T2][[R3] [No. of hrs. 10]

### UNIT III

**Deadlocks:** examples of deadlock, resource concepts, necessary conditions for deadlock, deadlock solution, deadlock prevention, deadlock avoidance with Bankers algorithms, deadlock detection, deadlock recovery. **Device Management:** Disk Scheduling Strategies, Rotational Optimization, System Consideration, Caching and Buffering

### [T1][T2][R1] [No. of hrs. 10]

[T1] [T2][R4][R5] [No. of hrs. 10]

### UNIT IV

File System: Introduction, File Organization, Logical File System, Physical File System, File Allocation strategy, Free Space Management, File Access Control, Data Access Techniques, Data Integrity Protection, Case study on file system viz FAT32, NTFS, Ext2/Ext3 etc.

### **Text Books:**

- [T1] Deitel & Dietel, "Operating System", Pearson, 3<sup>rd</sup> Ed., 2011
- [T2] Silbersachatz and Galvin, "Operating System Concepts", Pearson, 5<sup>th</sup> Ed., 2001
- [T3] Madnick & Donovan, "Operating System", TMH,1<sup>st</sup> Ed., 2001

### **Reference Books:**

- [R1] Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
- [R2] Godbole, "Operating Systems", Tata McGraw Hill, 3<sup>rd</sup> edition, 2014
- [R3] Chauhan, "Principles of Operating Systems", Oxford Uni. Press, 2014
- [R4] Dhamdhere, "Operating Systems", Tata McGraw Hill, 3<sup>rd</sup> edition, 2012
- [R5] Loomis, "Data Management & File Structure", PHI, 2<sup>nd</sup> Ed.

### COMPUTER NETWORKS

Paper Code: ETCS-306	L	T/P	С
Paper: Computer Networks	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the basics of networking with reference to OSI and TCP/IP models.

### UNIT-I

Introduction: Internet History, Uses of computer networks, Network hardware, network software, Protocol layering, Reference models (OSI & TCP/IP), Network standardization. The Physical Layer: Theoretical basis for data communication, Transmission media: Guided and Unguided media, Switching (circuit, packet), Multiplexing (FDM, WDM, and TDM), Overview of PSTN, ISDN, and ATM.

### [T1,T2][No. of Hrs. 10]

**UNIT-II** The Data Link Layer: Data link layer design issues, Error detection and Correction Techniques, Elementary data link control protocols, Sliding window protocols, Example data link protocols (HDLC and PPP). The Medium Access Sub layer: The channel allocation problem, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLANs, Network devices-repeaters, hubs, Bridge, Switches and Routers.

# [T1][T2][No. of Hrs. 12]

[T1][T2][No. of Hrs. 12]

[T1][No. of Hrs. 12]

### UNIT-III

Transmission Networks: PDH Networks, SONET/SDH Networks, DWDM Networks, Introduction to Cell Switched Networks e.g Asynchronous Transfer Mode (ATM) and Packet Switched Networks. The Network Layer: Network layer design issues, routing algorithms, congestion control algorithms, Quality of Service, Introduction to IPv4 Addressing, Subnetworks and Subneting, IPv4 protocol Packet Format, Forwarding of IP packets, IPv4 vs IPv6, Congestion control algorithms. Delay Models in Data Networks: Queueing Models, M/M/1 Queueing System, M/M/m/m and Markov Systems.

### UNIT - IV

Transport layer: Transport layer services, Elements of transport protocols, Overview of UDP and TCP.

### **Text Books:**

- [T1] Dimitri Bertsekas and Robert Gallager, "Data Networks", PHI.
- [T2] Behrouz A.Forouzan, 'Data Communication and Networking', 5E, Tata McGraw Hill, 2013.

### **Reference Books:**

- [R1] Uyless Black, "Computer Networks-Protocols, Standards and Interfaces", 2nd edition, PHI, 1996.
- [R2] A. Tannenbaum, "Computer Networks", 5th edition, Pearson.

## MAXIMUM MARKS: 75

### WEB TECHNOLOGY

Paper Code: ETCS-308	L	T/P	С
Paper: Web Technology	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This paper gives understanding of web designing to the students.

### UNIT - I

History of the Internet, Basic internet protocols, World Wide Web (W3C), HTTP: Hypertext Transfer Protocol. **Markup languages-XHTML:** Introduction to HTML, basics of XTHML, HTML elements, HTML tags, lists, tables, frames, forms, defining XHTML's abstract syntax, defining HTML documents.

**CSS style sheets:** Introduction, CSS core syntax, text properties, CSS box model, normal flow box layout, other properties like list, tables, DHTML, XML, XML documents & vocabulary, XML versions & declarations, Introduction to WML.

### UNIT – II

**Client Side Programming:** JAVA Scripts, basic syntax, variables & data-types, literals, functions, objects, arrays, built-in objects, JAVA Script form programming, Intrinsic event handling, modifying element style, document trees,

**Server side programming** – Java Servlets: Servlet architecture, life cycle, parameter data, sessions, cookies, servlets capabilities, servlets & concurrency. Introduction to JSP, JSP Tags, JSP life cycle, custom tags.

### [T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 10]

UNIT - III

Security Threats, Security risks of a site, Web attacks and their prevention, Web security model, Session management, authentication, HTTPS and certificates, Application vulnerabilities and defenses.

Client-side security, Cookies security policy, HTTP security extensions, Plugins, extensions, and web apps, Web user tracking.

Server-side security tools, Web Application Firewalls (WAFs) and Fuzzers.

### $\mathbf{UNIT} - \mathbf{IV}$

Introduction to Web 2.0 and Web 3.0, Concepts and Issues, Latest Trends in Web Technologies. Web Security concerns. Applications of Web Engineering Technologies in distributed systems etc. Case studies using different tools.

### **Text Books:**

[T1] Web Technologies: A Computer Science Perspective, Jackson, Pearson Education India, 2007.[T2] Web Engineering: A Practitioner's Approach by Roger S Pressman, David Lowe, TMH, 2008.

### **Reference Books:**

[R1] Achyut Godbole, Atul Kahate, "Web Technologies", McGraw-Hill Education, Third Edition.

- [R2] Uttam K Roy, "Web Technologies", Oxford University Press, 2012.
- [R3] Chris Bates, "Web Programming", Wiley
- [R4] Web Engineering by Gertel Keppel, Birgit Proll, Siegfried Reich, Werner R., John Wiley.

[R5] Thinking on the Web: Berner's LEE, Godel and Turing, John Wiley & Sons Inc.

### **MAXIMUM MARKS: 75**

### [T1,T2][No. of hrs. 10]

### [T1,T2][No. of hrs. 12]

### ARTIFICIAL INTELLIGENCE

Paper Code: ETCS-310	L	T/P	С
Paper: Artificial Intelligence	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

### UNIT-I

**Introduction:** Introduction to intelligent agents

**Problem solving:** Problem formulation, uninformed search strategies, heuristics, informed search strategies, constraint satisfaction Solving problems by searching, state space formulation, depth first and breadth first search, iterative deepening

### UNIT-II

**Logical Reasoning :** Logical agents, propositional logic, inferences, first-order logic, inferences in first order logic, forward chaining, backward chaining, unification, resolution

### UNIT-III

**Game Playing:** Scope of AI -Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques- search knowledge, abstraction

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 10]

### **UNIT-IV**

Learning from observations: Inductive learning, learning decision trees, computational learning theory, Explanation based learning

Applications: Environmental Science, Robotics, Aerospace, Medical Sciences etc.

### **Text Book:**

[T1] Rich and Knight, "Artificial Intelligence", Tata McGraw Hill, 1992

[T2] S. Russel and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Edu.

### **Reference Books:**

[R1] KM Fu, "Neural Networks in Computer Intelligence", McGraw Hill

[R2] Russel and Norvig, "Artificial Intelligence: A modern approach", Pearson Education

### **MAXIMUM MARKS: 75**

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 10]

# Modified Scheme and Syllabus of B. Tech-CSE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

### MICROPROCESSORS AND MICROCONTROLLERS

Paper Code: ETEE-310	L	T/P	С
Paper: Microprocessors and Microcontrollers	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the knowledge of microprocessor systems and microcontroller.

### UNIT- I

**UNIT-II** 

**Introduction to Microprocessor Systems:** Architecture and PIN diagram of 8085, Timing Diagram, memory organization, Addressing modes, Interrupts. Assembly Language Programming.

**8086 Microprocessor:** 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts.

### UNIT- III

**Interfacing of 8086 with 8255, 8254/ 8253, 8251, 8259:** Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

### UNIT-IV

**Overview of Microcontroller 8051:** Introduction to 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming.

### Text Books:

- [T1] Muhammad Ali Mazidi, "Microprocessors and Microcontrollers", Pearson, 2006
- [T2] Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" Tata McGraw Hill, 2006.
- [T3] Ramesh Gaonkar, "MicroProcessor Architecture, Programming and Applications with the 8085", PHI

### **References Books:**

- [R1] Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay "The 8051 Microcontroller and Embedded Systems",2<sup>nd</sup> Edition, Pearson Education 2008.
- [R2] Kenneth J. Ayala, "The 8086 Microprocessor: Programming & Interfacing The PC", Delmar Publishers, 2007.
- [R3] A K Ray, K M Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill, 2007.
- [R4] Vaneet Singh, Gurmeet Singh, "Microprocessor and Interfacing", Satya Prakashan, 2007.

### MAXIMUM MARKS: 75

[T2][No. of hrs. :12]

[T1][No. of hrs. :12]

### [T3][No. of hrs. 11]

# [T1][No. of hrs. 10]

### **OPERATING SYSTEMS (LINUX PROGRAMMING AND ADMINISTRATION) LAB**

### **List of Experiments:**

- 1. Write a program to implement CPU scheduling for first come first serve.
- 2. Write a program to implement CPU scheduling for shortest job first.
- 3. Write a program to perform priority scheduling.
- 4. Write a program to implement CPU scheduling for Round Robin.
- 5. Write a program for page replacement policy using a) LRU b) FIFO c) Optimal.
- 6. Write a program to implement first fit, best fit and worst fit algorithm for memory management.
- 7. Write a program to implement reader/writer problem using semaphore.
- 8. Write a program to implement Banker's algorithm for deadlock avoidance.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

### COMPUTER NETWORKS LAB

### Paper Code: ETCS-354 Paper: Computer Networks

L	T/P	С
0	2	1

### List of Experiments:

- Introduction to Computer Network laboratory Introduction to Discrete Event Simulation Discrete Event Simulation Tools - ns2/ns3, Omnet++
- 2. Using Free Open Source Software tools for network simulation I Preliminary usage of the tool ns3 Simulate telnet and ftp between N sources N sinks (N = 1, 2, 3). Evaluate the effect of increasing data rate on congestion.
- Using Free Open Source Software tools for network simulation II Advanced usage of the tool ns3 Simulating the effect of queueing disciplines on network performance - Random Early Detection/Weighted RED / Adaptive RED (This can be used as a lead up to DiffServ / IntServ later).
- 4. Using Free Open Source Software tools for network simulation III Advanced usage of the tool ns3 Simulate http, ftp and DBMS access in networks
- Using Free Open Source Software tools for network simulation IV Advanced usage of the tool ns3 Effect of VLAN on network performance - multiple VLANs and single router.
- Using Free Open Source Software tools for network simulation IV Advanced usage of the tool ns3 Effect of VLAN on network performance - multiple VLANs with separate multiple routers.
- 7. Using Free Open Source Software tools for network simulation V Advanced usage of the tool ns3

Simulating the effect of DiffServ / IntServ in routers on throughput enhancement.

- Using Free Open Source Software tools for network simulation VI Advanced usage of the tool ns3 Simulating the performance of wireless networks
- 9. Case Study I : Evaluating the effect of Network Components on Network Performance To Design and Implement LAN With Various Topologies and To Evaluate Network Performance Parameters for DBMS etc)
- Case Study II : Evaluating the effect of Network Components on Network Performance To Design and Implement LAN Using Switch/Hub/Router As Interconnecting Devices For Two Different LANs and To Evaluate Network Performance Parameters.
- 11. Mini project one experiment to be styled as a project of duration 1 month (the last month)

### NOTE:- At least 8 Experiments out of the list must be done in the semester.

### WEB TECHNOLOGY LAB

Paper Code: ETCS-356	L	T/P	С
Paper: Web Technology Lab	0	2	1

Web Technology Lab experiment based on syllabus of (ETCS-308).

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.

### MICROPROCESSORS AND MICROCONTROLLERS LAB

Paper Code: ETEE-358	L	T/P	С
Paper: Microprocessors and Microcontrollers Lab	0	2	1

### List of Experiments:

1. Write a program to add and subtract two 16-bit numbers with/ without carry using 8086.

- 2. Write a program to multiply two 8 bit numbers by repetitive addition method using 8086.
- 3. Write a Program to generate Fibonacci series.
- 4. Write a Program to generate Factorial of a number.
- 5. Write a Program to read 16 bit Data from a port and display the same in another port.
- 6. Write a Program to generate a square wave using 8254.
- 7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1(using 8051).
- 8. Write a Program to transfer data from external ROM to internal (using 8051).
- 9. Design a Minor project using 8086 Micro processor (Ex: Traffic light controller/temperature controller etc)
- 10. Design a Minor project using 8051 Micro controller

NOTE: - At least 8 Experiments out of the list must be done in the semester.

### **INFORMATION SECURITY**

Paper Code: ETCS-401	L	T/P	С
Paper: Information Security	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the basic concepts of web threats, legal ethical and professional issues of information security.

### UNIT- I

### **Information and Security:**

**Information Systems:** Recent History, Distributed Information System and its Importance, Role of Internet and Web Services, Threats and attacks, Classification of Threats and Assessing Damages Security in Mobile and Wireless Computing- Security Challenges in Mobile Devices, authentication Service Security, Security Implication for organizations, Laptops Security. Basic Principles of Information Security, Confidentiality, Integrity Availability and other terms in Information Security, Information Classification and their Roles, Privacy of Data.

[T1, T2][No. of hrs. 12]

### UNIT-II

**Networks and E-Security:** 

**Concepts in Internet and World Wide Web:** Brief review of Internet Protocols-TCP/IP, IPV4, IPV6. **Functions of various networking components:** Routers, bridges, switches, hub, gateway and Modulation Techniques. Need for security, Legal, Ethical and Professional Issues in Information Security, Risk Management, 11 Security Threats to E-Commerce, Virtual Organization, Business Transactions on Web, E Governance and EDI, Concepts in Electronics payment systems, E Cash, Credit/Debit Cards,

**Digital forensics including digital evidence handling:** Media forensics, Cyber forensics, Software forensics, Mobile forensics.

[T1, T2][No. of hrs. 11]

### UNIT-III

### Physical Security and Bio-metrics as Security:

**Physical Security:** Needs, Disaster and Controls, Basic Tenets of Physical Security and Physical Entry Controls, Access Control- Biometrics, Factors in Biometrics Systems, Benefits, Criteria for selection of biometrics, Design Issues in Biometric Systems, Interoperability Issues, Economic and Social Aspects, Legal Challenges Framework for Information Security, Security Metrics, Information Security Vs Privacy

[T1, T2][No. of hrs. 11]

### UNIT-IV

### Network Cryptography:

Model of Cryptographic Systems, Issues in Documents Security, System of Keys, Public Key Cryptography, Digital Signature, Requirement of Digital Signature System, Finger Prints, Firewalls, Design and Implementation Issues,

**Policies Network Security:** Basic Concepts, Dimensions, Perimeter for Network Protection, Network Attacks, Need of Intrusion Monitoring and Detection, Intrusion Detection Virtual Private Networks- Need, Use of Tunnelling with VPN, Authentication Mechanisms, Types of VPNs and their Usage, Security Concerns in VPN

[T1, T2][No. of hrs. 10]

### **Text Books:**

- [T1] Godbole," Information Systems Security", Wiley
- [T2] Merkov, Breithaupt," Information Security", Pearson Education

### **References:**

- [R1] Yadav, "Foundations of Information Technology", New Age, Delhi
- [R2] Schou, Shoemaker, "Information Assurance for the Enterprise", Tata McGraw Hill
- [R3] Furnell, "Computer Insecurity", Springer
- [R4] http://www.iiitd.edu.in/~gauravg/

Modified Scheme and Syllabus of B. Tech-CSE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

### MAXIMUM MARKS: 75

### SOFTWARE TESTING AND QUALITY ASSURANCE

Paper Code: ETCS-403	L	T/P	С
Paper: Software Testing and Quality Assurance	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To check the productivity of software alongwith its quality comparison with other software and core components of quality.

### UNIT I

### Introduction 4

Software testing:

Testing as an Engineering Activity, Role of Process in Software Quality, Testing as a Process, Software Testing Principles, Tester Role in Software Development, Artifacts of testing (Faults, Errors, and Failures), Limitations of Testing, Challenges in Software Testing, Testing and debugging, Verification, Validation, Test levels. *Software Quality:* 

Software Quality, Software Control, Quality Assurance, Quality Assurance Analyst, Quality Factor, Quality Management, Methods of Quality Management, Core components of Quality, Cost Aspect of Quality.

### [T1][T2][R3][No. of hrs. 10]

### UNIT II

### White Box and Black Box Testing

Different Testing Techniques, Differences between testing techniques

*Black Box Testing*: Requirements based testing techniques, Boundary value analysis, Equivalence partitioning, Decision table, State/Graph based testing

*White Box Testing:* Static testing techniques, Static analysis tools, Unit/Code functional testing, Control flow testing, Code complexity testing, Data flow testing

*Integration, System and Acceptance Testing:* Integration testing approaches, System testing, Scenario Testing, Deployment testing, Non-functional testing techniques,

Acceptance Testing: Acceptance criteria, types, test cases selection and execution.

### [T1][T2][R2][No. of hrs. 10]

UNIT III

*Quality Assurance:* Quality Planning, Quality plan objectives, Planning process overview, Business Plan and Quality Plan, TQM (Total Quality Management), TQM concepts, Zero defect movement

*Quality Standards:* Quality Models/Standards, Standards and guidelines, Types of Models, ISO Standards, CMM and CMMI, Six Sigma concepts, Quality Challenge, National Quality Awards.

[T2][R1][R3] [No. of hrs. 10]

[T1][R1][R2][No. of hrs. 10]

### UNIT IV

### Test Selection & Minimization for Regression Testing

Regression testing, Regression test process, Selection of regression tests, Dynamic Slicing, Test Minimization, Tools for regression testing.

Test Management and Automation

Test Planning, Management, Execution and Reporting, Software Test Automation: Scope of automation, Design & Architecture for automation, Testing tools, Object Oriented Testing.

### **Text Books:**

- [T1] Yogesh Singh,"Software Testing", Cambridge University Press, 2011
- [T2] Sagar Naik, Piyu Tripathy," Software Testing and Quality Assurance", Wiley

### **REFERENCE BOOKS:**

- [R1] Effective methods for Software Testing William Perry, Wiley
- [R2] Aditya P. Mathur, "Foundation of Software Testing", Pearson Education.
- [R3] Milind Limaye,"Software Quality Assurance, McGraw-Hill publication
- [R4] Paul C. Jorgensen, "Software Testing: A Craftsman's Approach", Auerbach Publications, 2008

### WIRELESS COMMUNICATION

Paper Code: ETEC-405	L	T/P	С
Paper: Wireless Communication	3	1	4

### **INSTRUCTIONS TO PAPER SETTER:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each auestion should be of 12.5 marks.

*Objective: The objective of the course is to introduce various wireless networks, mobile networks and their basic architecture starting from 2G through to 3G and 4G.* 

### UNIT – I

**Introduction To Wireless Communication Systems:** Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

**Introduction to Personal Communication Services (PCS):** PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

**Introduction to Wireless Channels and Diversity:** Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications

### UNIT - II

# **2G Networks:** Second generation, digital, wireless systems: GSM, IS\_136 (D-AMPS), IS-95 CDMA. Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling, mobile management, voice signal processing and coding. **Spread Spectrum Systems-** Cellular code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

### [T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

### UNIT - III

**2.5G Mobile Data Networks:** Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes, EDGE, Wireless LANs, (IEEE 802.11), Mobile IP.

**Third Generation (3G) Mobile Services:** Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

### [T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

### $\mathbf{UNIT} - \mathbf{IV}$

**Wireless Local Loop (WLL):** Introduction to WLL architecture, WLL technologies. Wireless personal area networks (WPAN): Blue tooth, IEEE 802.15, architecture, protocol stack. Wi-Max, introduction to Mobile Adhoc Networks.

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

### **Text Books:**

- [T1] Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001.
- [T2] Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2<sup>nd</sup> Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.

### **Reference Books:**

- [R1] T.L.Singhal "Wireless Communication", Tata McGraw Hill Publication.
- [R2] Jochen Schiller, "Mobile communications," Pearson Education Pvt. Ltd., 2002.
- [R3] Yi –Bing Lin & Imrich Chlamatac, "Wireless and Mobile Networks Architecture," John Wiley & Sons, 2001.
- [R4] Lee, W.C.Y., "Mobile Cellular Telecommunication", 2nd Edition, McGraw Hill, 1998.
- [R5] Smith & Collins, "3G Wireless Networks," TMH, 2007
- [R6] Schiller, Jochen, "Mobile Communications", 2<sup>nd</sup> Edition, Addison Wesley

### COMPLEXITY THEORY

Paper Code: ETCS-407	L	T/P	С
Paper: Complexity Theory	3	0	3

### **INSTRUCTIONS TO PAPER SETTER:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each auestion should be of 12.5 marks.

Objective: This subject focuses on the key tools and combines ideas from economics, political science, biology, physics, and computer science to illuminate topics in organization, adaptation, decentralization, and robustness

### UNIT I

**UNIT II** 

Complexity, properties common to complex systems, introduction to Net logo, Dynamics and Chaos, Fractals, Information, Order, and Randomness, Maxwell's Demon, Shannon Information.

### [T1][R2][T2][No. of hrs. 12]

Cellular Automata, Game of life, Cellular Automata as Dynamical Systems, Models of Biological Self-Organization, Ant Foraging and Task Allocation, Information Processing in Biological Systems, Models of Cooperation in Social Systems, The Prisoner's Dilemma.

### **UNIT III**

Small-World Networks, Scale-Free and Long-Tailed Degree Distributions, Scaling in Cities, Metabolic Scaling. [T1][T2][R1][No. of hrs. 10]

### Unit IV

Evolving Automata, Agent Behavior, Adaptation, Taxonomy of 2 x 2 Games, Game Theory, One Agent, Many Games

### [T2][R1][No. of hrs. 11]

### **Text Books:**

- Mitchell, Melanie. Complexity: A guided tour. Oxford University Press, 2009. [T1]
- [T2] Miller, John H., and Scott E. Page. Complex Adaptive Systems: An Introduction to Computational Models of Social Life: An Introduction to Computational Models of Social Life. Princeton University Press, 2009.

### **Reference Books:**

- Wolfram, Stephen. A New Kind of Science. Vol. 5. Champaign: Wolfram media, 2002. [R1]
- Johnson, Neil. Simply Complexity: A clear guide to complexity theory. One world Publications, 2009. [R2]

[T1][R1][No. of hrs. 11]

### INTELLECTUAL PROPERTY RIGHTS

Paper Code: ETCS-409	L	T/P	С
Paper: Intellectual Property Rights	3	0	3

### **INSTRUCTIONS TO PAPER SETTER:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each auestion should be of 12.5 marks.

Objective: To understand the basic concept of legal rights of an individual.

### UNIT- I

Intellectual Property Rights (IPR): Introduction, need of IPR, Origin of IPR, Importance of IPR, Intellectual Property Rights in India.

**Patents:** introduction; granting; infringement; searching & filing; Introduction of Utility Models

[T1][R2][T2][No. of hrs. 12]

### UNIT- II

**Copyrights:** Introduction, granting, infringement, searching & filing, Copy related rights-Explanation, comparison of copy rights and related rights

Industrial Designs ; Design Patents; scope; protection; filing infringement; difference between Designs & Patents

### UNIT- III

**Trademarks**: role in commerce, importance, protection, registration; domain name International protection; Plant varieties; breeder's rights, protection.

### UNIT-IV

Biotechnology& research and rights managements; licensing, commercialisation; ; legal issues, enforcement; Case studies in IPR.

### [T1][R2][T2][No. of hrs. 11]

### **Text Books:**

- [T1] T. M Murray and M.J. Mehlman, Encyclopedia of Ethical, Legal and Policy issues in Biotechnology, John Wiley & Sons 2000
- [T2] Ajit Parulekar and Sarita D' Souza, Indian Patents Law Legal & Business Implications; Macmillan India ltd, 2006

### **References Books:**

- [R1] P.N. Cheremisinoff, R.P. Ouellette and R.M. Bartholomew, Biotechnology Applications and Research, Technomic Publishing Co., Inc. USA, 1985
- [R2] D. Balasubramaniam, C.F.A. Bryce, K. Dharmalingam, J. Green and K. Jayaraman, Concepts in Biotechnology, University Press (Orient Longman Ltd.), 2002
- [R3] Bourgagaize, Jewell and Buiser, Biotechnology: Demystifying the Concepts, Wesley Longman, USA, 2000.
- [R4] B.L.Wadehra; Law Relating to Patents, Trade Marks, Copyright, Designs & Geographical Indications; Universal law Publishing Pvt. Ltd., India 2000
- [R5] P. Narayanan; Law of Copyright and Industrial Designs; Eastern law House, Delhi, 2010

### [T1][R2][T2][No. of hrs. 11]

[T1][R2][T2][No. of hrs. 11]

### EMBEDDED SYSTEMS

Paper Code: ETEC-401	L	T/P	С
Paper: Embedded Systems	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to enable a student to design an embedded system for specific tasks.

### UNIT- I

**Overview of Embedded Systems**: Characteristics of Embedded Systems. Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 micro controllers.

**PIC Microcontrollers:** Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals.

### [T1][No. of hrs. 12]

### UNIT- II

**ARM Processors:** Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture.

Bus structure: Time multiplexing, serial, parallel communication bus structure. Bus arbitration, DMA, PCI, AMBA, I2C and SPI Buses.

### [T2][No. of hrs. 12]

### UNIT- III

Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System.

### [T3][No. of hrs. 10]

[T3][No. of hrs. 10]

### **UNIT-IV**

**RTOS:** Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RT-Linux introduction, RTOS kernel, Real-Time Scheduling.

### **Text Book:**

- [T1] Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002
- [T2] ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss, Dominic Symes, Chris Wright, Morgan Kaufman Publication, 2004.
- [T3] Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

### **References Books:**

- [R1] The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
- [R2] Embedded System Design, Marwedel, Peter, Kluwer Publishers, 2004.

### MAXIMUM MARKS: 75

### DATA MINING AND BUSINESS INTELLIGENCE

Paper Code: ETCS-413	L	T/P	С
Paper: Data Mining and Business Intelligence	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the basics of Data Warehouse and Data Mining, to study algorithms and computational paradigms that allow computers to find patterns and regularities in databases, perform prediction and forecasting, and generally improve their performance through interaction with data.

### UNIT – I

Introduction to Data Warehousing: Overview, Difference between Database System and Data Warehouse, The Compelling Need for data warehousing, Data warehouse - The building Blocks: Defining Features, data warehouses and data marts, overview of the components, Three tier architecture, Metadata in the data warehouse. **Data pre-processing:** Data cleaning, Data transformation ETL Process. ETL tools.

**Defining the business requirements:** Dimensional analysis, information packages – a new concept, requirements gathering methods, requirements definition: scope and content.

### UNIT – II

UNIT – III

Principles of Dimensional Modeling: Objectives, From Requirements to data design, Multi Dimensional Data Model, Schemas: the STAR schema, the Snowflake schema, fact constellation schema.

OLAP in the Data Warehouse: Demand for Online Analytical Processing, limitations of other analysis methods-OLAP is the answer, OLAP definitions and rules, OLAP characteristics, major features and functions, hyper cubes.

OLAP Operations: Drill-down and roll-up, slice-and-dice, pivot or rotation, OLAP models, overview of variations, the MOLAP model, the ROLAP model, the DOLAP model, ROLAP versus MOLAP, OLAP implementation considerations. Query and Reporting, Executive Information Systems (EIS), Data Warehouse and Business Strategy.

### [T1, R4][No. of Hrs. 11]

[T1][No. of Hrs: 12]

Data Mining Basics: What is Data Mining, Data Mining Defined, The knowledge discovery process (KDD Process), Data Mining Applications- The Business Context of Data Mining, Data Mining for Process Improvement, Data Mining as a Research Tool, Data Mining for Marketing, Benefits of data mining,

Major Data Mining Techniques: Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, KNN Algorithm.

### [T2, R4][No. of Hrs: 11]

[T2, R3][No. of Hrs: 10]

UNIT - IV

Cluster detection, K- means Algorithm, Outlier Analysis, memory-based reasoning, link analysis, Mining Association Rules in Large Databases: Association Rule Mining, genetic algorithms, neural networks. Data mining tools.

### **Text Books:**

- Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2004. [T1]
- Kamber and Han, "Data Mining Concepts and Techniques", Hart Court India P. Ltd. Elsevier [T2] Publications Second Edition, 2001

### **Reference Books:**

- W. H. Inmon, "Building the operational data store", 2<sup>nd</sup> Ed., John Wiley, 1999. [R1]
- [R2] "Data Warehousing", BPB Publications, 2004.
- [R3] Pang- Ning Tan, Michael Steinbach, Viach, Vipin Kumar, Introduction to Data Mining, Pearson
- [R4] Shmueli, "Data Mining for Business Intelligence : Concepts, Techniques and Applications in Microsoft Excel with XLMiner", Wiley Publications

### ADVANCED COMPUTER ARCHITECTURE

Paper Code: ETCS-415	L	T/P	С
Paper: Advanced Computer Architecture	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

# 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand different program and network properties, concepts of pipelining and architectures of computers.

### UNIT-I

### **Parallel Computer Models:**

The state of computing, Classification of parallel computers, Multiprocessors and multicomputers, Multivector and SIMD computers.

### **Program and Network Properties:**

Conditions of parallelism, Data and resource Dependences, Hardware and software parallelism, Program partitioning and scheduling, Grain Size and latency, Program flow mechanisms, Control flow versus data flow, Data flow Architecture, Demand driven mechanisms, Comparisons of flow mechanisms

### [T1, R4][No. of Hrs: 10]

### UNIT-II Pipelining:

Linear pipeline processor, nonlinear pipeline processor, Instruction pipeline Design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch Handling techniques, branch prediction, Arithmetic Pipeline Design, Computer arithmetic principles, Static Arithmetic pipeline, Multifunctional arithmetic pipelines

### [T1, R2][No. of Hrs: 10]

### UNIT-III

### Arithmetic for Computers:

Signed and unsigned Numbers, Addition and Subtraction, Multiplication, Division, Floating Point. CPU Performance and Its factors, Evaluating performance of CPU.

[T2, R3][No. of Hrs: 10]

### UNIT-IV

### Memory Hierarchy:

Introduction, The basics of Cache, Measuring and Improving of Cache Performance, Virtual Memory, Common framework for memory hierarchies

Case study of PIV and AMD opteron memory hierarchies

### **Text Books:**

- [T1] Kai Hwang, "Advanced computer architecture"; TMH. 2000
- [T2] D. A. Patterson and J. L. Hennessey, "Computer organization and design", Morgan Kaufmann, 2nd Ed. 2002

### **Reference Books:**

- [R1] J.P.Hayes, "computer Architecture and organization"; MGH. 1998
- [R2] Harvey G.Cragon,"Memory System and Pipelined processors"; Narosa Publication. 1998
- [R3] V.Rajaranam & C.S.R.Murthy, "Parallel computer"; PHI. 2002
- [R4] R.K.Ghose, Rajan Moona & Phalguni Gupta, "Foundation of Parallel Processing", Narosa Publications, 2003
- [R5] Kai Hwang and Zu, "Scalable Parallel Computers Architecture", MGH. 2001
- [R6] Stalling W, "Computer Organisation & Architecture", PHI. 2000
- [R7] D.Sima, T.Fountain, P.Kasuk, "Advanced Computer Architecture-A Design space Approach,"Addison Wesley, 1997.
- [R8] M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design"; Narosa Publishing. 1998
- [R9] D.A.Patterson, J.L.Hennessy, "Computer Architecture :A quantitative approach"; Morgan Kauffmann feb, 2002.
- [R10] Hwan and Briggs, "Computer Architecture and Parallel Processing"; MGH. 1999

### MAXIMUM MARKS: 75

[T2, T1][No. of Hrs: 10]

### NATURAL LANGUAGE PROCESSING

Paper Code: ETCS-410	L	T/P	С
Paper: Natural Language Processing	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:** 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand semantics and machine translation for any compiler.

### UNIT-I

### Introduction to NLP

Achievement and brief history, open problems, major goal, characteristic of Language, Language structure, Language analyzer

### **UNIT-II**

### **Study of Grammar and Semantics**

Morphology, word formation, theory of semantics, componential theory of meaning, truth conditional theory of meaning, pragmatics and discourse

### **UNIT-III**

### **Machine Translation**

Introduction, problems of machine translation. Approaches, language Accesor, Structure of Anusaraka system.

### UNIT-IV

### Lexical: Functional Grammar (LFG) and Indian Languages

Overview of LGF, LFG formalism, well formedness conditions, computational aspects, CFG and Indian languages, functional specification, tree adjoining grammar.

### **Text Books:**

Natural language processing by Akshar Bhartati, Sangal and Chaitanya, Eastern Economy Edition [T1]

[T2] An introduction to Linguistics, language grammar and semantics by P.Syal and D.V.Jindal, Eastern **Economy Edition** 

### **References:**

- Natural Language Processing with Python 1st Edition, Steven Bird [R1]
- Foundations of Statistical Natural Language Processing, Christopher Manning [R2]

### **MAXIMUM MARKS: 75**

### [T1, T2][No. of Hrs: 12]

[T1, T2][No. of Hrs: 10]

[T1, T2][No. of Hrs: 10]

[T1, T2][No. of Hrs: 12]

### Modified Scheme and Syllabus of B. Tech-CSE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

### DIGITAL SIGNAL PROCESSING

Paper Code: ETIT-415	L	T/P	С
Paper: Digital Signal Processing	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objectives:** The aim of this course is to provide in depth knowledge of various digital signal processing techniques and design of digital filters, learn the concept of DFT FFT algorithms, and design of digital filters using different approximations, DSP processor and architecture. The prerequisites of this subject are basic knowledge of signal and systems.

### UNIT-I:

Frequency Domain Sampling: The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based of the DFT.

Efficient computation of the DFT: Principal of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT.

Application of DFT, Design of Notch filter

### [T2, T1][No. of Hours: 11]

**MAXIMUM MARKS: 75** 

### **UNIT-II:**

Design & Structure of IIR filters from analog filters: Impulse Invariance: Bilinear transformation and its use in design of Butterworth and Chebyshev IIR Filters; Frequency transformation in Digital Domain, Direct, Cascade, Parallel & transposed structure

Design & structure of FIR filters: Symmetric and anti-symmetric FIR filters; Design of Linear Phase FIR filters using windows, Frequency Sampling Method of FIR design, Direct, Cascade, Frequency Sampling, transposed structure

### [T1, T2] [No. of Hours: 11]

### **UNIT-III:**

### **Implementation of Discrete Time Systems:**

Lattice structures, Lattice and Lattice-Ladder Structures, Schur - Cohn stability Test for IIR filters; Discrete Hilbert Transform.

Linear predictive Coding:

Lattice filter design, Levension Darwin Technique, Schur Algorithm

### **UNIT-IV:**

Quantization Errors in Digital Signal Processing: Representation of numbers, Quantization of filter coefficients, Round-off Effects in digital filters.

Multirate Digital Signal Processing: Decimation, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Poly phase decomposition.

### [T1, T2][No. of Hours: 10]

[T1, T2] [No. of Hours: 10]

### **Text Books:** [T1]

Oppenheim & Schafer, Digital Signal Processing, PHI-latest edition. [T2] Proakis and Manolakis, Digital Signal Processing, PHI Publication

### **Reference Books:**

- S. K. Mitra, Digital Signal Processing, TMH edition 2006 [R1]
- Johny. R. Johnson, Introduction to Digital Signal Processing, PHI-latest edition [R2]
- [R3] R.Babu, Digital Signal Processing, SciTech Publication.

### SIMULATION AND MODELLING

Paper Code: ETCS-421	L	T/P	С
Paper: Simulation and Modelling	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objectives: The objective of this course is to teach students methods for modelling of systems using discrete event simulation. Emphasis of the course will be on modelling and on the use of simulation software. The students are expected to understand the importance of simulation in IT sector, manufacturing, telecommunication, and service industries etc. By the end of the course students will be able to formulate simulation model for a given problem, implement the model in software and perform simulation analysis of the system.

### UNIT-I:

### **Introduction to Simulation and Modelling:**

Appropriateness, Advantages and disadvantage, application areas, history of simulation software, an evaluation and selection technique for simulation software, general – purpose simulation packages. System and system environment, components of system, type of systems, model of a system, types of models and steps in simulation study.

### [T1, T2][No. of Hrs: 12]

### UNIT-II:

**Manual Simulation of Systems:** Simulation of Queuing Systems such as single channel and multi channel queue, lead time demand, inventory system, reliability problem, time-shared computer model, job-shop model.

**Discrete Event Formalisms:** Concepts of discrete event simulation, model components, a discrete event system simulation, simulation world views or formalisms, simulation of single channel queue, multi channel queue, inventory system and dump truck problem using event scheduling approach.

**Statistical Models in Simulation:** Overview of probability and statistics, useful statistical model, discrete distribution, continuous distribution, empirical distribution, Poisson process.

**Queuing Models:** Characteristics of queuing systems, queuing notations, long run measures of performance of queuing systems, Steady state behaviour of Markovian models (M/G/1, M/M/1, M/M/c) overview of finite capacity and finite calling population models, Network of Queues.

### [T1, T3][No. of Hrs: 10]

### UNIT-III:

**Random Number Generation:** Properties of random numbers, generation of true and pseudo random numbers, techniques for generating random numbers, hypothesis testing, various tests for uniformity, Kolmogorov-Smirnov and Chi-Square) and independence(runs, autocorrelation, gap, poker).

**Random Variate Generation:** Introduction, different techniques to generate random variate: - inverse transform technique, direct transformation technique, convolution method and acceptance rejection techniques.

**Input Modeling:** Introduction, steps to build a useful model of input data, data collection, identifying the distribution with data, parameter estimation, suggested estimators, goodness of fit tests, selection input model without data, covariance and correlation, multivariate and time series input models.

### [T1, T3][No. of Hrs: 12]

### **UNIT-IV:**

**Verification and Validation of Simulation Model**: Introduction, model building, verification of simulation models, calibration and validation of models:- validation process, face validity, validation of model, validating input-output transformation, test, power of test, input output validation using historical data and Turing test.

**Output Analysis:** Types of simulations with respect to output analysis, stochastic nature of output data, measure of performance and their estimation, output analysis of terminating simulators, output analysis for steady state simulation.

**Case Studies:** Simulation of manufacturing systems, Simulation of Material Handling system, Simulation of computer systems, Simulation of super market, Cobweb model, and any service sectors.

[T1, T2, T3][No. of Hrs: 10]

### **Text Books:**

- [T1] Banks J., Carson J. S., Nelson B. L., and Nicol D. M., "Discrete Event System Simulation", 3rd edition, Pearson Education, 2001.
- [T2] Edward A. Bender.. An Introduction to Mathematical Modeling.
- [T3] A.M. Law and W.D. Kelton., Simulation Modeling and Analysis, T.M.H. Edition.

### **References Books:**

- [R1] A. C. Fowler, "Mathematical Models in Applied Sciences", Cambridge University Press.
- [R2] J. N. Kapoor, "Mathematical Modeling", Wiley Eastern Limited.
- [R3] S.M. Ross, "Simulation", India Elsevier Publication.
- [R4] A. M. Law and W. D. Kelton, Simulation Modeling and Techniques. 2nd ed. New York: McGraw-Hill, 1990.
- [R5] M. H. MacDougall, Simulating Computer Systems: Techniques and Tools. Cambridge, MA: MIT Press, 1987.

### ADVANCED DBMS

Paper Code: ETCS-423	L	T/P	С
Paper: Advanced DBMS	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand different storage techniques and database techniques.

### UNIT-I

Concept of advanced database techniques, Impact of emerging database standards, Study of DDBMS architecture, New developments in database technology, Introduction of PL/SQL, PL/SQL Database Objects, Procedures, Functions, Packages, Triggers, Programmatic SQL, Embedded SQL, Dynamic SQL, and ODBC Standard. Parallel Database Architecture, Data base System Structure, Storage Manager, Query Processor.

### [T1, T3][No of Hours 10]

UNIT-II

Introduction to the Relational Model ,Advanced SQL programming, Advanced Transaction Processing, Relational model conformity and Integrity, Data Replication, Security considerations, Relational Model of Data and RDBMS Implementation Techniques, Query optimization, Integrity Constraint Over relations, Querying relational data and relational Algebra.

### [T1, T3] [No of Hours 10]

### UNIT-III

Object Relational database concepts, Temporal database concepts, Mobile Databases, Object based databases Complex data types, structured types and inheritance in SQL, object identity and reference types in SQL, Structure of XML, Document Schema, Querying and Transformation, API in XML, XML applications.

### [T2][No. of Hours 10]

### UNIT-IV

Postgre SQL, Oracle, IBM DB2 Universal Database, SQL standards, SQL1999, SQL: 2003, Standards for interoperability and integration, XML related specifications, X-Query, X-Path, Web Services, SOAP.

[T3, R3] [No of Hours 10]

### **Text Books:**

- [T1] Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.
- [T2] Elmasri, Navathe, Fundamentals of Database Systems, 5<sup>th</sup> Edition, Pearson Education, India.

### **Reference Books:**

- [R1] Raghu Ramakrishnan, Johannes Gehrke, Database Management Systems, McGraw-Hill
- [R2] Fundamentals of Database Systems, Elmasri Navrate Pearson Education
- [R3] S.R. Prabhu, "Object-Oriented Database Systems: Approaches and Architectures", Prentice-Hall of India, Pvt. Ltd., Second edition, 2005.
- [R4] SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4<sup>th</sup> Edition BPB Publications.
- [R5] Rajesh Narang, "Object Oriented Interfaces and Databases", Prentice-Hall of India, Pvt. Ltd., 2004.

### PARALLEL COMPUTING

Paper Code: ETCS-427	L	T/P	С
Paper: Parallel Computing	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The perquisites are Computer Architecture, OS. The student is introduced to the concepts of parallelism which enhances the speed of operations of an OS. Further, various architectures of multiprocessor is taught.

### UNIT I

Theory of Parallelism: Parallelism, Reason of parallel processing, Concepts and challenges, applications of parallel processing.

Parallel computer models: The state of computing, Classification of parallel computers, Flynn and Feng's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors, multiprocessors and multicomputers, Multivector and SIMD computers, PRAM and VLSI Models.

Program and Network Properties: Conditions of parallelism, program partitioning and scheduling, program flow mechanism, system interconnection architecture.

### [T1, T2][No. of Hrs. 10]

### UNIT II

Memory Hierarchy Design: Memory technologies and optimization, inclusion, coherence and locality, cache memory organization and cache performance optimization, shared memory organization, memory protection, virtual memory technology and introduction to buses, crossbar and multi-stage switches.

Pipelining and ILP: Instruction level parallelism and its exploitation- concepts and challenges, overcoming data hazards with dynamic scheduling. Pipelining, instruction and arithmetic pipelining designs, branch handling techniques, linear and non-linear pipeline processors, superscalar and super pipeline design.

### [T1, T2][No. of Hrs. 10]

### UNIT III

Parallel architectures: multi-processor system interconnects, cache coherence and synchronization mechanism, message passing mechanism, vector processing principles, multivector multiprocessors, compound vector processing, principles of multithreading, latency hiding techniques- shared virtual memory, prefetching techniques, distributed coherent cache, scalable and multithread architectures, dataflow and hybrid architecture.

### [T1, T2][No. of Hrs. 10]

### UNIT IV

Parallel Programming Platforms: Implicit Parallelism: Trends in Microprocessor Architectures, limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines, Routing Mechanisms for Interconnection Networks. Parallel Programming Models: Shared variable models, message passing models, parallel languages and complier, code optimization and scheduling, Introduction of shared-memory MIMD machines and message-passing MIMD machines.

### **Text Books:**

### [T1, T2][No. of Hrs. 10]

- [T1] Introduction to Parallel Computing by Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar in Pearson Publication.
- [T2] Advance computer Architecture by Kai Hwang under Tata McGraw Hill publications.

[T3] Introduction to Parallel Processing: Algorithms & Architectures, Behrooz Parhami in Springer Shop. **Reference Books:** 

- [R1] Introduction to Parallel Processing by P. Ravi Prakash, M. Sasikumar, Dinesh Shikhare By PHI Publications.
- [R2] Fundamentals of Parallel Processing by Jordan Harry, Alaghband Gita, PHI Publication
- [R3] Introduction to Parallel Programming by Steven Brawer.
- [R4] Parallel Computers Architecture and Programming by V. Rajaraman And C. Siva Ram Murthy.

### ADVANCED COMPUTER NETWORKS

Paper Code: ETIT-401	L	T/P	С
Paper: Advanced Computer Networks	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand different network protocols with emphasis on TCP/IP protocol suite.

### UNIT-I

### Network Layer:

ARP,RARP,ICMP,IPv4 Routing Principles, Routing and overview, DVR and LSR, the IGRP and EIGRP, BGP, Routing Information Protocol (RIP), OSPF (IPv4 / IPv6).

Multicasting in IP Environments-Broadcasting, Multicasting, IGMP and Multicast Listener Discovery (MLD). The Distance Vector Multicast Routing Protocol (DVMRP), Multicast OSPF (MOSPF), Protocol Independent Multicast (PIM).

### [T1][No. of Hours 10]

UNIT-II

**Transport Layer:** Transport layer overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), TCP Protocol: TCP Tahoe, TCP Reno.

[R1, R3][No. of Hours 10]

### UNIT-III

### **Optical Networking:**

Introduction to Optical networking, its benefits and drawbacks, SONET layered architecture, frame format, SONET network configuration, its advantages and benefits. **Quality of Service:** Introducing QoS, Queue Analysis, QoS Mechanisms, Queue Management algorithms, Resource Reservation, Diffserv and Intserv.

[T2] [No. of Hours 10]

### UNIT-IV

### **Overview of latest concepts:**

**TCP/IP Applications:** VoIP, NFS, Telnet ,FTP,SMTP, SNMP, Finger, Whois and WWW, IP v6 and Next Generation Networks, xAAS(PAAS,SAAS,HAAS) and Cloud Computing, Big data, Elements of Social Network. [R2][No. of Hours 12]

### **Text Books:**

- [T1] Douglas E. Comer, "Internet networking with TCP/IP", Pearson. TCP/IP, Vol. 2
- [T2] B. A. Forouzan, "TCP/IP Protocol Suite", TMH, 2nd Ed., 2004.

### **Reference Books:**

- [R1] TCP/IP Illustrated, Volume 1 (The Protocols) by W. Richard Stevens, Pearson Education.
- [R2] U. Black, "Computer Networks-Protocols, Standards and Interfaces", PHI, 1996.
- [R3] W. Stallings, "Computer Communication Networks", PHI, 1999.

### **CONTROL SYSTEMS**

Paper Code: ETEE-429	L	T/P	С
Paper: Control Systems	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective**: To teach the fundamental concepts of Control systems and mathematical modeling of the system. To study the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system

### UNIT I : Control Systems - - Basics & Components

Introduction to basic terms, classifications & types of Control Systems, block diagrams & signal flow graphs. Transfer function, determination of transfer function using block diagram reduction techniques and Mason's Gain formula. Control system components: Electrical/ Mechanical/Electronic/A.C./D.C. Servo Motors, Stepper Motors, Tacho Generators, Synchros, Magnetic Amplifiers, Servo Amplifiers,

### **UNIT II : Time – Domain Analysis**

Time domain performance specifications, transient response of first & second order systems, steady state errors and static error constants in unity feedback control systems, response with P, PI and PID controllers, limitations of time domain analysis.

### **UNIT III : Frequency Domain Analysis**

Polar and inverse polar plots, frequency domain specifications and performance of LTI systems, Logarithmic plots (Bode plots), gain and phase margins, relative stability. Correlation with time domain performance closes loop frequency responses from open loop response. Limitations of frequency domain analysis, minimum/non-minimum phase systems.

### **UNIT IV : Stability & Compensation Techniques**

Concepts, absolute, asymptotic, conditional and marginal stability, Routh–Hurwitz and Nyquist stability criterion, Root locus technique and its application.

Concepts of compensation, series/parallel/ series-parallel/feedback compensation, Lag/Lead/Lag-Lead networks for compensation, compensation using P, PI, PID controllers.

### Text Books:

[T1] B. C. Kuo, "Automatic control system", Prentice Hall of India, 7<sup>th</sup> edition 2001.

[T2] Nagraath Gopal "Control Systems Engineering -Principles and Design" New Age Publishers

### **Reference Books:**

- [R1] Norman S. Nise, "Control systems engineering" John Wiley & Sons (Asia) Singapore.
- [R2] Raymond T. Stefani, Design of Feedback Control System, Oxford University Press.
- [R3] K. Ogata, "Modern control engineering", Pearson 2002.
- [R4] S. P.Eugene Xavier, "Modern control systems", S. Chand & Company.
- [R5] M. Gopal "Control Systems-Principles and Design" TMH 4<sup>th</sup> Edition 2012

### **MAXIMUM MARKS: 75**

### [T1,T2][No. of Hrs. : 11]

### [T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 11]

### SOCIOLOGY AND ELEMENTS OF INDIAN HISTORY FOR ENGINEERS

Paper Code: ETHS-419	L	T/P	С
Paper: Sociology and Elements of Indian History for Engineers	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

### UNIT I

*Module 1A:* Introduction to Elements of Indian History: What is History? History Sources-Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.

[3 Lectures]

[3 Lectures]

*Module 1B:* Introduction to sociological concepts-structure, system, organization, social institution, Culture social stratification (caste, class, gender, power). State & civil society.

[7 Lectures] [T1][No. of Hrs. 10]

### UNIT II

*Module 2A:* Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.

Module 2B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[7 Lectures] [T1][No. of Hrs. 10]

### UNIT III

Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence.

[3 Lectures] Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

> [9 *Lectures*] [**T1**][**No. of Hrs. 12**]

### UNIT IV

*Module 4A:* Issues & concerns in post-colonial India (upto 1991); Issues & concerns in post-colonial India 2<sup>nd</sup> phase (LPG decade post 1991).

[3 Lectures]

*Module 4B:* Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.

[10 Lectures] [T1][No. of Hrs. 13]

### **Text Books:**

- [T1] Desai, A.R. (2005), Social Background of Indian Nationalism, Popular Prakashan.
- [T2] Giddens, A (2009), Sociology, Polity, 6<sup>th</sup> Edition

### **Reference Books:**

- [R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan
- [R2] Haralambos M, RM Heald, M Holborn, (2000), Sociology, Collins

### SOFTWARE TESTING AND QUALITY ASSURANCE LAB

Paper Code: ETCS-453	L	T/P	С
Paper: Software Testing and Quality Assurance Lab	0	2	1

### List of Experiments:

### Tool Required: Smartbear QA Complete

- 1. 1.To determine the nature of roots of a quadratic equations, its input is triple of +ve integers (say x,y,z) and values may be from interval[1,100] the program output may have one of the following:-[Not a Quadratic equations, Real roots, Imaginary roots, Equal roots] Perform BVA.
- 2. To determine the type of triangle. Its input is triple of +ve integers (say x,y,z) and the values may be from interval[1,100]. The program output may be one of the following [Scalene, Isosceles, Equilateral, Not a Triangle]. Perform BVA
- 3. Perform robust case testing on Problem No. 1.
- 4. Perform robust case testing on Problem No. 2.
- 5. Create a test plan document for any application (e.g. Library Management System)
- 6. Experiment: Study of Any Testing Tool (Win Runner)
- 7. Experiment: Study of Any Test Management Tool ( QA Complete)
- 8. Experiment: Automate the Test cases using Test Automation tool(using QA Complete)
- 9. Experiment: Learn how to raise and report Bugs using Bug tracking tool (Bugzilla,Jira using QA Complete)
- 10. Experiment: Study of any open source testing tool (Web Performance Analyzer/O STA)

NOTE: At least 8 Experiments out of the list must be done in the semester.

### **INFORMATION SECURITY LAB**

Paper Code: ETCS-451	L	T/P	С
Paper: Information Security Lab	0	2	1

### **List of Experiments:**

- 1. Make an experiment to implement WEP/WPA2 PSK, 802.1x EAP security protocol.
- 2. Implement firewall through App to login into bank-site,; to implement E-commerce, debit card transaction through payment gateway
- 3. Implement bio-metric system to have physical security through different access control permissions.
- 4. Implement RSA algorithm.
- 5. Implement DES algorithm
- 6. Implement Diffie-Hellman algorithm
- 7. Make a study of anyone simulation tool based on parameters of information security
- 8. Implement VPN through Packet-Tracer or any other network simulator tool.

NOTE: At least 8 Experiments from the syllabus must be done in the semester.

### WIRELESS COMMUNICATION LAB

Paper Code: ETEC-463	L	T/P	С
Paper: Wireless Communication Lab	0	2	1

### **List of Experiments:**

- 1. Eight experiments suggested on kits for GSM, CDMA and any possible experiments covering the subjects.
- 2. Setting up wireless network with and without infrastructure support.
- 3. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
- 4. Configuring Routing between wired and wireless Networks.
- 5. Configuring Security in wireless network with and without infrastructure support.

### NOTE: At least 8 Experiments from the syllabus must be done in the semester.

### EMBEDDED SYSTEMS LAB

Paper Code: ETCS-457(ELECTIVE) Paper: Embedded Systems Lab	L 0	T/P 2	C 1
List of Experiments:			
<ol> <li>Introduction to microcontroller and interfacing modules.</li> <li>To interface the seven segment display with microcontroller 8051</li> <li>To create a series of moving lights using PIC on LEDs.</li> <li>To interface the stepper motor with microcontroller.</li> <li>To display character 'A' on 8*8 LED Matrix.</li> <li>Write an ALP to add 16 bits using ARM 7 Processor</li> <li>Write an ALP for multiplying two 32 bit numbers using ARM Processor</li> <li>Write an ALP to multiply two matrices using ARM processor</li> <li>Write an ALP to multiply two matrices using ARM processor</li> </ol>	3	×	

### DATA MINING AND BUSINESS INTELLIGENCE LAB

Paper Code: ETCS-457(ELECTIVE)	L	T/P	С
Paper: Data Mining and Business Intelligence Lab	0	2	1

### List of Experiments:

1. Study of ETL process and its tools.

2. Program of Data warehouse cleansing to input names from users (inconsistent) and format them.

- 3. Program of Data warehouse cleansing to remove redundancy in data.
- 4. Introduction to WEKA tool.
- 5. Implementation of Classification technique on ARFF files using WEKA.
- 6. Implementation of Clustering technique on ARFF files using WEKA.
- 7. Implementation of Association Rule technique on ARFF files using WEKA.
- 8. Implementation of Visualization technique on ARFF files using WEKA.
- 9. Study of DBMINER tool
- 10. Study of ARMINER tool.

NOTE: At least 8 Experiments out of the list must be done in the semester.

### **ADVANCED COMPUTER NETWORKS LAB**

Paper Code: ETCS-457(ELECTIVE)	L	T/P	С
Paper: Advanced Computer Network Lab	0	2	1

### List of Experiments:

- 1. Configuration and logging to a CISCO Router and introduction to the basic user Interfaces. Introduction to the basic router configuration and basic commands.
- 2. Configuration of IP addressing for a given scenario for a given set of topologies.
- Configure a DHCP Server to serve contiguous IP addresses to a pool of four IP devices with a default gateway and a default DNS address. Integrate the DHCP server with a BOOTP demon to automatically serve Windows and Linux OS Binaries based on client MAC address.
- 4. Configure, implement and debug the following: Use open source tools for debugging and diagnostics.
  - a. ARP/RARP protocols
  - b. RIP routing protocols
  - c. BGP routing
  - d. OSPF routing protocols
  - e. Static routes (check using netstat)
- 5. Configure DNS: Make a caching DNS client, and a DNS Proxy; implement reverse DNS and forward DNS, using TCP dump/Wireshark characterise traffic when the DNS server is up and when it is down.
- 6. Configure FTP Server on a Linux/Windows machine using a FTP client/SFTP client characterise file transfer rate for a cluster of small files 100k each and a video file of 700mb.Use a TFTP client and repeat the experiment.
- 7. Configure a mail server for IMAP/POP protocols and write a simple SMTP client in C/C++/Java client to send and receive mails.
- 8. Implement Open NMS+ SNMPD for checking Device status of devices in community MIB of a linux PC. Using yellow pages and NIS/NFS protocols implement Network Attached Storage Controller (NAS).

Extend this to serve a windows client using SMB. Characterise the NAS traffic using wireshark.

NOTE: At least 8 Experiments out of the list must be done in the semester.

### NATURAL LANGUAGE PROCESSING LAB

Paper Code: ETCS-457(ELECTIVE)	L	T/P	С
Paper: Natural Language Processing Lab	0	2	1

### List of Experiments:

- 1. Write a Program for Word Analysis.
- 2. Write a Program for Word Generation.
- 3. Write a program to implement Morphology.
- 4. Write a Program to implement N-Grams.
- 5. Write a Program to implement N-Grams Smoothing.
- 6. Write a Program to implement POS Tagging: Hidden Markov Model.
- 7. Write a Program to implement POS Tagging: Viterbi Decoding.

NOTE: At least 8 Experiments from the syllabus must be done in the semester

### DIGITAL SIGNAL PROCESSING LAB

Paper Code: ETCS-457(ELECTIVE)	L	T/P	С
Paper: Digital Signal Processing Lab	0	2	1

### List of Experiments:

### Software Experiments:

- 1. Generation of basic signals sine, cosine, ramp, step, impulse and exponential in continuous and discrete domains using user defined functions.
- 2. Write a MATLAB program to find convolution (linear/circular) and correlation of two discrete signals.
- 3. Perform linear convolution using circular convolution and vice versa.
- 4. Write a MATLAB program to
  - i. Find 8 point DFT, its magnitude and phase plot and inverse DFT.
  - ii. Find 16 point DFT, its magnitude and phase plot and inverse DFT.
- 5. Perform the following properties of DFT
  - i. Circular shift of a sequence.
  - ii. Circular fold of a sequence.
- 6. Write a MATLAB Program to design FIR Low pass filter using
  - i. Rectangular window
  - ii. Hanning window
  - iii. Hamming window
  - iv. Bartlett window
- 7. Write a MATLAB program to
  - i. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Butterworth Approximation.
  - ii. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Chebyshev Approximation.

### Hardware Experiments using Texas Instruments Kits-DSK 6713:

- 8. Introduction to Code composer Studio.
- 9. Write a program to generate a sine wave and see the output on CRO
- 10. Write a Program to Generate ECHO to give audio file.
- 11. Write a program to demonstrate Band Stop filter by FIR.

### **Additional Experiments:**

- 12. Write a program to generate a cos wave and see the output on CRO
- 13. Write a program to blink the LED
- 14. Write a program to display a string on LCD.

### NOTE:- At least 8 Experiments out of the list must be done in the semester.

# SIMULATION AND MODELLING LAB

Paper Code: ETCS-457(ELECTIVE)	Ι
Paper: Simulation and Modelling Lab	0

# L T/P C 0 2 1

# List of Experiments:

- 1. Design finite State, and complex model Simulations.
- 2. Design Graph or Network Transitions Based Simulations.
- 3. Design actor Based Simulations, Mesh Based Simulation, Hybrid Simulations.
- 4. Convert to Parallel and Distributed Simulations, first Partition data, Algorithms
- 5. Design Probability and Statistics for Simulations and Analysis, Queues and Random Noise, Random Variates Generation and Sensitivity Analysis.
- 6. Simulations Results Analysis and Viewing Tools.
- 7. Display Forms: Tables, Graphs, and Multidimensional Visualization Terminals, X and MS Windows, and Web Interfaces, Validation of Model Results,.

Programming skills in one or more of the following programming languages:

- Java,
- C, or C++

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.

# ADVANCED DBMS LAB

Paper Code: ETCS-457(ELECTIVE)	L	T/P	С
Paper: Advanced DBMS Lab	0	2	1

### Lab based on Advanced DBMS

Lab includes implementation of Triggers, Procedures, Functions i.e PL\SQL. SQL implementation in PostgreSQL

# **Text Books:**

[T1] PostgreSQL: A Comprehensive Guide to Building, Korry Douglas, Susan Douglas, 2nd edition, Sams Publications.

# CONTROL SYSTEMS LAB

# Paper Code: ETCS-457(ELECTIVE) Paper: Control Systems Lab

L T/P C 0 2 1

### List of Experiments:

- 1. Comparison of open loop & closed loop control in speed control of D.C. motor & to find the transfer function.
- 2. To study the characteristics of positional error detector by angular displacement of two servo potentiometers
  - a. excited with dc
  - b. excited with ac
- 3. To study synchro transmitter in terms of position v/s phase and voltage magnitude with respect to rotor voltage magnitude /phase.
- 4. To study remote position indicator systems using synchro transmitter/receiver.
- 5. To plot speed- torque curves for ac servomotor for different voltages.
- 6. To study ac motor position control system & to plot the dynamic response & calculate peak time, settling time, peak overshoot, damping frequency, steady state error etc.
- 7. To study the time response of simulated linear systems.
- 8. To study the performance of PID Controller.
- 9. Plot impulse response, unit step response, unit ramp response of any 2<sup>nd</sup> order transfer function on same graph using MATLAB.
- 10. To draw the magnetization (Volt Amps) characteristics of the saturable core reactor used in the magnetic amplifier circuits.
- 11. Plot root locus for any 2<sup>nd</sup> order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
- 12. To design lead-lag compensator for the given process using Bode plots in MATLAB.

### NOTE:- At least 8 Experiments out of the list must be done in the semester.

## MOBILE COMPUTING

Paper Code: ETIT-402	L	T/P	С
Paper: Mobile Computing	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: Should have studied papers such as Communication systems, Data communications and networking and wireless networks. To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture. To have an exposure about wireless protocols –Wireless LAN, Bluetooth, WAP, Zig Bee issues. To Know the Network, Transport Functionalities of Mobile communication. To understand the concepts of Adhoc and wireless sensor networks. Introduce Mobile Application Development environment.

### UNIT-I

**Mobile Physical Layer:** Review of generation of mobile services, overview of wireless telephony, cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

**Mobile Computing Architecture:** Issues in mobile computing, three tier architecture for mobile computing, design considerations, Mobile file systems, Mobile databases. WAP: Architecture, protocol stack, Data gram protocol, Wireless transport layer security, Wireless transaction protocol, wireless session protocol, application environment, and applications.

# [T1] [T2][T3] [No. of Hrs. 12]

### UNIT-II

**Mobile Data Link Layer:** Wireless LAN over view, IEEE 802.11, Motivation for a specialized MAC, Near & far terminals, Multiple access techniques for wireless LANs such as collision avoidance, polling, Inhibit sense, spread spectrum, CDMA, LAN system architecture, protocol architecture, physical layer MAC layer and management, Hiper LAN.

Blue Tooth: IEEE 802.15 Blue tooth User scenarios, physical, MAC layer and link management.

Local Area Wireless systems: WPABX, IrDA, ZigBee, RFID, WiMax.

# [T1] [T2][T3] [No. of Hrs. 11]

### **UNIT-III**

**MOBILE IP Network Layer:** IP and Mobile IP Network Layer- Packet delivery and Handover Management-Location Management- Registration- Tunnelling and Encapsulation-Route Optimization- Dynamic Host Configuration Protocol, Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), VoIP –IPSec.

Mobile Transport Layer: Traditional TCP/IP, Transport Layer Protocols-Indirect, Snooping, Mobile TCP.

# [T1] [T2][T3] [No. of Hrs. 11]

[T1] [T2][T3] [No. of Hrs. 11]

### UNIT-IV

**Support for Mobility:** Data bases, data hoarding, Data dissemination, UA Prof and Caching, Service discovery, Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, Mobile devices and File systems, Data Synchronization, Sync ML.

Introduction to Wireless Devices and Operating systems: Palm OS, Windows CE, Symbion OS, Android, Mobile Agents. Introduction to Mobile application languages and tool kits.

### **Course Outcomes:**

1. Gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks. 2. Understand the architectures, the challenges and the Solutions of Wireless Communication.

3. Realize the role of Wireless Protocols in shaping the future Internet.

4. Able to develop simple Mobile Applications Using Toll kit.

### **Text Books:**

- [T1] J. Schiller, "Mobile Communications", 2<sup>nd</sup> edition, Pearson, 2011.
- [T2] Raj Kamal "Mobile Computing" Oxford Higher Education, Second Edition, 2012.
- [T3] Dharam prakash Agrawal and Qing-An Zeng, "Introduction to Wireless and Mobile Systems" 3<sup>rd</sup> edition, Cengage learning 2013.

### **Reference Books:**

- [R1] Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal "Mobile Computing", Tata McGraw Hill Pub, Aug – 2010
- [R2] Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farrell "Wireless Networking Complete" Morgan Kaufmann Series in Networking, 2009 (introduction, WLAN MAC)
- [R3] Vijay K Garg "Wireless Communications & Networking" Morgan Kaufmann Series, 2010
- [R4] M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
- [R5] Charles Perkins, Mobile IP, Addison Wesley.
- [R6] Charles Perkins, Ad hoc Networks, Addison Wesley.
- [R7] Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, "Principles of Mobile Computing", Springer.
- [R8] Evaggelia Pitoura and George Samarus, "Data Management for Mobile Computing", Kluwer Academic Press, 1998

Laboratory session: The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc., Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

TooL Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

- [R1] Donn Felker, "Android Application Development For Dummies", Wiley, 2010
- [R2] Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. to Programmer Series.
- [R3] Ed Burnette, 'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers,2012
- [R4] Jerome(J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University press, 2005.
- [R6] R.Riggs, A. Taivalsaari, M.VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74627-1, Addision Wesley, 2001.

### **MACHINE LEARNING**

Paper Code: ETCS-402	L	T/P	С
Paper: Machine Learning	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the knowledge of basic concepts of machine learning systems, types of learning etc.

### UNIT-I

# Introduction:

**Basic concepts:** Definition of learning systems, Goals and applications of machine learning. Aspects of developing a learning system: training data, concept representation, function approximation.

**Types of Learning:** Supervised learning and unsupervised learning. Overview of classification: setup, training, test, validation dataset, over fitting.

**Classification Families:** linear discriminative, non-linear discriminative, decision trees, probabilistic (conditional and generative), nearest neighbor.

### UNIT-II

**UNIT-III** 

Logistic regression, Perceptron, Exponential family, Generative learning algorithms, Gaussian discriminant analysis, Naive Bayes, Support vector machines: Optimal hyper plane, Kernels. Model selection and feature selection. Combining classifiers: Bagging, boosting (The Ada boost algorithm), Evaluating and debugging learning algorithms, Classification errors.

### [T1, T2][No. of Hrs: 11]

[T1, T2][No. of Hrs: 12]

Unsupervised learning: Clustering. K-means. EM Algorithm. Mixture of Gaussians. Factor analysis. PCA (Principal components analysis), ICA (Independent components analysis), latent semantic indexing. Spectral clustering, Markov models Hidden Markov models (HMMs).

# [T1, T2][No. of Hrs: 11]

UNIT-IV Reinforcement Learning and Control: MDPs. Bellman equations, Value iteration and policy iteration, Linear quadratic regulation (LQR). LQG. Q-learning. Value function approximation, Policy search. Reinforce. POMDPs. [T1, T2][No. of Hrs: 10]

### **Text Books:**

- [T1] Tom M Mitchell, Machine Learning, McGraw Hill Education
- [T2] Bishop, C. (2006). Pattern Recognition and Machine Learning. Berlin: Springer-Verlag.
- [T3] Duda, Richard, Peter Hart, and David Stork. Pattern Classification. 2nd ed. New York, NY: Wiley-Interscience, 2000. ISBN: 9780471056690.
- [T4] Tom M. Mitchell, Machine Learning .ISBN 9781259096952, McGraw-Hill Series, Edition First

### **Reference Books:**

- [R1] Bishop, Christopher. Neural Networks for Pattern Recognition. New York, NY: Oxford University Press, 1995. ISBN: 9780198538646.
- [R2] Introduction to Machine Learning Ethem Alpaydin, MIT Press, Prentice hall of India.

# HUMAN VALUES & PROFESSIONAL ETHICS – II

Paper Code: ETHS-402	L	T/P	С
Paper : Human Values & Professional Ethics-II	1	0	1

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

3. Two internal sessional test of 10 marks each and one project report\* carrying 5 marks.

### Objectives:

- The main object of this paper is to inculcate the skills of ethical decision making and then to apply these skills to the real and current challenges of the engineering profession.
- 2. To enable student to understand the need and importance of value-education and education for Human Rights.
- To acquaint students to the National and International values for Global development 3.

# **UNIT I - Appraisal of Human Values and Professional Ethics:**

Review of Universal Human Values: Truth, Love, Peace, Right conduct, Non violence, Justice and Responsibility. Living in harmony with 'SELF', Family, Society and Nature. Indian pluralism - the way of life of Islam, Buddhism, Christianity, Jainism, Sikhism and Hinduism, Greek - Roman and Chinese cultural values. Sensitization of Impact of Modern Education and Media on Values:

a) Impact of Science and Technology

b) Effects of Printed Media and Television on Values

c) Effects of computer aided media on Values (Internet, e-mail, Chat etc.)

d) Role of teacher in the preservation of tradition and culture.

e) Role of family, tradition & community prayers in value development.

Review of Professional Ethics: Accountability, Collegiality, Royalty, Responsibility and Ethics Living. Engineer as a role model for civil society, Living in harmony with 'NATURE', Four orders of living, their intercorrectness, Holistic technology (eco-friendly and sustainable technology).

# [T1] [T2] [R1] [R5] [R4][No. of Hrs. 03]

# UNIT II - Engineers responsibility for safety:

Safety and Risks, Risk and Cost, Risk benefit analysis, testing methods for safety. Engineer's Responsibility for Safety Social and Value dimensions of Technology - Technology Pessimism - The Perils of Technological Optimism - The

Promise of Technology - Computer Technology Privacy

Some Case Studies: Case Studies, BHOPAL Gas Tragedy, Nuclear Power Plant Disasters, Space Shuttle Challenger, Three Mile Island Accident, etc.

# **UNIT III – Global Issues:**

Globalization and MNCs: International Trade, Issues,

Case Studies: Kelleg's, Satyam, Infosys Foundation, TATA Group of Companies

Business Ethics: Corporate Governance, Finance and Accounting, IPR.

Corporate Social Responsibility (CSR): Definition, Concept, ISO, CSR.

Environmental Ethics: Sustainable Development, Eco-System, Ozone depletion, Pollution.

Computer Ethics: Cyber Crimes, Data Stealing, Hacking, Embezzlement.

# **UNIT IV - Engineers Responsibilities and Rights and Ethical Codes:**

Collegiality and loyalty, Conflict of interests, confidentiality, occupational crimes, professional rights, responsibilities. To boost industrial production with excellent quality and efficiency, To enhance national economy, To boost team spirit, Work Culture and feeling of job satisfaction, National integration, Examples of some illustrious professionals.

Need for Ethical Codes, Study of some sample codes such as institution of Electrical and Electronics Engineers, Computer Society of India etc., Ethical Audit.

Development and implementation of Codes: Oath to be taken by Engineering graduates and its importance\*\*, [T1] [T2] [R4][R2][No. of Hrs. 05]

# [T1] [T2] [R4] [R2][No. of Hrs. 03]

[T1] [T2] [R4][No. of Hrs. 05]

- [T1] Professional Ethics, R. Subramanian, Oxford University Press.
- [T2] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

### **References Books:**

- [R1] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers" Manual by the same author
- [R2] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press
- [R3] Values Education: The paradigm shift, by Sri Satya Sai International Center for Human Values, New Delhi.
- [R4] Professional Ethics and Human Values M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi
- [R5] A Textbook on Professional Ethics and Human Values R.S. Naagarazan New Age International (P) Limited, Publishers New Delhi.
- [R6] Human Values & Professional Ethics- S B Gogate- Vikas publishing house PVT LTD New Delhi.
- [R7] Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill
- [R8] Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning
- [R9] PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications
- [R10] Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press
- [R11] Charles D Fleddermann, "Engineering Ethics", Prentice Hall.
- [R12] George Reynolds, "Ethics in Information Technology", Cengage Learning
- [R13] C, Sheshadri; The Source book of Value Education, NCERT
- [R14] M. Shery; Bhartiya Sanskriti, Agra (Dayalbagh)

\*Any topic related to the experience of the B.Tech student in the assimilation and implementation of human values and professional ethics during the past three years of his/her studies in the institute OR A rigorous ethical analysis of a recent case of violation of professional ethics particularly related to engineering profession.

\*\*All students are required to take OATH in writing prior to submission of major project and the record of the same is to be maintained at the college level and/or, this oath may be administered by the head of the institutions during the graduation ceremonies. The draft for the same is available alongwith the scheme and syllabus.

# **DIGITAL IMAGE PROCESSING**

Paper Code: ETIT-418	L	T/P	С
Paper: Digital Image Processing	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The aim of this course is to provide digital image processing fundamentals, hardware and software, digitization, encoding, segmentation, feature extraction etc. It will enhance the ability of students to apply tools in image restoration, enhancement and compression and to apply the techniques in both the spatial and frequency domains. It will enhance the ability of students to identify the quality characteristics of medical images, differences between computer vision and image processing and help in studying the remote sensing images of the environmental studies.

### UNIT-I:

**Introduction and Digital Image Fundamentals:** The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

**Image Enhancement in the Spatial Domain:** Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

### [T1, T2][No. of Hrs: 10]

# UNIT-II:

**Filtering in the Frequency Domain:** Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters.

**Image Restoration:** A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

### UNIT-III:

**Image Compression**: fundamentals of compression, coding redundancy, Lossy and lossless compression, Spatial and temporal redundancy, Image compression models. Some basic compression methods

**Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Region Oriented Segmentation, Motion based segmentation.

# [T1, T2][No. of Hrs. 12]

[T1, T2][No. of Hrs. 12]

### UNIT- IV:

**Representation and Description:** Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

Object Recognition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods. [T1, T2][No. of Hrs: 10]

### **Text Books:**

[T1] Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3<sup>Rd</sup> edition, Pearson, 2002.

[T2] A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

### **Reference Books:**

- [R1] Bernd Jahne, "Digital Image Processing", 5<sup>th</sup> Ed., Springer, 2002.
- [R2] William K Pratt, "Digital Image Processing: Piks Inside", John Wiley & Sons, 2001.

## **MICROELECTRONICS**

Paper Code: ETCS-408	L	T/P	С
Paper: Microelectronics	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The aim is to provide the student with experience of the use of industry standard commercial software packages for design and simulation of semiconductor devices, processes and circuits

# UNIT I

Semiconductor, VLSI device technology, VLSI design flow, MOS Capacitance fundamentals, MOSFET principles and characteristics, MOS transistor theory, MOS structure, enhancement & depletion transistor, CMOS & NMOS process technology, explanation of different stages in fabrication, Threshold voltage, MOS device design equations

## [T1, R1, R2][No. of Hrs.11]

### UNIT II

MOSFET Operation and modelling, Short and narrow channel effects, Radiation and hot-carrier effects, Breakdown, LDD, CMOS latch-up, CMOS Device design considerations & performance factors, Brief overview of MOSFET CAD SPICE model- different levels.

# [T1, R1][No. of Hrs. 10]

[T2][No. of Hrs. 10]

## UNIT III

CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, Static & Dynamic power dissipation, switching characteristics & inter connection effects, Rise time, fall time delays, Noise margin, power consumption in CMOS.

# [T1, R1, R2, R3][No. of Hrs. 11]

# UNIT IV

Basic I.C. processing step, Clean room concept, wafer cleaning, oxidation, diffusion. Ficks laws, Ion implantation. Epitaxy, Basics of vacuum deposition, Chemical vapour deposition, high and low temperature/pressure depositions. Etching techniques, integrated circuit packaging.

### **Text Books:**

- [T1] Sedra and Smith, "Microelectronic Circuits", Oxford University Press, 6<sup>th</sup> Edition, 2013
- [T2] S. M. Sze, "VLSI Technology", McGraw-Hill, 1983

# **Reference Books:**

- [R1] S. M. Kang, Y. Lebiebici, "CMOS digital integrated circuits analysis & design" TMH, 3rd Edition.
- [R2] Donald A. Neaman, Semiconductor Physics and Devices, Tata McGraw-Hill, 2003
- [R3] J. P. Uyemura, "Introduction to VLSI Circuits and Systems" John Wiley, 1st Edition
- [R4] J. M. Rabaey, "Digital Integrated Circuits" PHI 2nd Edition
- [R5] R. T. Howe and C. G. Sodini, "Microelectronics: An Integrated Approach", PHI.

Paper C	Code: ETEC-406	
Paper:	Ad Hoc and Sensor Networks	

### **INSTRUCTIONS TO PAPER SETTER:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: The prerequisites are data communication networks, wireless communication and networks. The objective of the paper is to introduce infrastructure less wireless networking.* 

### UNIT I

### Ad Hoc Wireless Networks:

Introduction. Issues in Ad Hoc Wireless Networks. Ad Hoc Wireless Internet.

# MAC Protocols for Ad Hoc Wireless Networks:

Introduction, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols. Contention-Based Protocols with Reservation Mechanisms. Contention-Based MAC Protocols with Scheduling Mechanisms. MAC Protocols in Directional Antennas. Other MAC Protocols

[T1, T2][No. of Hrs. 11]

### UNIT II

### **Routing Protocols for Ad Hoc Wireless Networks:**

Introduction to Routing algorithm, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks. Classifications of Routing Protocols. Table-Driven Routing Protocols. On-Demand Routing Protocols. Hybrid Routing Protocols. Routing Protocols with Efficient Flooding Mechanisms. Hierarchical Routing Protocols. Power-Aware Routing Protocols.

### **Transport Layer and Security Protocols for Ad Hoc Wireless Networks:**

Introduction. Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks. Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks. Classification of Transport Layer Solutions. TCP Over Ad Hoc Wireless Networks. Other Transport Layer Protocols for Ad Hoc Wireless Networks. Security in Ad Hoc Wireless Networks. Network Security Requirements. Issues and Challenges in Security Provisioning. Network Security Attacks. Key Management. Secure Routing in Ad Hoc Wireless Networks.

### [T1, T2][No. of Hrs. 12]

[T1, T2][No. of Hrs. 11]

### UNIT III

### Wireless Sensor Networks:

Introduction. Sensor Network Architecture. Data Dissemination. Data Gathering. MAC Protocols for Sensor Networks. Location Discovery. Quality of a Sensor Network. Evolving Standards. Other Issues.

### Hybrid wireless Networks:

Introduction. Next-Generation Hybrid Wireless Architectures. Routing in Hybrid Wireless Networks. Pricing in Multi-Hop Wireless Networks. Power Control Schemes in Hybrid Wireless Networks. Load Balancing in Hybrid Wireless Networks.

# UNIT IV

### Wireless Geolocation Systems:

Introduction. What is wireless Geolocation? Wireless Geolocation System Architecture. Technologies for Wireless Geolocation. Geolocation Standards for E-911 Services. Performance Measures for Geolocation Systems. Questions. Problems.

### **Recent Advances in Wireless Networks:**

Introduction. Ultra-Wide-Band Radio Communication. Wireless Fidelity Systems. Optical Wireless Networks. The Multimode 802.11 -IEEE 802.11a/b/g. The Meghadoot Architecture, introduction to vehicular sensor networks.

[T1, T2] [No. of Hrs. 11]

С

3

# MAXIMUM MARKS: 75

T/P

0

L

3

### **Text Books:**

- [T1] Siva Ram Murthy, C. and Manoj,B. S., Adhoc Wireless Networks Architectures and Protocols, Prentice Hall, PTR, (2004) 2nd ed.
- [T2] Perkins, Charles E., Ad hoc Networking, Addison Wesley, (2000) 3rd ed.

### **Reference Books**

- [R1] Toh, C. K., Ad hoc Mobile Wireless Networks Protocols and Systems, Prentice Hall, PTR, (2001) 3rd Edition.
- [R2] Pahlavan, Kaveh., Krishnamoorthy, Prashant., Principles of Wireless Networks, A united approach -Pearson Education, (2002) 2nd ed.
- [R3] Wang X. and Poor H.V., Wireless Communication Systems, Pearson education, (2004) 3rd ed.
- [R4] Schiller Jochen., Mobile Communications, Person Education 2003, 2nd ed.
- [R5] Carlos De Morais Cordeiro and Dharam P Agrawal, "Adhoc and Sensor Networks- Theory & Applications", 2<sup>nd</sup> Ed, Cambridge Univ Press India Ltd

### SOFT COMPUTING

Paper Code: ETIT-410	L	T/P	С
Paper: Soft Computing	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand the various concepts of neural networks and fuzzy logic.

# UNIT-I

# Neural Networks:

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithmsperceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

### [T1, T2][No. of Hrs. 11]

### UNIT-II

### **Fuzzy Logic:**

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation, Operations.

### [T1, T2][No. of Hrs. 11]

# UNIT-III

### **Fuzzy Arithmetic:**

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic:

Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers,

### **Uncertainty based Information:**

Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

### [T1, T2][No. of Hrs. 11]

### UNIT-IV

### Introduction of Neuro-Fuzzy Systems:

Architecture of Neuro Fuzzy Networks.

**Application of Fuzzy Logic:** 

# Medicine, Economics etc.

Genetic Algorithm:

An Overview, GA in problem solving, Implementation of GA.

### **Text Books:**

- [T1] Hertz J. Krogh, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.
- [T2] G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
- [T3] Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
- [T4] F. O. Karray and C. de Silva, "Soft computing and Intelligent System Design", Pearson, 2009.

### **Reference Books:**

- [R1] "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
- [R2] Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley, Reading, Mass, (1992).

### MAXIMUM MARKS: 75

# [T1, T2][No of Hrs 11]

## VLSI DESIGN

Paper Code: ETIC-414	L	T/P	С
Paper: VLSI Design	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The prerequisite are analog devices, STLD, Digital system design and micro-electronics. The students are introducing to MOS technology, design rules and some applications.

# UNIT I

Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage, MOS device design equations, MOSFET scaling and small geometry effects, MOSFET capacitances.

NMOS inverter, CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, static & dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, body effect, latch up in CMOS.

### [T1,T2][No. of Hours: 11]

UNIT II

Stick diagram and design rules, lambda based design rules, switching characteristics & inter connection effects: rise time, fall time delays, noise margin.

CMOS logic gate design: NAND, NOR, XOR and XNOR gates, Transistor sizing, combinational MOS logic circuits: pass transistor and transmission gate designs, Pseudo NMOS logic.

# [T1,T2][No. of Hours: 11]

# UNIT III

Sequential MOS logic circuits: SR latch, clocked latch and flip flop circuits, CMOS D latch and edge triggered flip flop, dynamic logic circuits; basic principle, non ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution.

## [T1,T2][No. of Hours: 11]

# UNIT IV

VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

# [T1,T2][No. of Hours: 11]

### Text Books:

- [T1] Basic VLSI Design Pucknell Douglas A., Eshraghian Kamran, PHI Learning Pvt Limited, 2013.
- [T2] N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective 4th Edition", Pearson Education, India.

# **Reference Book:**

- [R1] S. M. Kang, Y. Lebiebici, "CMOS digital integrated circuits analysis & design" Tata McGraw Hill, 3<sup>rd</sup> Edition.
- [R2] Digital Integrated Circuit Design- Ken Martin, Oxford University Press
- [R3] The MOS Transistor- Yaniiis Tsividis and Colin Mcandrew, Oxford University Press, 2013
- [R4] J. M. Rabaey, "Digital Integrated Circuits" PHI Learning Pvt Limited, India
- [R5] J. P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Inc., New York, NY
- [R6] Neelam Sharma, "Digital Logic Design", Ashirwad Publication 2013-14

### **DISTRIBUTED SYSTEMS**

Paper Code: ETIT-430	L	T/P	С
Paper: Distributed Systems	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand networking, operating systems and various issues.

# UNIT-I

# Fundamentals of Distributed Computing:

Architectural models for distributed and mobile computing systems, Basic concepts in distributed computing. **Distributed Operating Systems:** 

Overview, network operating systems, Distributed file systems, Middleware, client/server model for computing.

[T1, T2][No. of Hours 12]

# UNIT-II

### **Communication:**

Layered protocols, RPC, RMI, Remote objects. Basic Algorithms in Message Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Message Passing, PVM and MPI.

### **Process Concepts:**

Threads, Clients and Servers, Code migration, Agent based systems, Distributed objects, CORBA, Distributed COM.

### [T1 [No. of Hours 10]

# UNIT-III

Synchronization:

Clock synchronization, Logical clocks, Election algorithms, Mutual exclusion, Distributed transactions, Naming concepts, Security in distributed systems

## **Distributed Databases:**

Distributed Data Storage, Fragmentation & Replication, Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols.

# [T2][No. of Hours 11]

# UNIT-IV

### **Processing:**

Basic Concepts: Introduction to processing, processing terminology, Design of algorithms, Design of Parallel Databases, Parallel Query Evaluation.

### [T1, T2][No. of Hours 11]

### **Text Books:**

- [T1] Tannenbaum, A, Maarten Van Steen. Distributed Systems, Principles and Paradigm, Prentice Hall India, 2002
- [T2] Elmarsi, Navathe, Somayajulu, Gupta, "Fundamentals of Database Systems", 4<sup>th</sup> Edition, Pearson Education, 2007

# **Reference Books:**

- [R1] Tanenbaum, A, "Modern Operating Systems", 2nd Edition, Prentice Hall India, 2001.
- [R2] Singhal and Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 1994
- [R3] Attiya, Welch, "Distributed Computing", Wiley India, 2006
- [R4] Coulouris, Dollimore and Kindberg, "Distributed Systems", Pearson, 2009.

# **OBJECT ORIENTED SOFTWARE ENGINEERING**

Paper Code: ETCS-412	L	T/P	С
Paper: Object Oriented Software Engineering	3	0	3

# **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To make the students well versed with current s/w developments in the industry.

# UNIT I:

**Introduction** – Overview of Object-Orientation; Basic Concepts of Object-Orientation: Data abstraction, Encapsulation, Inheritance, Aggregation, classes, objects, messages, inheritance, polymorphism. Importance of modeling, principles of modeling, Object oriented modeling.

**OO Life cycle** – Object Oriented analysis, modeling and design; Requirement Elicitation. Introduction to Object Oriented Methodologies, Overview of Requirements Elicitation, Requirements Model-Action & Use cases.

# **UNIT II:**

Architecture: Introduction, System development is model building, model architecture, requirement model, analysis model, design model, implementation model.

**Analysis:** Introduction, System development based on user requirement, Use case model, interface descriptions, Problem domain objects, interface objects, entity objects, control objects.

Code Design Improvement: Refactoring, Anti patterns, Visitor Patterns.

### [T1][R3][No. of Hours: 10]

[T1][R1][No. of Hours: 10]

[T1][R1][R2][No. of Hours: 10]

# UNIT III:

**Construction:** Introduction, the design model, design model dimensions, block design, working with construction.

Testing: Introduction, Object Oriented testing process, testing of analysis and design model, testing of classes.

### **UNIT IV:**

Modelling with UML: Basic Building Blocks of UML, A Conceptual Model of UML.

**Basic structural modelling**: Classes, interfaces, Dependency, generalization and association relationship, comparison of E-R diagram and UML class Diagram, forward and reverse engineering.

**Basic Behavioral Modeling**- Use case diagram-relationships between use cases- extend, include, and generalize. Activity diagram-Action state, Activity state, Transition (Fork, Merge, Join), State diagram-events, State Diagram states, transitions, Interaction diagrams: Sequence diagram, Collaboration diagram (iterations, conditional messaging, branching, object creation and destruction, time constraints, origin of links.)

### Architectural modelling:

Deployment: Common Modelling technique; Modelling processors and devices, modelling distribution of artifacts.

Collaboration: Modeling roles, modelling the realization of a Use Case, modelling the realization of an operation, modelling a mechanism.

# [T1][R3][No. of Hours: 10]

### **Text Books:**

- [T1] Ivar Jacobson, "Object Oriented Software Engineering", Pearson.
- [T2] Grady Booch, James Runbaugh, Ivar Jacobson, "The UML User Guide", Pearson.

### **Reference Books:**

- [R1] Rumbaugh et. al, "Object Oriented Modeling and Design", Pearson.
- [R2] Booch, Maksimchuk, Engle, Young, Conallen and Houstan, "Object Oriented Analysis and Design with Applications", Pearson Education.
- [R3] Object-Oriented Analysis and Design: using UML Mike O'Docherty Wiley Publication.
- [R4] Edwards Yourdon. Carl Argila,"Case Studies in object oriented analysis and design" Prentice Hall.

### **COMPUTER VISION**

Paper Code: ETCS-414	L	T/P	С
Paper: Computer Vision	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: To understand geometric, analytical features, edge detection and texture etc.* 

# UNIT I

# **Geometric Image Features**

Elements of Differential Geometry, Contour Geometry,

## **Analytical Image Features**

Elements of Analytical Euclidean Geometry, Geometric Camera Parameters, Calibration Methods.

[T1, T2][No. of Hrs. 11]

# UNIT II

**Linear Filters** 

Linear Filters and Convolution, Shift invariant linear systems, Spatial Frequency and Fourier Transforms, Sampling and Aliasing

# **Edge Detection**

Estimating Derivatives with Finite Differences, Noise, Edges and Gradient-based Edge Detectors.

[T1, R1][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 11]

# UNIT III

Texture

Representing Texture, Analysis (and Synthesis) Using Oriented Pyramids, Application: Synthesizing Textures for Rendering, Shape from Texture: Planes and Isotropy

# Shape from Shading

Introduction to the concept of Shading From Shading (SFS), Application of SFS (Texture Shop, Image-Based Material Emitting, Optimization Based SFS), Photometric stereo, Spherical Illumination, Displacement Mapping, Feature Mapping.

### UNIT IV

### Affine Structure from Motion

Elements of Affine Geometry, Affine Structure from Two Images, Affine Structure from Multiple Images, From Affine to Euclidean Images, Affine Motion Segmentation

# **Projective Structure from Motion**

Elements of Projective Geometry.

### **Text Books:**

- [T1] Computer Vision- A modern Approach, by D. Forsyth and J. Ponce, Prentice Hall
- [T2] Robot Vision, by B.K.P. Horn, McGraw-Hill.

# **Reference Books:**

[R1] Introductory Techniques for 3D Computer Vision by E Trucco and A. Verri, Prentice Hall

# SOFTWARE PROJECT MANAGEMENT

Paper Code: ETCS-416	L	T/P	С
Paper: Software Project Management	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the knowledge of software project management, project estimation and evaluation alongwith risk analysis and management.

# UNIT-I

**UNIT-II** 

**Introduction to Software Project Management (SPM):** Definition of a Software Project (SP), SP Vs. other types of projects activities covered by SPM, categorizing SPs, project as a system, management control.

**Software Project scheduling and planning:** Basic concepts, project scheduling, defining a task set and task network, scheduling, earned value analysis indicators, Project elements, WBS [Work Breakdown Structure]. Selecting a project, identifying project scope and objectives, identifying project infrastructure, analyzing project characteristics, identifying project products and activities.

## [T1, T2][No. of Hrs. 11]

**Project Estimation and Evaluation:** software project estimation, decomposition techniques, empirical estimation models, estimation for object oriented projects, estimation for Agile development and Web engineering projects.

Cost benefit analysis, cash flow forecasting, cost benefit evaluation techniques, risk evaluation. Selection of an appropriate project report; choice of process model, structured methods, rapid application development, water fall, spiral models, Prototyping delivery, Albrecht function point analysis.

### [T1, T2][No. of Hrs. 11]

UNIT-III

Activity planning: Objectives of activity planning, project schedule, projects and activities, sequencing and scheduling activities, Network planning model; Network Diagrams : CPM, Bar Charts, Gantt Chart, PERT [ Activity-on-arrow network; Activity on Node network ] Precedence network; Forward pass; Backward pass; Critical path.

**Risk Analysis and Management**: Risk and risk types, Risk Break down Structure, Risk management process, Evaluating schedule risk using PERT.

### [T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

# UNIT-IV

**Resource allocation & Monitoring the control**: Introduction, the nature of resources, identifying resource requirements, visualizing progress, Project Tracking, Status Reports, Milestone Analysis, Actual Versus Estimated Analysis of Effort and Schedule.

**Software quality and project closure:** Defining software quality attributes, ISO 9126, Software quality measures, Project Closure Analysis, The Role of Closure Analysis, Performing Closure Analysis.

### Text Books:

- [T1] Software Project Management (2nd Edition), by Bob Hughes and Mike Cottrell, 1999, TMH
- [T2] Software Project Management, Walker Royce, 1998, Addison Wesley.

### **Reference Books:**

- [R1] R. S. Pressman, Software Engineering, TMH, 7th ed.
- [R2] Pankaj Jalote, Software project management in practice, Addison-Wesley
- [R3] Robert T. Futrell, Donald F. Shafer, and Linda I. Shafer, "Quality Software Project Management", 2002, Pearson Education Asia.
- [R4] Ramesh Gopalaswamy, "Managing Global Software Projects", 2003, Tata McGraw-Hill
- [R5] S. A. Kelkar, "Software Project Management"

# HUMAN COMPUTER INTERACTION

Paper Code: ETCS-404	L	T/P	С
Paper: Human Computer Interaction	3	0	3

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the interaction between and computer and human being.

### UNIT I

**Introduction:** The Human, The Computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles and Theories.

**Design Process:** Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User Support.

# [T1, T2][No. of Hrs. 10]

UNIT II

**Models and Theories:** Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modelling rich interaction.

### UNIT III

# [T1, T2][No. of Hrs. 11]

**Interaction Styles:** Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation.

### [T1, T2][No. of Hrs. 10]

### UNIT IV

**Design Issues:** Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization.

**Outside the Box:** Group ware, Ubiquitous computing and augmented realities, Hypertext, Multimedia and the World Wide Web.

# [T1, T2][No. of Hrs. 11]

## **Text Books:**

- [T1] Alan Dix, Janet Finlay, "Human Computer Interaction", ISBN: 9788131717035 Pearson Education, 2004.
- [T2] Ben Shneiderman, "Designing the User Interface-Strategies for Effective Human Computer Interaction", ISBN:9788131732557, Pearson Education , 2010

### **Reference Books:**

- [R1] Usability Engineering: Scenario-Based Development of Human-Computer Interaction, by Rosson, M. and Carroll, J. (2002)
- [R2] The Essentials of Interaction Design, by Cooper, et al., Wiley Publishing(2007)
- [R3] Usability Engineering, by Nielsen, J. Morgan Kaufmann, San Francisco, 1993. ISBN 0-12-518406-9
- [R4] The Resonant Interface: HCI Foundations for Interaction Design, by Heim, S., Addison-Wesley. (2007)
- [R5] Usability engineering: scenario-based development of human-computer interaction, By Rosson, M.B & Carroll, J.M., Morgan Kaufman.(2002)

## **INFORMATION THEORY AND CODING**

Paper Code: ETIT-416	L	T/P	С
Paper: Information Theory and Coding	3	0	3

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: In this course the students will study a number of efficient encoding/decoding strategies which have proven important in practice with a categorization on the notion of decoding.

# UNIT-I

**UNIT-II** 

Review of Probability Theory, Random Variables and Random Process. Information Theory Introduction, Uncertainty, Information, and Entropy, Information Rate, Conditional and Joint Entropies. Source Coding Theorem, Data Compaction, Prefix Coding, Kraft McMillan Inequality, Huffman Coding, Lempel Ziv Coding, Discrete Memoryless Channels, Mutual Information, Markov Sources, Channel Capacity.

### [T1, T2][No. of hrs. 12]

Channel Coding Theorem, Differential Entropy and Mutual Information for Continuous Ensembles, Information Capacity Theorem and its implications, Information Capacity of a colored noise channel. Discrete Memoryless Channels and Channel Coding Theorem revisited.

# [T1, T2, R1, R5][No. of Hrs. 10]

# UNIT-III

Linear Block codes, Repetition Codes, Syndrome Decoding, Hamming Codes, Dual Code, Cyclic Codes, Maximal Length Codes, CRC Codes, BCH Codes, Reed-Solomon Codes, Golay Codes, Convolutional Codes: Code Tree, Trellis and State Diagram.

### [T1, R2, R4][No. of Hrs. 11]

[T1, R2, R3, R5] [No. of Hrs. 11]

# UNIT-IV

Decoding of Convoltutional Codes: Maximum Likelihood decoding, Viterbi's algorithm, free distance of a convolutional code. Turbo Codes: Turbo Encoder and Decoder, Puncturing, Performance of Turbo Codes. Introduction to Cryptography.

### **Text Books:**

- [T1] Simon Haykins, "Communication Systems", 4<sup>th</sup> Edition Wiley, 2001.
- [T2] J G Proakis, "Digital Communications", Mc Graw Hill, 2001.

### **Reference Books:**

- [R1] T M Gover, J M Thomos, "Elements of Information Theory", Wiley, 1999.
- [R2] Arijit Saha, Nilotpal Manna, Surajit Mandal, "Information Theory, Coding and Cryptography", Pearson Education, 2013.
- [R3] Schaum's Outlines, Analog and Digital Communications, Second Edition.
- [R4] Amitabha Bhattacharya, "Digital Communication", TMH 2006.
- [R5] J. H. van Lint.. Introduction to Coding Theory, Springer -Verlag.

## WEB INTELLIGENCE AND BIG DATA

Paper Code: ETCS-418	L	T/P	С
Paper: Web Intelligence and Big Data	3	0	3

## **INSTRUCTIONS TO PAPER SETTERS:** 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective

or short answer type questions. It should be of 25 marks. 2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this paper is to build web-intelligence applications exploiting big data sources arising social media using new big-data platforms based on the 'map-reduce' parallel programming paradigm.

# **UNIT-I**

Introduction: Web Scale AI and Big Data, Web Intelligence, Big Data Look: Indexing- Index creation, Ranking, Page Rank Searching- Enterprise search, Searching structured data, Object Search, Locality Sensitive Hashing and Memory. [T1, R2][No. of Hours: 10] **UNIT-II** Listen: Streams, Information and Language, Analyzing Sentiment and Intent Load: Databases and their Evolution, Big data Technology and Trends. Programming: Map-Reduce, Map-Reduce applications and its efficiency, Big-Table and HBase [T1, R1][No. of Hours: 12] **UNIT-III** 

Learn: Classification, Clustering, and Mining, Information Extraction Connect: Reasoning: Logic and its Limits, Dealing with Uncertainty.

**UNIT-IV** 

Predict: Forecasting, Neural Models, Deep Learning, and Research Topics. Data Analysis: Regression and Feature Selection

# **Text Book:**

The Intelligent Web: Search, Smart Algorithms and Big Data published by Oxford University Press, UK, [T1] in November 2013, authored by Dr. Gautam Shroff.

# **References Books:**

- Mining Massive Datasets by J.D. Ullman and A. Rajaraman (Cambridge University Press, UK 2012) [R1]
- Introduction to Information Retrieval by Christopher Manning, Prabhakar Raghavan and Hinrich Schutze [R2] (Cambridge University Press, UK 2008).

[T1, R1][No. of Hours: 12]

[T1, R1][No. of Hours: 10]

# SERVICE ORIENTED ARCHITECTURE

Paper Code: ETCS-420	L	T/P	С
Paper: Service Oriented Architecture	3	0	3

# **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the fundamentals of Service oriented architecture, enterprise architecture, architectural and design considerations with various SOA Analysis, Design technologies and applications.

# UNIT-I

**Service Oriented Architecture (SOA):** Introduction, Evolution, Fundamental SOA, Common Characteristics of contemporary SOA, Benefits of SOA, Common misperceptions about SOA, Promise and Challenges of SOA, Drivers, Dimensions, Key components, Perspectives.

**SO Architectures:** Architectures like Enterprise architecture, software architecture, SOA Reference architecture overview, The roots of SOA (comparing SOA to Past architectures)

**Enterprise-wide SOA:** Services-orientation and the enterprise, Considerations, Layers, Strawman architecture and other architectures, Application Development process, SOA methodology for Enterprise, Enterprise Applications.

# [T1][No. of Hours: 10]

# UNIT-II

**Service-Oriented Enterprise Applications:** Considerations, Patterns for SOA, SOA Programming Models. **SOA Analysis and Design:** Principles and best practices of Service Design, Designing - Activity Services, Data

Services, Client Services, Business process services.

Designing SOA: Business architecture, Business Process Models (Creating, Management & Modeling).

Service Context and common Semantics: Importance of Semantics in SOA, Core information modeling, defining types, Beyond the basics, structuring information models, documents and XML, XML: Schema and Patterns, Best practices for SOA Architect.

# [T2][No. of Hours: 12]

# UNIT-III

**Designing Service interfaces:** Services, Design Guidelines, Interface Design, Solution model.

**Designing Service implementations**: Basic Service architecture, Implementing: interface layer, business layer, Resource layer.

Composing Services: Understanding, Architectural models, implementation, business rules and Transactions.

**Designing and Using Integration in SOA Solutions:** Challenges of Integration in SOA, Special Considerations for implementing Integration.

# [T1, T2][No. of Hours: 12]

[T1, T2][No. of Hours: 10]

# UNIT-IV

**SOA Security:** Goals and fundamentals, Web service security Standards and specifications, SOA Security blueprints.

**SOA Governance**: Management and governance defined, Case for SOA governance, service life cycle, Developing and Registering Run Time policies, Run time policy enforcement and adaptation. Approach for Enterprise-wide SOA Implementation. SOA Applications and various Case Studies.

# **Text Books:**

- [T1] Michael Rosen, Boris Lublinsky, Kevin T Smith, Marc J Balcer, "Applied SOA: Service Oriented Architectures and Design Strategies", Wiley Reprint 2014.
- [T2] Shankar Kambhampaly, "Service –Oriented Architecture for Enterprise and Cloud Applications", Wiley

# **Reference Books:**

[R1] Thomas Erl, "SOA Principles of Service Design" by Prentice Hall

[R2] Roshen, "SOA based Enterprise Integration" by TMH publications

[R3] Eric Newcomer, Greg Lomow, "Understanding SOA with Web Services" by Pearson Education.

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### MULTIAGENT SYSTEMS

Paper Code: ETCS-422	L	T/P	С
Paper: Multiagent Systems	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** The objective of the paper is to facilitate the student with the basics of Multi-Agent Systems that are helpful for a Computer Engineering student who would like his carrier in Artificial Intelligence and Robotics.

### UNIT- I

**Introduction:** What Are Agents, Intelligent Agents, Agents and Objects, Agents and Expert Systems? Abstract Architectures for Intelligent Agents, Concrete Architectures for Intelligent Agents.

Agent Programming Languages: Agent-Oriented Programming, Concurrent MetateM.

Multiagent Systems and Societies of Agents: Introduction, Agent Communications, Agent Interaction Protocols, Societies of Agents.

### [T1, T2] [No. of hrs. 10]

### UNIT-II

**Distributed Problem Solving and Planning,** Introduction, Example Problems, Task Sharing, Result Sharing, Distributed Planning, Distributed Plan Representations, Distributed Planning and Execution,

**Search Algorithms for Agents**, Introduction, Constraint Satisfaction, Path-Finding Problem, Two-Player Games. **Distributed Rational Decision Making:** Introduction, Evaluation Criteria, Voting, Auctions, Bargaining, General Equilibrium Market Mechanisms, Contract Nets, Coalition Formation.

# [T1, T2][No. of hrs. 10]

### UNIT- III

**Methodologies:** When is an Agent-Based Solution Appropriate?, Agent-Oriented Analysis and Design, Pitfalls of Agent Development, Mobile Agents, Applications, Agents for Workflow and Business Process Management, Agents for Distributed Sensing, Agents for Information Retrieval and Management, Agents for Electronic Commerce, Agents for Human-Computer Interfaces, Agents for Virtual Environments, Agents for Social Simulation, Agents for X.

**Multiagent Decision Making:** Multiagent Interactions, Utilities and Preferences, Setting the Scene, Solution Concepts and Solution Properties, Competitive and Zero-Sum Interactions, The Prisoner's Dilemma, Other Symmetric 2 x 2 Interactions, Representing Multiagent Scenarios, Dependence Relations in Multiagent Systems.

### [T1, T2][No. of hrs. 12]

[T1, T2][No. of hrs. 11]

### UNIT-IV

**Groupware and Computer Supported Cooperative Work**- Introduction, Basic Definitions, Aspects of Groupware, Multi-Aspect Groupware, Social and Group Issues in Designing Groupware Systems, Supporting Technologies and Theories, Other Taxonomies of Groupware, Groupware and Internet. **Distributed Models for Decision Support:** Introduction, Decision Support Systems, An Agent Architecture for Distributed Decision Support Systems, Application Case Studies.

### **Text Books:**

- [T1] Wooldridge, Michael, "An Introduction to MultiAgent Systems", John Wiley & Sons.
- [T2] Gerhard Weiss," Multiagent systems: a modern approach to distributed artificial intelligence", The MIT Press

### **Reference Books:**

- [R1] Yoav Shoham, Kevin Leyton-Brown," MULTIAGENT SYSTEMS: Algorithmic, Game-Theoretic, and Logical Foundations", Cambridge University Press
- [R2] Adelinde M. Uhrmacher, Danny Weyns," Multi-Agent Systems: Simulation and Applications", CRC Press

# PRINCIPLES OF PROGRAMMING LANGUAGES

Paper Code: ETCS-424	L	Т	С
Paper: Principles of Programming Languages	3	0	3

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the principles of programming languages that are required for an engineering student.

# UNIT-I

**Introduction:** Syntax, semantics and pragmatics; Formal translation models, Variables, Expressions & Statements, Binding time spectrum; Variables and expressions; Assignment; I-values and r-values; Environments and stores; Storage allocation; Constants and initialization; Statement-level control structure.

### [T1, T2][No. of hrs. 12]

### UNIT-II

**Primitive Types:** Pointers; Structured types; Coercion; Notion of type equivalence; **Polymorphism:** overloading, inheritance, type parameterization, Abstract data types; Information hiding and abstraction; Visibility, Procedures, Modules, Classes, Packages, Objects and Object-Oriented Programming.

### [T1, T2][No. of hrs. 10]

# UNIT-III

Storage Management: Static and dynamic, stack-based, and heap-based storage management.

Sequence Control: Implicit and explicit sequencing with arithmetic and non-arithmetic expressions; Sequence control between statements.

**Subprogram Control:** Subprogram sequence control, data control and referencing environments; parameter passing; static and dynamic scope; block structure.

### [T1, T2] [No. of hrs. 12]

# UNIT-IV

**Concurrent Programming:** Concepts, Communication, Deadlocks, Semaphores, Monitors, Threads, Synchronization.

**Logic programming:** Introduction; Rules, Structured Data and Scope of the variables; Operators and Functions; Recursion and recursive rules; Lists, Input and Output; Program control; Logic Program design.

### [T1, T2][No. of hrs. 10]

### **Text Books:**

[T1] Programming Languages – Pratt T.V. (Pearson Ed).

- [T2] Introduction to Programming Languages: Programming in C, C++, Scheme, Prolog, C# and SOA Chen Y., Tsai W-T. (Kendall).
- [T3] Programming Languages: Design & Implementation Pratt T.W., Zelkowski M.V. (PHI).
- [T4] Programming Languages, Adesh K Pandey, Narosa Publishing House

### **References:**

- [R1] Programming Languages: Principles and Practice Louden K.C. (Addision-Wesley).
- [R2] Programming languages Grover P.S. (S. Chand).
- [R3] Programming Languages: Principles and Paradigms Tucker A., Noonan R. (TMH).

# TELECOMMUNICATION NETWORKS

Paper Code: ETCS-426	L	T/P	С
Paper: Telecommunication Networks	3	0	3

## **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand the basics of telecommunication transport and signalling protocols.

# UNIT I

Introduction to Telecommunication networks: Overview of Network Structure and Services, PSTN Network, Overview of Regulatory Bodies and Standards. Introduction to Access Networks -Analog,

PSTN Access Loops, WiLL, xDSL, Wireless Access Loops:-RF(Point to Point, GSM, CDMA(Radio Access Layer), Free Space Optical Access), Signalling,(CAS,CCS-SS7), ISDN ,Signalling:- CAS/CCS, with LAPB, LAPD, Robbed-Bit Signalling Protocols.

### [T1][No. of Hours 10]

### UNIT II

**Data Transport, Aggregation, grooming, Quality of Service:** Carrier Networks:- asynchronous carrier networks - Carrier Ethernet; synchronous carrier networks-TDM hierarchies(E1 to E3, T1 to T3), STS to STMx hierarchies under SDH, Cell Switched Networks(ATM, Burst Switched Networks).

# [T1][No. of Hours 10]

# UNIT III

Overview of SS6 and SS7 signalling systems. Fundamentals of UNI and NNI Signalling, Packet Based Signalling (SIGTRAN,SS7-IP Gateways) Core Networks-Optical Lambda Networks(with Wavelength assignment algorithms) Backhaul Networks for GSM/CDMA. Voice Transport: VoIP: Real Time Interactive Protocols: Rationale for new protocols, RTP, RTCP, Session Initialization Protocol (SIP), H.323.

### [T1][T2][R2][No. of Hours 10]

[T1, T2][No. of Hours 12]

# UNIT IV

**Wireless Networks:** GSM (2G,3G,4G,5G), CDMA, and UMTS with emphasis on Reference point interfaces, Basics of IP Multimedia systems(IMS, ePC) and NGN.

### **Text Books:**

- [T1] Behrouz A.Forouzan, 'Data Communication and Networking', 5E, Tata McGraw Hill, 2013.
- [T2] Telecommunication System Engineering by Roger L. Freeman, 4<sup>th</sup> Edition, Wiley India.

### **Reference Books:**

- [R1] Telecommunication Switching, Traffic & networks by J.E.Flood, Pearson Education Asia
- [R2] Optical Networks- A Practical Perpective by Rajiv Ramaswamy and Kumar Sivarajan, Morgan Kaufman.

# SELECTED TOPICS OF RECENT TRENDS IN COMPUTER SCICENE AND ENGINEERING

Paper Code: ETCS-428	L	T/P	С
Paper: Selected Topics of Recent Trends in CSE	3	0	3

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the recent trends in CSE and IT fields that are required for an engineering student.

# UNIT I

# **Trends in Information Retrieval:**

Recent Trends in IR: Parallel and distributed IR, multimedia IR, data modeling Web Searching, Characterizing the Web, Search Engines ,Browsing , Meta searchers ,Searching using hyperlinks.

Cluster Analysis: Cluster Analysis, Types of data, Categorization of methods, Partitioning methods, hierarchical methods, density based methods, grid based methods.

# [T1][R2][No. of hrs. 10]

### **UNIT II High Performance Computing**

Introduction: Need of high speed computing – increase the speed of computers – history of parallel computers and recent parallel computers; solving problems in parallel - temporal parallelism - data parallelism - comparison of temporal and data parallel processing - data parallel processing with specialized processors - inter-task dependency. The need for parallel computers - models of computation - analyzing algorithms - expressing algorithms.

# UNIT III

# **Grid Computing**

IT Infrastructure Evolution: Introduction, Technologies, Global Internet Infrastructure,- World Wide Web and Web Services, Open-Source Movement. Productivity Paradox and Information Technology: Productivity Paradox, Return on Technology Investment, Information Technology Straightjacket, Consolidation - Outsourcing - Toward a Real-Time Enterprise - Operational Excellence. Business Value of Grid Computing: Grid Computing Business Value Analysis, Risk Analysis, Grid Marketplace.

# UNIT IV

# **BIG DATA Analysis using Hadoop:**

Database evolution, Big data and Hadoop overview, Hadoop Distributed File System (HDFS), Map Reduce, Hadoop Streaming and Compression.

# **Text Books:**

- Ricardo Baeza-Yates, Berthier Ribeiro-Neto, "Modern Information Retrieval", Addison Wesley, 1999. [T1]
- V. Rajaraman and C. Siva Ram Murthy, "Parallel Computers Architecture and Programming", [T2] Prentice-Hall of India, 2003.

# **Reference Books:**

- Joshy Joseph and Craig Fellenstein, "Grid Computing", Pearson Education, 2003. [R1]
- Christopher D. Manning, Prabhakar Raghavan and Hinrich Schutze, [R2] "Introduction to Information Retrieval", Cambridge University Press, 2008.
- [R3] Hadoop in Practice, Holmes Wiley
- Chuck Lam "Hadoop in Action" Wiley India Selim G. Akl, "The Design and Analysis of Parallel [R4] Algorithms", Prentice-Hall of India, 1999

# [T2][No. of hrs. 12]

### [R3][R4][No. of hrs. 10]

[R1][No. of hrs. 10]

## **MOBILE COMPUTING LAB**

Paper Code: ETIT-452	L	T/P	С
Paper: Mobile Computing Lab	0	2	1

### List of Experiments:

The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc., Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

For MANETS, use of NS2/NS3 is recommended for two experiments.

### **Reference Books:**

- [R1] Donn Felker, "Android Application Development for Dummies", Wiley, 2010
- [R2] Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. To Programmer Series.
- [R3] Ed Burnette, 'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers, 2012
- [R4] Jerome (J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University press, 2005.
- [R6] R.Riggs, A. Taivalsaari, M.VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74627-1, Addison Wesley, 2001.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

## MACHINE LEARNING LAB

Paper Code: ETCS-454	L	T/P	С
Paper: Machine Learning Lab	0	2	1

### **List of Experiments:**

- 1. Study and Implement the Naive Bayes learner using WEKA. (The datasets taken can be: Breast Cancer data file or Reuters data set).
- 2. Study and Implement the Decision Tree learners using WEKA. (The datasets taken can be: Breast Cancer data file or Reuter's data set).
- 3. Estimate the accuracy of decision classifier on breast cancer dataset using 5-fold cross-validation. (You need to choose the appropriate options for missing values).
- 4. Estimate the precision, recall, accuracy, and F-measure of the decision tree classifier on the text classification task for each of the 10 categories using 10-fold cross-validation.
- 5. Develop a machine learning method to classifying your incoming mail.
- 6. Develop a machine learning method to Predict stock prices based on past price variation.
- 7. Develop a machine learning method to predict how people would rate movies, books, etc.
- 8. Develop a machine learning method to Cluster gene expression data, how to modify existing methods to solve the problem better
- 9. Select two datasets. Each dataset should contain examples from multiple classes. For training purposes assume that the class label of each example is unknown (if it is known, ignore it). Implement the K-means algorithm and apply it to the data you selected. Evaluate performance by measuring the sum of Euclidean distance of each example from its class center. Test the performance of the algorithm as a function of the parameter k.
- 10. Implement the EM algorithm assuming a Gaussian mixture. Apply the algorithm to your datasets and report the parameters you obtain. Evaluate performance by measuring the sum of Mahalanobis distance of each example from its class center. Test performance as a function of the number of clusters.
- 11. Suggest and test a method for automatically determining the number of clusters.
- 12. Using a dataset with known class labels compare the labeling error of the K-means and EM algorithms. Measure the error by assigning a class label to each example. Assume that the number of clusters is known.

### NOTE:- At least 8 Experiments out of the list must be done in the semester.

approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

# **MICROELECTRONICS LAB**

Paper Code: ETCS-456(ELECTIVE-I)	L	T/P	С
Paper: Microelectronics Lab	0	2	1

# **List of Experiments:**

- 1. To study the MOS characteristics and introduction to tanner EDA software tools.
- 2. To design and study the DC characteristics of PMOS and NMOS.
- 3. To design and study the DC characteristics of resistive inverter.
- 4. To design and study the transient and DC characteristics of CMOS inverter.
- 5. To design and study the characteristics of CMOS NAND gate.
- 6. To design and study the characteristics of CMOS multiplexer.
- 7. To design any Boolean function using CMOS gates.
- 8. To design and study the characteristics of CMOS NOR gate.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

# **COMPUTER VISION LAB**

Paper Code: ETCS-456(ELECTIVE-I)	L	T/P	С
Paper: Computer Vision Lab	0	2	1

# **List of Experiments:**

- 1. WAP for Affine Transformation
- 2. WAP for representing epipolar geometry
- 3. WAP for implementing shapes from shading

- 4. WAP for finding depth from motion
- 5. WAP to find the structure by solving the motion equation (Motion equation: rotation and translation) **N** I

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- 6. WAP for segmentation by edge Detection
- WAP for object detection using color, texture and motion cues.

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.

# SOFTWARE PROJECT MANAGEMENT LAB

Paper Code: ETCS-456(ELECTIVE-I)	L	T/P	С
Paper: Software Project Management Lab	0	2	1

# List of Experiments:

1. Consider the following information that you have compiled regarding the steps needed to complete a project. You have identified all relevant steps and have made some determination regarding predecessor/successor relationships. Using MS project, develop a simple network diagram for this project, showing the links among the project activities.

Activity	Predecessors
A- Survey Site	
B- Install sewer and storm drainage	A
C- Install gas and electric power lines	A
D- Exacavate site for spec house	B,C
E- Pour Foundation	D

2. Suppose that we add some duration estimates to each of the activities from question 1. A portion of the revised table is shown here. Recreate the network diagram for this project and note how MS project uses nodes to identify activity durations, start and finish dates, and predecessors. What is the critical path for this diagram? How do we know?

Activity	1	Predecessors	Duration
A-	Survey Site		5 Days
B-	Install sewer and storm	А	9 Days
drainag	e		
C-	Install gas and electric power	Α	4 Days
lines			
D-	Exacavate site for spec house	B,C	2 Days
E-	Pour Foundation	D	2 Days
			2 Days

- 3. Draw the PERT diagram for the question no 2 using Activity on Arrow (AOA) convention and Activity on Node (AON) Convention.
- 4. Refer to the activity network shown here in the table. Suppose that we have modified the original table slightly to show the following predecessor relationship between tasks and resources assigned to perform these activities. Enter the information using MS project to produce a Gantt chart. Assume that each resource has been assigned to the project activity on full time basis.

Activ	ity	Predecessors	Duration	Resource Assigned
A-	User Survey		5 Days	Gail Wilkins
B-	Coding	A	12 Days	Tom Hodges
C-	Debug	А	5 Days	Tom Hodges
D-	Design Interface	B,C	6 Days	Sue Ryan
E-	Develop Training	D	5 Days	Reed Taylor

- A. Using the resource usage view, can you determine any warning signs that some member of the project team has been over assigned?
- B. Click on the Task Usage view to determine the specific days when there is conflict in the resource assignment schedule.

- 5. Using the keywords "Cases on project risk management "search the Internet to identify and generate the report on any recent example of a project facing significant risks. What steps did the project organization take to fist identify and then mitigate the risk factors in this case.
- 6. Go to the site http://www. Dof.ca.gov/HTML/IT/PMM/OPT and reproduce the summary project budget worksheet. How would you adjust this worksheet if you were estimating the costs for a new software project? What items would you retain? Which would you remove or modify? Use MS Project to create project summary report.
- 7. Using the data shown in the network precedence table below, enter various tasks in MS Project. Then select a data approximately halfway through the overall project duration and update all tasks in the network to show current status. You may assume that all tasks in the first half of the project are now 100% completed. What does the tracing Gantt chart look like?

			~
Activity	XUI	Predecessors	Duration
A- C	onduct Competitive analysis		3
B- R	eview field sales reports		2
C- C	onduct tech capabilities assessment		5
D- D	evelop focus group data	A,B,C	2
E- C	onduct telephone surveys	D	3
F- Id	lentify relevant specification	E	3
G- In	nterface with marketing staff	F	1
H- D	evelop engineering specifications	G	5
I- C	heck and debug designs	Н	4
J- D	evelop testing protocols	G	3
K- Id	lentify Critical Performance levels	J	2
L- A	ssess and modify product	I,K	6
component	ts		
M- C	onduct capabilities assessments	L	12
N- Id	lentify selection criteria	М	3
0- D	evelop RFQ	М	4
P- D	evelop production master schedule	N,O	5
Q- Li	iaison with sales staff	Р	1
R- Pi	repare product Launch	Q	3

- 8. Draw the PERT diagram for the question no 7 using Activity on Arrow (AOA) convention and Activity on Node (AON) Convention.
- 9. Go to a search engine and enter the term "Project failure" or "Project disaster". Select one example and develop and analysis of the project using MS Project was it terminated or not? If not why in your opinion was it allowed to continue?
- 10. Do the case study of the following :
  - A. The IT department at Kimble college
  - B. The Tacoma Narrows suspension bridge
  - C. Project Libra to terminate or not to terminate
  - D. Johnson and Rogers Software Engineering Inc. (Ref.:- Jeffrey K. Pinto, Pearson publications)
- 11. What are the company's top risks? How severe Is their impact and how likely are they about to occur. Prepare RMMN plan for same. [Hint. Table should have following columns : Risk, Category, Problem , Impact , RMMN ]
- 12. Explain Software Management Tools, CASE Tools, Planning and Scheduling Tools.
- 13. What is the Software Project Quality measures related to any projects?

# PRINCIPLES OF PROGRAMMING LANGUAGES LAB

Paper Code: ETCS-458(ELECTIVE-II)	L	T/P	С
Paper: Principles of Programming Languages Lab	0	2	1

# List of Experiments:-

- 1. Implement all major functions of string.h in single C program using switch case to select specific function from user choice (like strlen, strcat, strcpy, strcmp, strrev)
- 2. Write a program (WAP) in C to reverse a linked list iterative and recursive.
- 3. WAP in C to implement iterative Towers of Hanoi.
- 4. WAP in C++ to count the no.s of object of a class with the help of static data member, funtion and constructor.
- 5. WAP in C++ & Java to declare a class Time with data members mm for minutes, ss for seconds and hh for hours. Define a parameterize constructor to assign time to its objects. Add two time objects using member function and assign to third objects. Implement all possible cases of time.
- 6. WAP in C++ to define a class Complex to represents set of all complex numbers. Overload '+' operator to add two complex numbers using member function of the class and overload '\*' operator to multiply two complex numbers using friend function of the class complex.
- 7. Implement simple multi-threaded server to perform all mathematics operation parallel in Java.
- 8. Write a program in to prepare a list of 50 questions and their answers.
- 9. Write a program to display 10 questions at random out of exp.8-50 questions (do not display the answer of these questions to the user now).
- 10. Implement producer-consumer problem using threads.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

# **TELECOMMUNICATION NETWORKS LAB**

### Paper Code: ETCS-458(ELECTIVE-II) Paper: Telecommunication Networks Lab

# List of Experiments:

- 1. Experiments: Access Networks (on Telephone Trainer kit)
- 2. Measurement of tip and ring voltages, (verify the BORSCHT functions).
- 3. Check how the Caller ID is transmitted, design a circuit to read the Caller ID
- 4. Check the DTMF dialling function, displaying the freq pairs for DTMF, design a circuit for DTMF and Pulse dial-out using a microcontroller
- 5. To study dial tone, busy tone and ring back tone waveforms and generations.
- 6. To study speech circuit and ring generator using EPABX.
- 7. To study the working of sound section or speech section.
- 8. Study of working of Voltage Dropper Circuit in Telephone.
- 9. Study of the working of Key Matrix Section.
- 10. To study working of dialer section and DTMF signals using High Pass and Low Pass Filters.
- 11. DSL-Using a DSLAM simulator, checks the functioning of a any ADSL modem.
- 12. Ethernet-Using Wireshark checks the Ethernet packet format across a live LAN.
- 13. Using OpenNMS, check the status of a Network Element such as a Linux node running SNMPD

NOTE:- At least 8 Experiments out of the list must be done in the semester.

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# SCHEME OF EXAMINATION



### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) FIRST SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
ETMA-101		Applied Mathematics-I	3	1	4	М
ETPH-103		Applied Physics-I	2	1	3	М
ETME-105		Manufacturing Processes	3	0	3	М
ETEE-107		Electrical Technology	3	0	3	М
ETHS-109		Human Values and Professional Ethics-I#	1	1	1	
ETCS-111	64	Fundamentals of Computing	2	0	2	
ETCH-113	X	Applied Chemistry	2	1	3	М
PRACTICAL/	VIVA VOC	E		4;		
ETPH-151	97	Applied Physics Lab-I		2	1	
ETEE-153		Electrical Technology Lab		2	1	М
ETME-155		Workshop Practice		3	2	М
ETME-157	1	Engineering Graphics Lab		3	2	
ETCS-157		Fundamentals of Computing Lab		2	1,	
ETCH-161		Applied Chemistry Lab		2	1	
		NCC/NSS*#				
TOTAL	-		16	18	27	

M: Mandatory for award of degree

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

#NUES (Non University Examination System)

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

# BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) SECOND SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
ETMA-102		Applied Mathematics-II	3	1	4	М
ETPH-104		Applied Physics-II	2	1	3	
ETEC-106		Electronic Devices	3	0	3	М
ETCS-108		Introduction to Programming	3	0	3	М
ETME-110	5	Engineering Mechanics	2		3	
ETHS-112	10	Communication Skills	2	10	3	
ETEN-114	(1)	Environmental Studies	2	1	3	
PRACTICAL/	VIVA VOCE	6			1	
ETPH-152	5/	Applied Physics Lab-II		2	1	
ETCS-154		Programming Lab		2	1	М
ETEC-156		Electronic Devices Lab		2	1-	М
ETME-158		Engineering Mechanics Lab		2	1	
ETEN-160		Environmental Studies Lab		2	1	
		NCC/NSS*#			1	
TOTAL			17	15	27	

M: Mandatory for award of degree

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

#NUES (Non University Examination System)

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	APERS					
ETMA-201		Applied Mathematics – III	3	1	4	
ETEC-203		Analog Electronics-I	3	1	4	
ETEE-205		Materials in Electrical Systems	3	0	3	М
ETEE-207		Circuits and Systems	3	1	4	М
ETCS-209	C	Data Structures	3		4	
ETEE-211	.0	Electrical Machines-I	3	1	4	М
PRACTICAL	L/VIVA VOC	CE		7	~	
ETEC-251	X.C.	Analog Electronics – I Lab.	0	2		
ETEE-253	51	Electrical Machines-I Lab	0	2	1	
ETCS-255	5/	Data Structures Lab.	0	2	13	<u>,</u>
ETEE-257		Circuits and Systems Lab. <sup>@</sup>	0	2	1	4
ETEE-259		Scientific Computing Lab <sup>@</sup>	0	2	1	
		NCC/NSS*	-	F	-	
ГОТАL		2 10	18	15	28	

# BACHELOR OF TECHNOLOGY (ELECTRICAL AND ELECTRONICS ENGINEERING) THIRD SEMESTER EXAMINATION

M: Mandatory for the award of degree.

\*NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

@A few lab experiments must be performed using any circuit simulation software e.g. PSPICE/MATLAB/Scilab/R/Octave.

BACHELOR OF TECHNOLOGY
(ELECTRICAL AND ELECTRONICS ENGINEERING)
FOURTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	APERS					
ETEE 202		Electrical Machines-II	3	1	4	М
ETEC 204		Analog Electronics-II	3	1	4	М
ETEE 206		Power System– I	3	1	4	М
ETEE 208	(	Electrical and Electronics Measuring Instruments	3		4	
ETEE 210	1	Electromagnetic Field Theory	3	0	3	
ETEE 212	$\langle \rangle$	Control Systems	3	17	4	М
PRACTICA	L/VIVA VO	CE 🍝		1	1	
ETEE 252	5/	Electrical Machines-II Lab <sup>@</sup>	0	2	1	
ETEC 254		Analog Electronics-II Lab <sup>@</sup>	0	2	1	1
ETEE 256		Power System-I Lab. <sup>@</sup>	0	2	1-	
ETEE 258		Electrical and Electronics Measuring Instruments Lab. <sup>@</sup>	0	2	1	
ETEE 260		Control Systems Lab. <sup>@</sup>	0	2	1	
ETSS 250	1	NCC/NSS*	-		1	
FOTAL	-		18	15	29	

M: Mandatory for the award of degree.

\*NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

**NOTE:** 4 weeks Industrial / In-house Workshop will be held after fourth semester. However, Viva-Voce will be conducted in the fifth semester (ETEE 359).

@ A few lab experiments must be performed using any circuit simulation software e.g. PSPICE/MATLAB/ETAP.

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY P.	APERS					
ETHS 301		Communication Skills for	2	0	1	
		Professionals				
ETEE-303		Power Electronics	3	1	4	М
ETEE 305		Sensors and Transducers	3	1	4	М
ETEE 307		Switching Theory and Logic Design	3	1	4	М
ETEE 309	1	Communication Systems	3	1	4	
ETMS 311	X	Industrial Management	3	0	3	
PRACTICA	L/VIVA VOO	CE		-	9.	
ETEE 351	(0)	Sensors and Transducers Lab <sup>®</sup>	0	2	E CO	3
ETEE 353	2	Power Electronics Lab.	0	2	1	À
ETEE 355	5/	Switching Theory and Logic Design Lab	0	2	1	2
ETEE 357	5 12	Communication Systems Lab. <sup>@</sup>	0	2	1	1
ETEE 359		#*Electrical and Electronic Workshop	0	0	1	М
ETHS 351		Communication Skills for Professionals Lab	0	2	1	
TOTAL			17	14	26	

# BACHELOR OF TECHNOLOGY (ELECTRICAL AND ELECTRONICS ENGINEERING) FIFTH SEMESTER EXAMINATION

# # NUES

M: Mandatory for the award of degree.

\*Viva-Voce for evaluation of Industrial Training / In-house Workshop will be conducted in this semester. @ A few lab experiments must be performed using any circuit simulation software e.g. PSPICE/Scilab/ETAP.

# **BACHELOR OF TECHNOLOGY** (ELECTRICAL AND ELECTRONICS ENGINEERING) SIXTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
	THEORY I	PAPERS				
ETEE 302		Power System – II	3	1	4	М
ETEE 304		Utilization of Electrical Energy and Electric Traction	3	1	4	М
ETEC 306		Digital Signal Processing	3	1	4	
ETEC 308	5	VLSI Design	3	2	4	
ETEE 310		Microprocessor and Microcontroller	3	ð.	4	
ETEE 312	20	Power Station Practice	3	10	4	М
-	PRACTICA	AL/VIVA VOCE		1:	2	
ETEE 352	5/	Power System – II Lab <sup>@</sup>	0	2	24	
ETEE 354		Utilization of Electrical Energy Lab <sup>@.</sup>	0	2	1	
ETEC 356		Digital Signal Processing Lab <sup>@</sup>	0	2	1	
ETEE 358		Microprocessors and Microcontrollers Lab	0	2	1	
FOTAL		2 9	18	14	28	

M: Mandatory for award of degree

#NUES (Non University Examination System)

Note: Minimum of 4-6 weeks of industrial training related to EEE will be held after 6<sup>th</sup> semester; however, viva-

voce will be conducted in 7<sup>th</sup> Semester (ETEE 459). **Imp:-** Elective Paper will be floated in 7<sup>th</sup> Semester, if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 7<sup>th</sup> Semester is done before the 15<sup>th</sup> April every year before end of 6<sup>th</sup> semester.

@ A few lab experiments must be performed using any circuit simulation software e.g. PSPICE/Scilab/ETAP.

# BACHELOR OF TECHNOLOGY (ELECTRICAL AND ELECTRONICS ENGINEERING) SEVENTH SEMESTER EXAMINATION

Code No. I	Paper ID	Paper	L	T/P	Credits
THEORY PAPERS	5	•			
ETEE 401		Electrical Drives	3	1	4
ETEE 403		Advanced Control Systems	3	1	4
ETEE 405		EHV AC and HVDC Transmissions	3	0	3
ELECTIVE- SELE	CT ANY T	TWO (ONE FROM EACH GROUP) \$			
GROUP-A			5		
ETEE 419	X	Renewable Energy Resources	3	0	3
ETEE 409	20	Power Distribution System	3	0	3
ETEE 411	$\wedge$	Telemetry and Data Acquisition Systems	3	0	3
ETEE 413	- /	PLC and SCADA Systems	3	0	3
ETAT 403	- /	Mechatronics	3	0	3
ETEE 417	1	High Voltage Engineering	3	0	3
ETEE 421	/	Selected topics in EEE**	3	0	3
GROUP-B				1,2	1
				1	
ETEC-403		Optoelectronics and Optical Communication	3	0	3
ETCS 425		Database Management Systems	3	0	3
ETIC 403		Biomedical Instrumentation	3	0	3
ETEC 427		Digital System Design	3	0	3
ETEE 431		Power line Carrier Communication	3	0	3
ETEL 405		Electrical Machines Design	3	1	4
ETHS 419	1	Sociology and Elements of Indian History for Engineers	3	0	3
PRACTICALVIVA	VOCE	Engineers			
ETEE-451	1	Electrical Drives Lab	0	2	1
ETEE-453		Advanced Control Systems Lab <sup>@</sup>	0	2	1
ETEE-455		Practical Based on Electives Group A or B	0	2	1
ETEE-457		#Seminar	0	2	1
ETEE-457		Minor Project <sup>+</sup>	0	6	3
FTFF-459		^Industrial Training	0	0	1
TOTAL	-01		15	16	25

# NON UNIVERSITY EXAMINATION SYSTEM

@ A few lab experiments must be performed using any circuit simulation software e.g. Scilab/LABVIEW.

+ The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.

\$ Elective Paper will be offered if one-third of the total students opt for the same. It is mandatory that the decision about the elective subject is made before the 15<sup>th</sup> April every year before end of sixth semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

<sup>A</sup>Industrial training was conducted after sixth semester. However, Viva-Voce for evaluation of Practical Training will be conducted in this semester.

\*\*Syllabus may be revised every 2 years.

# BACHELOR OF TECHNOLOGY (ELECTRICAL AND ELECTRONICS ENGINEERING) EIGHTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits
THEORY P	APERS				
ETEE 404		Neuro-Fuzzy Systems	3	1	4
ETEE 406		Power System Operation and Control	3	0	3
ETHS-402		Human Values and Professional Ethics-II	1	0	1
ELECTIVE	- SELECT A	NY TWO (ONE FROM EACH GROUP) \$	6		
GROUP-A	(	111	1	~	
ETEE 408	1	Application of Power Electronics to Power Systems	3	0	3
ETIT418	$\langle \Lambda \rangle$	Digital Image Processing	3	0	3
ETEE 412	X	Reliability Engineering and Application to Power System	3	0	3
ETEE 414		Electrical Machine - III	3	0	3
ETEE 416	5/	Electrical Energy Conservation	3	0	3
ETEL 402		Power System Analysis and Stability	3	1	4
ETEE 418		Electrical System Design	3	0	3
GROUP-B					
ETIC 410		Embedded Systems	3	0	3
ETEC-420		Data Communication and Networks	3	0	3
ETCS 430		Object Oriented Programming Using C++	3	0	3
ETEE 426		Power Plant Instrumentation	3	0	3
ETEE 428		Intelligent and Smart Instrumentation	3	0	3
ETEC 430	1	Digital Communication	3	0	3
ETEE 432	1	Electrical Power Quality	3	0	3
PRACTICA	L/VIVA VO	CE ON O	J/		1
ETEE 452		Neuro and Fuzzy Systems Lab <sup>@</sup>	0	2	1
ETEE 454		Practical Based on Elective	0	2	1
ETEE 456		Major Project <sup>+</sup>	0	12	8
TOTAL			13	18	24

# @ A few lab experiments must be performed using any circuit simulation software e.g. MATLAB/LABVIEW

+ The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to major project should be delivered one month after staring of Semester.

\$ Elective Paper will be float if one-third of the total students opt for the same. It is advice that the decision about the elective subject is done before the 15<sup>th</sup> November every year before end of seventh semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

### NOTE:

- 1. The total number of the credits of the B.Tech. (EEE) Programme = 214.
- 2. Each student shall be required to appear for examinations in all courses. However, for the award of the degree a student shall be required to earn a minimum of 200 credits, including mandatory papers (M).

# FOR LATERAL ENTRY STUDENTS:

1. The total number of the credits of the B. Tech. (EEE) Programme = 160.

2. Each student shall be required to appear for examinations in all courses Third Semester onwards. However, for the award of the degree a student shall be required to earn a minimum of 150 credits, including mandatory papers (M).

# NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF

# **B.TECH AND M.TECH**

- 1. ET stands for Engineering and Technology.
- 2. PE stands for Power Engineering.
- 3. ME stands for Mechanical Engineering.
- 4. MT stands for Mechatronics.
- 5. AT stands for Mechanical and Automation Engineering.
- 6. EE stands for Electrical and Electronics Engineering.
- 7. EL stands for Electrical Engineering.
- 8. IT stands for Information Technology
- 9. CS stands for Computer Science and Engineering
- **10.** CE stands for Civil Engineering
- 11. EC stands for Electronics and Communications Engineering.
- 12. EN stands for Environmental Engineering
- **13. TE** stands for Tool Engineering
- 14. MA stands for Mathematics
- 15. HS stands for Humanities and Social Sciences
- 16. SS stands for Social Services

# **APPLIED MATHEMATICS-III**

Paper Code: ETMA-201	L	T/P	С
Paper: Applied Mathematics-III	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of this course is to teach the students the applications of fourier series, fourier transform, difference equation and numerical methods to solve various engineering problems.

# UNIT-I

Fourier series: Definition, Euler's formula, conditions for Fourier expansion, functions having points of discontinuity, change of intervals, even and odd functions ,half range series, Harmonic analysis. Fourier Transforms: Definition, Fourier integral, Fourier transform, inverse Fourier transform, Fourier sine and cosine transforms, properties of Fourier transforms (linearity, scaling, shifting, modulation), Application to partial differential equations.

# UNIT-II

UNIT-III

Difference equation: Definition, formation, solution of linear difference equation with constant coefficients simultaneous difference equations with constant coefficients, applications of difference equations .Z- transform: Definition, Z- transform of basic functions, properties of Z-transform (linearity, damping, shifting, multiplication), initial value theorem, final value theorem, convolution theorem, convergence of Z- transform, inverse of Z- transform, Application to difference equations.

Numerical Methods: Solution of algebraic and transcendental equations using bisection method, Regula-Falsi method and Newton – Raphson method. Solution of linear simultaneous equations using Gauss-Jacobi's iteration method and Gauss-Seidal's iteration methods. Finite differences: Forward differences, backward differences and Central differences. Interpolation: Newton's interpolation for equi-spaced values. Stirling's central difference interpolation formula, Divided differences and interpolation formula in terms of divided differences, Lagrange's interpolation formula for unequi-spaced values.

# UNIT-IV

Numerical Differentiation, maxima and minima of a tabulated function. Numerical Integration: Newton-Cote's quadrature formula, Trapezoidal rule, Simpson's one-third rule and Simpson's three-eighth rule .Numerical solution of ordinary differential equations: Picard's method, Taylor's method, Euler's method, modified Euler's method, Runge-Kutta method of fourth order.

# [T1,T2][No. of hrs 11]

[T1,T2] [No. of hrs 11]

# Text Books:

- R.K. Jain and S.R.K. Ivengar," Numerical methods for Scientific and Engineering Computation". [T1] New Age Publishing Delhi-2014.
- [T2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications, 2014 Edition. V A

# Reference Books:

E. kresyzig," Advance Engineering Mathematics", Wiley publications [R1]

N.

- P. B. Patil and U. P. Verma, "Numerical Computational Methods", Narosa [R2]
- Partial Differential Equations" Schaum's Outline Series, McGraw Hill. [R3].
- Michael Greenberg, "Advance Engineering mathematics", Pearson. [R4]
- Schaum's Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw-[R5] Hill

CAD

1.1

1.4

# [T2][No. of hrs 11]

Maximum Marks: 75

# [T2][No. of hrs 11]

# ANALOG ELECTRONICS-I

Paper Code: ETEC-203	L	T/P	С
Paper: Analog Electronics-I	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of teaching this subject is to impart in depth understanding of the concepts of biasing in active circuits and employing simple models to represent nonlinear and active elements in circuits. It also includes the operation of the circuits at high frequencies and effects of feedback. The analysis of power amplifier & tuned amplifiers is also dealt with.

# UNIT – I

**Review of diode and BJT, Bias stabilization:** Need for stabilization, fixed Bias, emitter bias, self-bias, bias stability with respect to variations in  $I_{co}$ ,  $V_{BE}$  &  $\beta$ , Stabilization factors, thermal stability. Bias compensation techniques.

**Small signal amplifiers:** CB, CE, CC configurations, hybrid model for transistor at low frequencies, RC coupled amplifiers, mid band model, gain & impedance, comparisons of different configurations, Emitter follower, Darlington pair(derive voltage gain, current gain, input and output impedance). Hybrid-model at high frequencies ( $\pi$  model).

## UNIT – II

[T1,T2,T3][No. of Hours: 11]

**Multistage Amplifiers:** Cascade and cascode amplifiers, Calculations of gain, impedance and bandwidth. Design of multistage amplifiers.

Feedback Amplifiers: Feedback concept, Classification of Feedback amplifiers, Properties of negative Feedback amplifiers, Impedance considerations in different configurations. Analysis of feedback Amplifiers.

[T1,T2,T3][No. of Hours: 11]

### UNIT – III

**Field Effect Transistor:** Introduction, Classification, FET characteristics, Operating point, Biasing, FET small signal Model, enhancement & Depletion type MOSFETS, MESFET, FET Amplifier configurations (CD,CG and CS).

Introduction to UJT, SCR, Triac and Diac (working, construction, characteristics and application), UJT relaxation oscillator.

[T1,T2,T3][No. of Hours: 11]

# UNIT – IV

**Power Amplifiers:** Power dissipations in transistors, Amplifiers Classification, (Class-A, Class-B, Class-C, Class-AB) Efficiency analysis, Push-pull and complementary Push-pull amplifiers, cross over distortion and harmonic distortion in push pull amplifier. Tuned amplifiers(single, double & stagger tuned amplifier).

# [T1,T2,T3][No. of Hours: 11]

# Text Books:

- [T1] Boylestad & Nashelsky, "Electronic Devices & Circuit Theory" PEARSON PUBLICATION.
- [T2] Salivahanan, Suresh Kumar, Vallavaraj, "Electronic devices and circuits" TMH, 1999.
- [T3] J. Millman and Halkias, "Integrated Electronics, Analog & Digital Circuits & Systems" TMH 2000.

### **Reference Books:**

- [R1] Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, 2000
- [R2] B.Kumar & Shail Bala Jain, "Electronic Devices And Circuits" PHI
- [R3] David A Bell, "Electronic Devices and Circuits", Oxford University Press, 2000.

[R4] Albert Malvino, David J.Bates, "Problems and Solutions in Basic Electronics", TMH.

# MATERIALS IN ELECTRICAL SYSTEMS

Paper Code: ETEE-205	L	T/P	С
Paper: Materials in Electrical Systems	3	0	3

# INSTRUCTIONS TO PAPER SETTERS

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: Explain the basic concepts regarding the difference in behavior of different materials used in electrical and electronics industry, explaining the various properties of different materials and their application to devices, equipments and systems selection of proper materials for given application.

# UNIT I

# **Conducting Materials:**

Energy band diagram of conductors, semiconductors and insulators. Conductivity and Resistivity, factors affecting the resistivity, classification of conducting materials, electrical, mechanical and thermal properties and applications of low resistance materials like copper, aluminium, steel, silver, gold, platinum, brass and bronze. Electrical, mechanical and thermal properties and applications of high resistance materials like manganin, constantan, nichrome, mercury, tungsten and carbon. Introduction of super conductors.

# UNIT II

# Insulating Materials :

Classification of insulating materials, electrical, physical, thermal, chemical, mechanical properties of insulating materials. Thermoplastic and natural insulating materials, Gaseous and liquid insulating materials, properties and applications of ceramics and synthetic insulating materials.

[T1,T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

## UNIT III

# Magnetic Materials :

Introduction and classification of magnetic materials, permeability, B-H curve, magnetic saturation, hysteresis loop, coercive force and residual magnetism, concept of eddy current and hysteresis loss, curie temperature, magnetostriction effect. Soft and hard magnetic materials, ferro and ferri magnetic materials, special purpose magnetic materials.

### UNIT IV

### **Special Materials and components:**

Properties and applications of different materials used in electrical systems like – thermocouples, bimetallic, fusing, and soldering. Introduction to different types of materials used in electromagnetic and electromechanical systems, resistors, capacitors, inductors, special semiconductors used in electrical engineering.

[T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

### Text Books:

- [T1] Electrical properties of materials by L. Solymer, Oxford University Press, 2014
- [T2] An Introduction to Electrical Engineering Materials, C.S. Indulkar, S.Thiruvengadam, S. Chand Publishing, 4<sup>th</sup> edition, 2004

- [R1] Electronic Engineering Materials and Devices, J. Allison, Tata McGraw Hill Education, 1973
- **[R2]** Electrical Materials, Rob Zachariason, Delmar Cengage Learning, 2<sup>nd</sup> Revised edition 2011
- **[R3]** Electrical Engineering Materials, Dekker Adrianu., PHI,1<sup>st</sup> edition, 2011
- **[R4]** A Course In Electrical Engineering Materials, Seth S P, Dhanpat Rai, 3<sup>rd</sup> edition, 2011
- **[R5]** Electrical and Electronic Engineering Materials by S.K. Bhattacharya, Khanna Publishers, New Delhi.

## **CIRCUITS & SYSTEMS**

Paper Code: ETEE-207	L	T/P	С
Paper: Circuits & Systems	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Q. No.1 rest of the paper shall consist of four units as per the syllabus, every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

**Objective:** The purpose of this course is for each student to learn and further explore the techniques of advanced circuit analysis. The concepts and analytical techniques gained in this course (e.g., signals, Laplace transformation, frequency response) will enable students to build an essential foundation of many fields within electrical engineering, such as control theory, analog electronic circuits, signal processing.

# UNIT-I

Introduction to signals, their classification and properties, different types of systems, LTI systems and their properties, periodic waveforms and signal synthesis, properties and applications of Laplace transform of complex waveform. [T1,T2][No. of Hrs: 10]

# UNIT-II

System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuits for impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform. [T1,T2][No. of Hrs: 12]

# UNIT-III

Graph theory: concept of tree, tie set matrix, cut set matrix and application to solve electric networks. Two port networks – Introduction of two port parameters and their interconversion, interconnection of two 2-port networks, open circuit and short circuit impedances and ABCD constants, relation between image impedances and short circuit and open circuit impedances. Network functions, their properties and concept of transform impedance, Hurwitz polynomial.

# UNIT IV

Positive real function and synthesis of LC, RC, RL Networks in Foster's I and II, Cauer's I& II forms, Introduction of passive filter and their classification, frequency response, characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section.

[T1,T2][No. of Hrs: 10]

[T1,T2][No. of Hrs: 10]

# TEXT BOOKS:

- [T1] W H Hayt "Engineering Circuit Analysis" TMH Eighth Edition
- [T2] Kuo, "Network analysis and synthesis" John Weily and Sons, 2<sup>nd</sup> Edition.

# **REFERENCE BOOKS**

- [R1] S Salivahanan "Circuit Theory" Vikas Publishing House 1<sup>st</sup> Edition 2014
- [R2] Van Valkenburg, "Network analysis" PHI, 2000.
- [R3] Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design" Umesh publication, 2000.
- [R4] D. R. Choudhary, "Networks and Systems" New Age International, 1999
- [R5] Allan H Robbins, W.C.Miller "Circuit Analysis theory and Practice" Cengage Learning Pub 5<sup>th</sup> Edition 2013
- [R6] Bell "Electric Circuit" Oxford Publications 7<sup>th</sup> Edition.

## DATA STRUCTURES

Paper Code: ETCS-209	L	Т	С
Paper: Data Structures	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

### Maximum Marks: 75

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand the programming and the various techniques for enhancing the programming skills for solving and getting efficient results.

### UNIT – 1:

Introduction to programm ing methodologies and design of algorithms. Abstract Data Type, array, array organization, sparse array. Stacks and Stack ADT, Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.

## UNIT – II:

Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expreession trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

### UNIT – III:

Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B\* and B+ Trees. Graphs, Graph representation, Graph traversal. [T1,T2][No. of hrs. 12]

# UNIT – IV:

Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (only 2-way merge sort). Searching - List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

### Text Books:

R. F. Gilberg, and B. A. Forouzan, "Data structures: A Pseudocode approach with C", Thomson

Learning.

[T1]

A.V. Aho, J. E. Hopcroft, J. D. Ulman "Data Structures and Algorithm", Pearson Education. [T2]

### Reference Books:

- S. Sahni and E. Horowitz, "Data Structures", Galgotia Publications. [R1]
- [R2]
- Tanenbaum: "Data Structures using C", Pearson/PHI. T.H. Cormen, C.E. Leiserson, R.L. Rivest "Introduction to Algorithms", PHI/Pearson. [R3]
- [R4] A.K.Sharma, "Data Structures", Pearson
- Ellis Horowitz and Sartaz Sahani "Fundamentals of Computer Algorithms", Computer Science Press. [R5]

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# ELECTRICAL MACHINES-I

Paper Code: ETEE-211	L	Т	С
Paper: Electrical Machines-I	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Providing sound knowledge about the principles of operation of various electrical machines, their constructional features, and their behavior and characteristics under various condition of operation.

# UNIT I

**Principles of EMEC:** Energy in Electro-Magnetic Systems, Flow of Energy in Electro-Mechanical Devices, Energy and co-energy in Magnetic field, Singly and doubly excited systems, Electromagnetic and Reluctance Torque.

**DC** Generators: Constructional features, Armature winding details, lap & wave connections, EMF equation, separately excited, shunt, series and compound connected D.C. generators process of voltage build up in shunt generators, Characteristics and applications of separately/self-excited generators.

# UNIT II

DC Generators (Contd.): Armature Reaction, Demagnetizing and Cross-magnetizing armature MMF, Interpoles and compensating windings, commutation process and its improvement.

**D.C. Motors:** Speed and Torque Equation of D.C. motors, Characteristics of D.C. series, shunt and compound motors and their applications, Starting and speed control of D.C. motors, Braking of D.C. motors, Efficiency and testing of D.C. Machines, Introduction of D.C. servo motor and permanent magnet / brushless D.C. motors.

[T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs.11]

[T1, T2][No. of Hrs. 11]

### UNIT III

**Single phase Transformers:** Transformer construction and practical considerations. Equivalent circuit(Exact and approximate), per unit values, Phasor diagram, Transformer testing : open circuit test, Short Circuit test, Sumpner's test, Efficiency and voltage regulation, All day efficiency.

### UNIT IV

**3 phase Transformers:** Three-phase Bank of Single-phase Transformers, Parallel operations of 1-phase and 3-phase transformers, load division between transformers in parallel. Three winding transformers, Zigzag connections, vector grouping with clock convention, tertiary winding, tap changing, phase conversions-3phase to 2 phase and 3phase to 6 phase.

Special Purpose Transformers: Auto-transformers. Welding, Traction, Instruments and pulse Transformers. [T1, T2][No. of Hrs.11]

# TEXT BOOKS:

- [T1] Electric Machinery, A Fitzgerald, Charles Kingsley, Stephen Umans, Tata McGraw Hill Education, 6<sup>th</sup> Edition, 2002.
- [T2] Electrical Machines with MATLAB, Turan Gnen, CRC Press, Taylor&Francis, 2<sup>nd</sup> edition, 1998.

# **REFERENCE BOOKS:**

- [R1] The Performance and Design of Alternating Current Machines, M.G. Say, CBS Publishers, 2005
- [R2] Electro-Mechanical Energy Conversion with Dynamics of Machines, Rakosh Das Begamudre, Wiley-Blackwell, 1988.
- [R3 Performance and Design of Direct Current Machines: AE Clayton and NN Hancock, CBS Publishers, 2014
- [R4] Oblems in Electrical Engineering: Power engineering and electronics with answers Partly Solved in I. Units: Parker Smith, CBS Publishers, 9<sup>th</sup> edition, 2003
- [R5] Electric Machines, IJ Nagrath D P Kothari, Mc Graw-Hill Education, 3<sup>rd</sup> edition, 2011
- [R6] Samarjit Ghosh, "Electrical Machines", Pearson

ANALOG	<b>ELECTRONICS-1</b>	LAB

ANAL	<b>JG ELECTRONICS-I LAD</b>	
Paper Code: ETEC-251	L	T/P
Paper: Analog Electronics-1 Lab	0	2

NOTE:- At least 8 Experiments out of the list must be done in the semester.

## List of Experiments:

- 1. Plotting input and output characteristics and calculation of parameters of a transistor in common emitter configuration.
- Transistor biasing circuit. Measurement of operating point (Ic and Vce) for a :-2.
  - a) fixed bias circuit
  - b) potential divider biasing circuit.
- 3. Plot the FET characteristics & MOSFET characteristics. 4.Two Stage R.C. Coupled Amplifier. To measure the overall gain of two stages at 1 KHz and compare it with gain of Ist stage, Also to observe the loading effect of second stage on the first stage
- 4. To plot the frequency response curve of two stage amplifier.
- To study Emitter follower circuit & measurement of voltage gain and plotting of frequency response 5. Curve.
- 6. Feedback in Amplifier. Single stage amplifier with and without bypass capacitor, measurement of voltage gain and plotting the frequency response in both cases.
- 7. To determine and plot firing characteristics of SCR by varying anode to cathode voltage, and varying gate current.
- 8. To note the wave shapes and voltages at various points of a UJT relaxation oscillator circuit.
- Transistorized push pull amplifier & Measurement of optimum load, maximum undistorted power (by 9. giving maximum allowable signal) Efficiency and percentage distortion factor.
- 10. To study the characteristics of single tuned & double tuned amplifier.

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# **ELECTRICAL MACHINES-I LAB**

Paper Code: ETEE-253			L	T/P	С
Paper: Electrical Machines–I Lab			0	2	1

EXP: 1 To study the construction and operation of various types of starters available in the laboratory for starting DC motors.

EXP:2 To study the magnetization characteristics of a separately excited D.C generator at different speeds and to find the critical field resistance at those speeds.

EXP:3 To perform the load test on D.C. shunt motor and to draw the performance characteristics.

- EXP:4 To control the speed of a DC shunt motor by using
  - a) Field control
    - b) Armature/Rheostatic control
    - c) Supply voltage control

EXP: 5 To perform the Swinburne's test on a D.C. shunt Machine and to pre determine its efficiency when running as a motor as well as generator and also draw the characteristic curves.

EXP: 6 To conduct load test on DC shunt generator and obtain its internal and external characteristics.

EXP: 7 To perform O.C./S.C. tests on a single phase transformer and determine equivalent circuit parameters.

EXP: 8 To perform Sumpner's (back to back) test on two identical single phase transformers and draw the load efficiency graphs.

EXP: 9 To perform load test on a single-phase transformer and determine the following:

- (a) Voltage ratio of transformer.
- (b) Efficiency at different loads.
- (c) Voltage regulation of the transformer.

EXP: 10 To perform Polarity test on two single-phase transformers, connect them in parallel and study the load sharing between them.

EXP: 11 To convert a three-phase supply into two phase supply using Scott-connection between two single phase transformers with suitable tapping. Verify the following:

- (a) Turn ratio between windings of main and teaser transformers.
- (b) Voltage of both phases of two phase supply is equal.

(c) Whether the phase angle between them is  $90^{\circ}$ .

EXP: 12 To connect three-phase transformers in Y-Y/Y -  $\Delta$ ,  $\Delta$ - $\Delta/\Delta$ -Y connections and study line /phase voltage relationships.

Books:

- [T1]. Laboratory Operations for Rotating Electric Machinery and Transformer Technology, Donald V. Richardson, Prentice Hall, 1980
- [T2] Electric Machinery Experiments: Laboratory Practices and Simulation Studies, Sailendra Nath Bhadra, Alpha Science International Ltd, 2013

NOTE:- At least 8 Experiments out of the list must be done in the semester.

# DATA STRUCTURES LAB

# Paper Code: ETCS-255 Paper: Data Structures Lab

L T/P C 0 2 1

# List of Experiments :

- Perform Linear Search and Binary Search on an array. Description of programs:
  - a. Read an array of type integer.
  - b. Input element from user for searching.
  - c. Search the element by passing the array to a function and then returning the position of the element from the function else return -1 if the element is not found.
  - d. Display the position where the element has been found.
- Implement sparse matrix using array. Description of program:
  - a. Read a 2D array from the user.
  - b. Store it in the sparse matrix form, use array of structures.
  - c. Print the final array.
- 3. Create a linked list with nodes having information about a student and perform
  - I. Insert a new node at specified position.
  - II. Delete of a node with the roll number of student specified.
  - III. Reversal of that linked list.

4. Create doubly linked list with nodes having information about an employee and perform Insertion at front of doubly linked list and perform deletion at end of that doubly linked list.

5. Create circular linked list having information about an college and perform Insertion at front perform Deletion at end.

6. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linked list.

7. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display the queue elements.

8. Create a Binary Tree (Display using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.

9. Implement insertion, deletion and display (inorder, preorder and postorder) on binary search tree with the information in the tree about the details of a automobile (type, company, year of make).

10. To implement Insertion sort, Merge sort, Quick sort, Bubble sort, Bucket sort, Radix sort, Shell sort, Selection sort, Heap sort and Exchange sort using array as a data structure.

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NOTE:- At least 8 Experiments out of the list must be done in the semester.

# CIRCUITS AND SYSTEMS LAB

Paper Code: ETEE-257	L	T/P	С
Paper: Circuits and Systems Lab	0	2	1

# List of Experiments

- 1. Study the transient response of series RLC circuit for different types of waveforms on CRO and verify using MATLAB
- 2. Study the time response of a simulated linear system and verify the unit step and square wave response of first order and second order, type 0,1 system
- 3. Using MATLAB determine current in various resistors connected in network using mesh current and node voltage analysis.
- 4. To determine Z and Y parameters of the given two port network.
- 5. To determine ABCD parameters of the given two port network.
- 6. To verify Reciprocity Theorem for the given two port network.
- 7. To determine Hybrid parameters of the given two port network.
- 8. To design Cascade Connection and determine ABCD parameters of the given two port network.
- 9. To design Series-Series Connection and determine Z parameters of the given two port network.
- 10. To design Parallel-Parallel Connection and determine Y parameters of the given two port network.
- 11. To design Series-Parallel Connection and determine h parameters of the given two port network
- 12. Study the frequency response of different filter circuits.

# NOTE:- At least 8 Experiments out of the list must be done in the semester.



# **SCIENTIFIC COMPUTING LAB**

Paper Code: ETEE-259	L	Т	С
Paper: Scientific Computing Lab	0	2	1

### List of Experiments:

- 1. Introduction to MATLAB: Command Window, Figure Window, MATLAB Workspace and Workspace Browser and Related Applications like Plot of any functions, Evaluations of any function, Creation of New Directory, use of Edit Window.
- Introduction of MATLAB Basics: Variable and Arrays, Sub-arrays, Displaying Data, Data Files, X-Y Plots, Debugging MATLAB Programmes and related applications like Formation of Matrices, Evaluation of expressions etc.
- 3. Basics of Programme Design: Logic Operators, Branches, Solution of quadratic equation and advance plotting features and related applications like time response of electrical networks etc.
- 4. MATLAB Loops and related applications: Calculations of RMS value, average value, Geometric mean, Harmonic mean.
- 5. Data types and plot types: Representation of complex number in rectangular and polar coordinates, Mesh plot, Contour plot, Histogram, in 2-D and 3-D.
- 6. Write the MATLAB program to calculate the sum of series
- 7. Create square matrices and perform various mathematical operations.
- 8. Write a program in M-file to determine the current in each resistor using the mesh current method. Any electric resistive network provided the values of voltage of resistances.
- 9. Write the program to find out whether a given no is 'odd' or 'even' using 'if' else structure.
- 10. Introduction to MATLAB SIMULINK environment and creating MAT Files. Draw simulink model to simulate any given function.
- 11. Obtain the step response for given transfer function and save the result in MATLAB workspace.
- 12. With the help of an example illustrate how the masked sub-systems are created.

### Books:

Stephen J. Chapman, "MATLAB(r) Programming for Engineers" Cengage Learning India 2013.
 Kandarpa Kumar Sharma "MATLAB Demystified" Vikas Publishing House 2009.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

# **ELECTRICAL MACHINES-II**

Paper Code: ETEE- 202	L	T/P	С
Paper: Electrical Machines–II	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

## MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Providing sound knowledge about the principles of operation of various electrical machines, their constructional features, and their behavior and characteristics under various condition of operation.

## Unit I: Poly phase Induction Machines

Constructional features, production of rotating magnetic field, working of 3-phase Induction motor, phasor diagram, equivalent circuit, power and torque relations, torque and slip relations, no load and blocked rotor tests and efficiency, speed control by rotor resistance, injected e.m.f, frequency variation and pole changing, DOL, Y- $\Delta$  and autotransformer starters, deep bar and double cage rotor motors, cogging and crawling, operation of Induction machine as generator and phasor diagram.

Unit II: Synchronous Alternators

Constructional features, armature windings, E.M.F. equation, winding coefficients, harmonics in the induced E.M.F., armature reaction, O.C. and S.C. tests, voltage regulation-Synchronous impedance method, MMF Method, Potier's triangle method parallel operation, operation on infinite bus, cooling. Two reaction theory, power expressions for cylindrical and salient pole machines, performance characteristics.

[T1,T2][No. of Hrs. : 12]

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 11]

# Unit III :Synchronous Motors

Synchronous Motor – Principle of operation, starting methods, phasor diagram torque-angle characteristics, V-curves hunting and damping, synchronous condenser, introduction to single phase synchronous motors: Reluctance and Hysteresis motors.

### **Unit IV: Fractional Horse Power Motors**

Single Phase Induction Motor: Double revolving field theory, equivalent circuit, no load and blocked rotor tests, starting methods, split phase Induction motor- capacitor start, two value capacitor motor. Introduction and applications of single phase AC series motor, universal motor, AC servo motor, stepper motor, permanent magnet AC motors.

[T1,T2][No. of Hrs. : 10]

# **Text Books:**

- [T1] A Fitzgeral, Charles Kingsley, Stephen Umans, "Electric Machinery", Tata McGraw Hill Education, 6<sup>th</sup> Edition, 2002
- [T2] I J Nagrath D P Kothari, "Electric Machines", McGraw-Hill Education, 3<sup>rd</sup> edition, 2011.

- [R1] The Performance and Design of Alternating Current Machines, M.G. Say, CBS Publishers, 2005
- [R2] Direct and Alternating Current Machinery, Jack Rosenblatt, CBS Publishers, 2<sup>nd</sup> edition, 2001
- [R3] Fractional and Sub fractional Horse-power Electric Motors, Cyril G. Veinott, Joseph E. Martin, McGraw Hill.
- [R4] Problems in Electrical Engineering: Power engineering and electronics with answers Partly Solved in S.I. Units: Parker Smith, CBS Publishers, 9<sup>th</sup> edition, 2003
- [R5] Electrical Machines with MATLAB, Turan Gönen, CRC Press, Taylor&Francis, 2<sup>nd</sup> edition, 1998.
- [R6] Samarjit Ghosh, "Electrical Machines", Pearson

# ANALOG ELECTRONICS – II

Paper Code: ETEC-204	L	T/P	С
Paper: Analog Electronics – II	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: - The objective of teaching this subject is to give students in depth knowledge of design and analysis of analog IC (OP-AMP, OTA), The internal details of OP-AMP and measurement of its parameters is elaborated. The linear and nonlinear applications, useful for practical circuits, are detailed. Some important and widely used ICs such as 555 timer IC,PLL & VCO, Voltage Regulator IC etc., are also included.

### Unit – I

**Introduction to Op-Amp:** Differential amplifier using BJT, Block diagram of op-amp, pin diagram of 741 IC, characteristics of ideal Op-Amp, equivalent circuit of Op-Amp, ideal voltage transfer curve, Op-Amp ac and dc parameters. Building blocks of Analog ICs: Differential amplifier using single and two op-amp, virtual ground, circuit for improving CMRR, Wilson & Widlar Current mirrors, Active loads, Level shifters and output stages, instrumentation amplifier using Op-Aamp. [T1,T2][No. of Hours: 11]

### Unit – II

**Linear & Non Linear Wave shaping:** Inverting and non-inverting amplifiers, voltage follower, difference amp. adders, Voltage to current with floating & grounded load, current to voltage converter, practical integrator & differentiator, Clipping & Clamping circuits, Comparators, log/antilog circuits using Op-Amps, precision rectifiers(half & full wave), peak detector, Inverting & non inverting Schmitt trigger circuit.

Waveform generations: Sine wave generator (Phase shift, Wein bridge, Hartley & Colpitts), Barkhausen criteria of oscillations, conditions for oscillation, cystal oscillator.

[T1,T2][No. of Hours: 11]

# Unit – III

Waveform generators: Square and triangular waveform generators (determine period and frequency), saw tooth wave generator, Astable multi-vibrator, Monostable and Bistable Multivibrator.

Active RC Filters: Idealistic & Realistic response of filters (LPF, BPF, HPF, BRF), Butter worth & Chebyshev approximation filter functions All pass, Notch Filter.

### Unit – IV

Introduction to 555 Timer IC: Functional and block diagram of 555 timer, Application of 555 timer as astable and monostable multivibrator. Operational transconductance amplifier (OTA)-C filters.OTA integrator & differentiator, Introduction to current conveyer. Applications of IC Analog Multiplier: IC phase locked loops, IC voltage regulators, IC VCO.

### Text Books:

- S Salivahanan, V S Kanchana Bhaaskaran, "Linear Integrated Circuits" TMH. [T1]
- Op Amps And Linear Integrated Circuits, Ramakant A Gayakwad, PHI. [T2]

### Reference Books:

- D. Roy Choudhary, Shail B Jain, "Linear Integrated Circuits" New Age Publisher, 1999. [R1]
- M.Rashid, "Microelectronic Circuit", Cengage Learning Publication. [R2]
- Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, 2000 [R3]
- [R4] David A Bell, "Operational Amplifiers and Linear IC's", PHI.

[T1,T2][No. of Hours: 11]

### [T1,T2][No. of Hours: 11]

### **POWER SYSTEM-I**

Paper Code: ETEE-206	L	T/P	С
Paper: Power System-I	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to enable the Electrical Engineering students to have knowledge of Power System-I, an important aspect of overall Electricity Supply System.

### UNIT I

**Power System Components:** Block diagram of electric power system, Single line diagram of power system, brief description of power system elements such as, synchronous machine, transformer, transmission line, bus bar and circuit breaker.

Transmission line: Configurations, type of conductors, Mechanical Design of Transmission Line: catenary curve, calculation of sag and tension, effects of wind and ice loadings on sag, sag template, vibration dampers. **Overhead Lines Insulators:** Types of insulators and their applications, potential distribution over a string of insulators, methods of equalizing the potential.

# UNIT II

**Overhead Transmission Lines: Corona and Interference:** Phenomenon of corona, corona loss, factors affecting corona, methods of reducing corona, bundle conductors and interference.

Calculation of resistance (skin & proximity effects), inductance and capacitance of single phase, three phase, single circuit and double circuit transmission lines. Modeling and performance analysis of short, medium and long transmission line. Ferranti effect, Transposition of transmission conductors, surge impedance loading, Introduction and analysis of travelling wave use of Bewley Diagram.

[T1,T2][No. of Hr.: 11]

### UNIT III

Insulated Cables: Types of cables, dielectric stress, grading of cables, insulation resistance, capacitance of single phase and three phase cables, dielectric loss, heating of cables.

Fault Analysis: Per unit system, symmetrical component, calculation of symmetrical and unsymmetrical fault, use of current limiting reactors.

# UNIT IV

Power Flow Analysis: Formulation of Y-bus Matrix, Power flow equations, Classification of buses, Data for load flow, Gauss-Seidal Method, acceleration factor of convergence; Newton Raphson Method Fast Decoupled load flow; Comparison of power Flow Methods.

### Text Books:

- C.L.Wadhava, "Electrical Power Systems", New Age International, 2004 [T1]
- Hadi Saddat, "Electric power systems", Tata McGraw Hill. 2014. [T2]

### **Reference Books:**

- S. L. Uppal, "Electrical Power", Khanna Publishers, 13th edition 2003 [R1]
- W. H. Stevension, "Elements of Power System Analysis", McGraw Hill, 1982 [R2]
- [R3] Ashfaq Hussain, "Electrical Power System" CBS Publishers and Distributors.

# [T2][No. of Hr.: 10]

[T2][No. of Hr.: 11]

[T1,T2][No. of Hrs. 12]

**MAXIMUM MARKS: 75** 

# ELECTRICAL AND ELECTRONIC MEASURING INSTRUMENTS

Paper Code : ETEE- 208	L	T/P	С
Paper: Electrical and Electronic Measuring Instruments	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: Electric and Electronic Instruments are being used in industries and in Labs. The Subject provides material for a first course on electric and electronic instruments. It details the basic working and use of different instruments. The knowledge of this subject will be helpful to students while working in industries.

# UNIT I [Power and Energy Measurement]

Instrument transformers:, CT and PT, Ratio and phase angle errors.

Measurement of Power: Single phase and three phase dynamometer wattmeter, LPF and UPF, expression for deflecting and control torques, Extension of range of wattmeter using instrument transformers.

Type of P.F. Meters, dynamometer and moving iron type, Single phase and three phase meters. Frequency meters, Resonance type and Weston type, synchoroscopes.

Measurement of Energy: single phase and three phase induction type energy meter, driving and braking torques, errors and compensations, testing by phantom loading, trivector meter, maximum demand meters.

# [T1 T2][No. of Hrs.: 12]

# UNIT II [Potentiometers and Bridges]

Principle of operation and types of D. C. / A.C potentiometers, application of DC/AC potentiometers.Bridges for measuring low, medium and high resistance, Carey Foster's bridge, Kelvin's double bridge, Megohm bridge, Megger.

A.C. Bridges: Measurement of inductance and capacitance, Maxwell's bridge, Hay's bridge, Anaderson's bridge, Owen's bridge, Heaviside Bridge and its modifications, Desauty bridge. Wien's bridge, Schering Bridge. [T1 T2][No. of Hrs. : 12]

# UNIT III

### [Display Devices and Recorders]

Introduction of various display devices, LCD, LED and plasma display, resolution, sensitivity and accuracy specifications, CRO & its applications, triggered CRO, sampling oscilloscope. Recorders: requirement of recording data, selection of recorder for a particular application, analog, graphic, strip chart, galvanometeric, circular chart, XY, digital recorders, single point and multipoint recorders.

Printers: Types of Printers, Drum type printer, dot matrix type printer, Ink-jet and Laser jet printers

[T1 T2][No. of Hrs.: 10]

[T1 T2][No.of Hrs.:10]

### UNIT IV

# [Electronic Measuring Instruments]

**Electronic Voltmeter:** Solid state voltmeter, RMS and average reading voltmeters, rectifier type voltmeter, vector voltmeter, A.C. voltage measurements. Current measurement using electronic instruments, multi range ammeter, Measurement of Power at Audio and Radio Frequencies, Diode Sensor based instruments, Analog and Digital Multimeters. Digital Measurement of time, frequency, phase, pH, capacitance, Counters. **Function Generator:** Sine, Square and Triangular wave generator.

### Text Book:

- [T1] E. W. Gloding and F. C. Widdis Electrical Measurements and measuring Instruments, Wheeler Publishing, fifth Edition.
- [T2] A. K. Shawney Electrical & Electronic Measurement & Instruments, Dhanpat Rai & Sons Publications, 2000

- [R1] Buckingham and Price Electrical Measurements, Prentice Hall Harris Electrical Measurements
- [R2] Reissland, M. U. Electrical Measurements: Fundamentals, Concepts, Applications New age International (P) Limited, Publishers.
- [R3] W. D. Cooper, "Modern Electronics Instrumentation & Measurement Technique" PHI, 1998

# ELECTROMAGNETIC FIELD THEORY

Paper Code: ETEE-210	L	T/P	С
Paper: Electromagnetic Field Theory	3	0	3

# **INSTRUCTIONS TO PAPER SETTERS**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objectives:** To list Maxwell's equations and solve them for specific regular geometries, understand general electromagnetic wave propagation and its applications to engineering problems.

# UNIT I

**Introduction**: Review of scalar and vector field, Dot and Cross products, Coordinate Systems-Cartesian, cylindrical and spherical. Vector representation of surface, Physical interpretation of gradient divergence and curl, Transformation of vectors in different co-ordinate systems, dirac-delta function.

**Electrostatics**: Electric field due to point-charges, line charges and surface charges, Electrostatic potential, Solution of Laplace and Poisson's equation in one dimension, M-method of image applied to plain boundaries, field mapping and conformal transformation, Electric flux density, Boundary conditions. Capacitance: calculation of capacitance for simple rectangular, cylindrical and spherical geometries, Electrostatic energy.

## UNIT II

**Magnetostatics** : Magnetic Induction and Faraday's Law, Magnetic Flux Density, Magnetic Field Strength H, Ampere, Gauss Law in the Differential Vector Form, Permeability, Energy Stored in a Magnetic Field, Ampere's Law for a Current Element, Volume Distribution of Current, Ampere's Law Force Law, Magnetic Vector Potential, The Far Field of a Current Distribution, Maxwell's Equations: The Equation of Continuity for Time Varying Fields, Inconsistency of Ampere's Law, Maxwell's Equations, Conditions at a Boundary Surface.

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 10]

### UNIT III

**Electromagnetic Waves**: Continuity equations, Displacement current, Maxwell's equation, Boundary conditions, Plane wave equation and its solution in conducting and non-conducting media, Phasor notation, Phase velocity, Group velocity, Depth of penetration, Conductors and dielectrics, Impedance of conducting medium. Polarization, Reflection and refraction of plane waves at plane boundaries, Poynting vectors, and Poynting theorem.

### UNIT IV

**Transmission Lines:** Transmission line equations, Characteristic impendence, Distortion-less lines, Input impendence of a loss less line, computation of primary and secondary constants, Open and Short circuited lines, Standing wave and reflection losses, Impedance matching, Loading of lines, Input impedance of transmission lines, RF lines, Relation between reflection coefficient and voltage standing wave ratio (VSWR), Lines of different lengths –  $\lambda/2$ ,  $\lambda/4$ ,  $\lambda/8$  lines, Losses in transmission lines, Smith chart and applications, impedance matching Single stub, Double stub.

[T1,T2][No. of Hrs. : 10]

### Text Books:-

- [T1] Matthew N. O. Sadiku, "Elements of Electromagnetics", Oxford University Press
- [T2] E. C. Jordon, K. G. Balman, "Electromagnetic Waves & Radiation System" PHI 2nd Edition

- [R1] William H. Hayt, "Engineering Electromagnetics", TMH
- [R2] J.D. Kraus, "Electromagnetics", TMH
- [R3] David K. Cheng," Field and Wave Electromagnetic", 2<sup>nd</sup> Edition, Pearson Education Asia,2001
- [R4] John R. Reitz, "Foundations of Electromagnetic Theory". Pearson

# CONTROL SYSTEMS

Paper Code: ETEE-212	L	T/P	С
Paper: Control Systems	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective**: To teach the fundamental concepts of Control systems and mathematical modeling of the system. To study the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system

# UNIT I : Control Systems - - Basics & Components

Introduction to basic terms, classifications & types of Control Systems, block diagrams & signal flow graphs. Transfer function, determination of transfer function using block diagram reduction techniques and Mason's Gain formula. Control system components: Electrical/Mechanical/Electronic/A.C./D.C. Servo Motors, Stepper Motors, Tacho Generators, Synchros, Magnetic Amplifiers, Servo Amplifiers,

# UNIT II : Time – Domain Analysis

UNIT III : Frequency Domain Analysis

UNIT IV : Stability & Compensation Techniques

Time domain performance specifications, transient response of first & second order systems, steady state errors and static error constants in unity feedback control systems, response with P, PI and PID controllers, limitations of time domain analysis.

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 11]

# Polar and inverse polar plots, frequency domain specifications and performance of LTI systems, Logarithmic plots (Bode plots), gain and phase margins, relative stability. Correlation with time domain performance closes loop frequency responses from open loop response. Limitations of frequency domain analysis, minimum/non-minimum phase systems.

# [T1,T2][No. of Hrs. : 10]

Concepts, absolute, asymptotic, conditional and marginal stability, Routh–Hurwitz and Nyquist stability criterion, Root locus technique and its application.

Concepts of compensation, series/parallel/ series-parallel/feedback compensation, Lag/Lead/Lag-Lead networks for compensation, compensation using P, PI, PID controllers.

[T1,T2][No. of Hrs. : 11]

11

# Text Books:

- [T1] B. C. Kuo, "Automatic control system", Prentice Hall of India, 7<sup>th</sup> edition 2001.
- [T2] Nagraath Gopal "Control Systems Engineering -Principles and Design" New Age Publishers

- [R1] Norman S. Nise, "Control systems engineering" John Wiley & Sons (Asia) Singapore.
- [R2] Raymond T. Stefani, Design of Feedback Control System, Oxford University Press.
- [R3] K. Ogata, "Modern control engineering", Pearson 2002.
- [R4] S. P.Eugene Xavier, "Modern control systems", S. Chand & Company.
- [R5] M. Gopal "Control Systems-Principles and Design" TMH 4<sup>th</sup> Edition 2012

## ELECTRICAL MACHINES-II LAB

Paper Code: ETEE-252	L	T/P	С
Paper: Electrical Machines–II Lab	0	2	1

### List of Experiments

- EXP. 1 To conduct no-load and blocked rotor test on three phase squirrel cage Induction motor and draw the equivalent circuit.
- EXP: 2 To conduct the load test on three phase squirrel cage Induction motor
  - (a) Compute torque, output power, efficiency, input power factor and slip for various load settings.(b) To plot the following curves on the same graph sheet from the data obtained in part (a)
    - (1) Efficiency vs. output power.
    - (2) Torque vs. output power.
    - (3) Line current vs. output power.
    - (4) Power factor vs. output power.
    - (5) Slip vs. output power.
  - (c) Also plot Torque-slip characteristic.

EXP: 3 To conduct the load test on three phase slip ring Induction motor

(a) Compute torque, output power, efficiency, input power factor and slip for various load settings.(b) To plot the following curves on the same graph sheet from the data obtained in part (a)

- (1) Efficiency vs. output power.
- (2) Torque vs. output power.
- (3) Line current vs. output power.
- (4) Power factor vs. output power.
- (5) Slip vs. output power.
- (c) Also plot Torque-slip characteristic.

EXP: 4 To study the different methods available in laboratory for of starting three-phase Induction motor and compare them.

EXP: 5 To find the effect of the variation of supply voltage on the performance of three-phase Induction motor at 120%, 100%, 80%, 60%, and 50% of rated voltage and plot the variation of power factor, speed, current and input power for different voltages.

# EXP: 6

- a) Perform no load and short circuit test on a three-phase synchronous generator.
- b) Measure the resistance of the stator windings
- c) Find the voltage regulation at full load at (i) Unity power factor (ii) 0.85 power factor leading (iii) 0.85 power factor lagging by synchronous impendence method.
- EXP: 7 To synchronize a three-phase synchronous generator with the infinite bus bar. (main supply)

EXP: 8 To start a synchronous motor and study the effect of variation of field current upon the stator current and power factor, hence draw V and inverted V curves of the motor for  $\frac{1}{2}$  load,  $\frac{3}{4}$ <sup>th</sup> load and full load. Also draw the unity power factor curve.

EXP: 9 To perform slip test on a 3 phase synchronous machine and find direct axix and quadrature axix synchronous reactances (Xd, Xq).

- EXP: 10 To study voltage build up in isolated Induction generator and find its load characteristics using suitable terminal capacitor.
- EXP: 11 To conduct no-load and blocked rotor test on single phase squirrel cage Induction motor and draw the equivalent circuit.

### **Reference Books:**

- **R1.** Laboratory Operations for Rotating Electric Machinery and Transformer Technology, Donald V. Richardson, Prentice Hall, 1980
- **R2.** Electric Machinery Experiments: Laboratory Practices and Simulation Studies, Sailendra Nath Bhadra, Alpha Science International Ltd, 2013

### NOTE:- At least 8 Experiments out of the list must be done in the semester.

# ANALOG ELECTRONICS-II LAB

Paper Code: ETEC-254	L	T/P	С
Paper: Analog Electronics-II Lab	0	2	1

# List of Experiments:

- 1. To study the op-amp (IC 741) as inverting and non-inverting amplifier and calculate its gain.
- 2. Observe and plot the output Wave shape of Op-Amp R-C differentiating circuits, R-C integrating circuits for square wave input
- 3. To study the op-amp (IC 741) as adder, subtractor and voltage follower, calculate its output voltage...
- 4. Construct biased and unbiased series and shunt clipping circuits & combinational clipper circuit for positive and negative peak clipping of a sine wave.
- 5. To study RC phase shift/Wien Bridge oscillator measurement of frequency and amplitude of oscillations using Op-Amp.
- 6. To study the waveform of square wave generator using 741 Op-Amp IC.
- 7. To study the waveform of Schmitt Trigger circuit & Precision Rectifier using 741 OP-AMP IC.
- 8. To make and test the operations of Monostable Multivibrator circuits using 555 timer.
- 9. To make and test the operations of Astable Multivibrator circuits using 555 timer.
- 10. To study the Sallen Key Voltage controlled voltage source active filters.

NOTE: - At least 8 Experiments out of the list must be done in the semester

### POWER SYSTEM-I LAB

Paper Code: ETEE-256
Paper: Power System-I Lab

L	T/P	С
0	2	1

### LIST OF EXPERIMENTS

- 1. Study of constructional features, applications, power rating of LT and HT cables
- 2. Measurement of Inductance, Capacitance, Resistance and Insulation Resistance of multi-core cables.
- 3. Study of different types of distribution systems by physical inspection of these systems.
- 4. Study and calculation of ABCD parameters for a Transmission Line.
- 5. Study of Ferranti Effect for Transmission Line.
- 6. Study of different types of insulators with rating. Enumerate the different application of the different types of insulators, with their properties.
- 7. Calculate the resistance of earth using earth electrodes and Megger.
- 8. Calculate the dielectric strength of the transformer oil.
- 9. Enumerate the different applications involved in the power generating station. Write a report on visit of Thermal/Hydro/Nuclear power station.
- 10. Estimation and Costing of over head lines/distribution lines of specified voltage level and length.
- 11. Estimation and Costing of service mains for single face, three face domestic/industrial consumers.
- 12. Estimation and Costing of pole mounted sub-station /indoor outdoor sub-station.
- 13. To locate fault in a cable by Murray loop test.

# SIMULATIONS:

- 1. MATLAB Simulation of Transmission Line for Short Transmission Line for calculation of various parameters.
- 2. Explain why the guard ring is required for string insulators. Using MATLAB simulink calculate the potential distribution across different units of string insulator, with and without guard ring and also calculate the string efficiency.
- 3. MATLAB Simulation of Transmission Line for Medium Transmission Line for calculation of various parameters.
- 4. MATLAB Simulation of Transmission Line for Long Transmission Line for calculation of various parameters.
- 5. Study the typical application software for power system (ETAP), which not only handles large power system SLD, also handle fault analysis, load flow analysis, stability analysis etc.
- 6. Study of single line diagram of typical power system and enumerate the different components involved in the power system viz. Alternator Transformer, Busbar etc. and also write their application.
- 7. Write a programme in C/C++ to draw a single line diagram of a typical power system, keeping in view the number of generating units, Buses, lines etc with their rating.

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NOTE:- At least 8 Experiments out of the list must be done in the semester.

# ELECTRICAL AND ELECTRONIC MEASURING INSTRUMENTS LAB

Paper Code: ETEE-258	L	T/P	С
Paper: Electrical and Electronic Measuring Instruments Lab	0	2	1

# List of Experiments:

- 1. Testing of singe phase and three phase electromechanical and electronic energy meters.
- 2. Measurement of three phase power by two watt meters using instrument transformer.
- 3. Study and demonstration of Trivector Meter.
- 4. Calibration of D.C. and A.C. potentiometers.
- 5. Measurement of low resistance using Kelvin's double bridge.
- 6. Measurement of inductance using Maxwell's bridge/ Hay's bridge/ Anaderson's bridge/ Owen's bridge.
- 7. Measurement of capacitance using Desauty Bridge/ Schering Bridge.
- 8. Study and demonstration of universal / electronic counter and measurement of frequency and time period.
- 9. Measurement of inductance and capacitance using C.R.O.
- 10. Measurement of phase and frequency using C.R.O.
- 11. R.F. Power Measurement.
- 12. Study and use of different types of Recorders / Printers.

# NOTE:- At least 8 Experiments out of the list must be done in the semester.

Scheme and Syllabi for B. Tech-EEE,  $1^{st}$  year (Common to all branches) w.e.f batch 2014-15 and  $(2^{nd}, 3^{nd} \& 4^{th} \text{ years})$  w.e.f batch 2013-14 approved in the  $22^{nd}$  BOS of USET on  $30^{th}$  June, 2014 and approved in the  $37^{th}$  AC Sub Committee Meeting held on  $10^{th}$  July, 2014.

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# CONTROL SYSTEMS LAB

Paper Code: ETEE-260	L	T/P	С
Paper: Control Systems Lab	0	2	1

# List of Experiments:

- 1. Comparison of open loop & closed loop control in speed control of D.C. motor & to find the transfer function.
- 2. To study the characteristics of positional error detector by angular displacement of two servo potentiometers
  - a. excited with dc
  - b. excited with ac
- 3. To study synchro transmitter in terms of position v/s phase and voltage magnitude with respect to rotor voltage magnitude /phase.
- 4. To study remote position indicator systems using synchro transmitter/receiver.
- 5. To plot speed- torque curves for ac servomotor for different voltages.
- 6. To study ac motor position control system & to plot the dynamic response & calculate peak time, settling time, peak overshoot, damping frequency, steady state error etc.
- 7. To study the time response of simulated linear systems.
- 8. To study the performance of PID Controller.
- 9. Plot impulse response, unit step response, unit ramp response of any 2<sup>nd</sup> order transfer function on same graph using MATLAB.
- 10. To draw the magnetization (Volt Amps) characteristics of the saturable core reactor used in the magnetic amplifier circuits.
- 11. Plot root locus for any 2<sup>nd</sup> order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
- 12. To design lead-lag compensator for the given process using Bode plots in MATLAB.

# NOTE:- At least 8 Experiments out of the list must be done in the semester.

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# COMMUNICATION SKILLS FOR PROFESSIONALS

Paper Code: ETHS-301	L	T/P	С
Paper: Communication Skills for Professionals	2	0	1

# **INSTRUCTIONS TO PAPER SETTERS:**

# MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

# UNIT I

**Organizational Communication:** Meaning, importance and function of communication, Process of communication, Communication Cycle - message, sender, encoding, channel, receiver, decoding, feedback, Characteristics, Media and Types of communication, Formal and informal channels of communication, 7 C's of communication, Barriers to communication, Ethics of communication (plagiarism, language sensitivity)

**Soft Skills:** Personality Development, Self Analysis through SWOT, Johari Window, Interpersonal skills -Time management, Team building, Leadership skills. Emotional Intelligence.Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self esteem.

[T1,T2][No. of Hrs. 08]

# UNIT II

**Introduction to Phonetics:** IPA system (as in Oxford Advanced Learner's Dictionary), Speech Mechanism, The Description of Speech Sounds, Phoneme, Diphthong, Syllable, Stress, Intonation, Prosodic Features; Pronunciation; Phonetic Transcription - Conversion of words to phonetic symbols and from phonetic symbols to words. British & American English (basic difference in vocabulary, spelling, pronunciation, structure)

Non-Verbal Language: Importance, characteristics, types – Paralanguage (voice, tone, volume, speed, pitch, effective pause), Body Language (posture, gesture, eye contact, facial expressions), Proxemics, Chronemics, Appearance, Symbols.

# [T1,T2][No. of Hrs. 08]

# UNIT III

**Letters at the Workplace** – letter writing (hard copy and soft copy): request, sales, enquiry, order, complaint. Job Application -- resume and cover letter

Meeting Documentation -- notice, memo, circular, agenda and minutes of meeting.

**Report Writing** - Significance, purpose, characteristics, types of reports, planning, organizing and writing a report, structure of formal report. Writing an abstract, summary, Basics of formatting and style sheet (*IEEE Editorial Style Manual*), development of thesis argument, data collection, inside citations, bibliography; Preparing a written report for presentation and submission. Writing a paper for conference presentation/journal submission. [**T1,T2**][No. of Hrs. 08]

# UNIT IV

**Listening and Speaking Skills**: Importance, purpose and types of listening, process of listening, difference between hearing and listening, Barriers to effective listening, Traits of a good listener, Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

**Presentations:** Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

Group Discussion: Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

**Interview Skills:** Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

[T1,T2][No. of Hrs. 07]

### **Text Books:**

- [T1] Anna Dept. Of English. Mindscapes: English for Technologists & Engineers PB. New Delhi: Orient Blackswan.
- [T2] Farhathullah, T. M. Communication Skills for Technical Students. Orient Blackswan, 2002.

- [R1] Masters, Ann and Harold R. Wallace. Personal Development for Life and Work, 10th Edition.Cengage Learning India, 2012.
- [R2] Institute of Electrical and Electronics Engineers. IEEE Editorial Style Manual. IEEE, n.d. Web. 9 Sept. 2009.
- [R3] Sethi and Dhamija. A Course in Phonetics and Spoken English. PHI Learning, 1999.
- [R4] Khera, Shiv. You Can Win. New York: Macmillan, 2003.



# **POWER ELECTRONICS**

Paper Code: ETEE-303	L	T/P	С
Paper: Power Electronics	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Power Electronics that are required for an engineering student.

## UNIT- I

# Introduction

Characteristics and switching behaviour of Power Diode, SCR, UJT, TRIAC, DIAC, GTO, MOSFET, IGBT, MCT and power BJT, two-transistor analogy of SCR, firing circuits of SCR and TRIAC, SCR gate characteristics, SCR ratings. Protection of SCR against over current, over voltage, high dV/dt, high dI/dt, thermal protection, Snubber circuits, Methods of commutation, series and parallel operation of SCR, Driver circuits for BJT/MOSFET. [T1,T2][No. of hrs. 11]

# UNIT- II

**A.C. to D.C. Converter:** Classification of rectifiers, phase controlled rectifiers, fully controlled and half controlled rectifiers and their performance parameters, .three phase half wave, full wave and half controlled rectifiers and their performance parameters, effect of source impedance on the performance of single phase and three phase controlled rectifiers, single-phase and three phase dual converter.

[T1, T2, T3][No. of hrs. 11]

## UNIT- III

**D.C. to D.C. Converter:** Classification of choppers as type A, B, C, D and E, principle of operation, switching mode regulators: Buck, Boost, Buck-Boost, Cuk regulators.

**A.C. to A.C. Converter:** AC voltage Controllers, Cyclo-converters : single phase to single phase, three phase to single phase, three phase Cyclo-converter circuit and their operation, Matrix converter.

### UNIT-IV

**D.C. to A.C. Converter:** single phase single pulse inverter: Square wave, quasi square. Three phase single pulse inverters (120° and 180° conduction) Modulation Techniques and reduction of harmonics, PWM techniques, SPWM techniques, SVM, Carrier less modulation. , PWM Inverter, Bidirectional PWM converters, voltage source inverters and current source inverter, Multi level Inverter: cascaded and NPC Inverters.

# [T1, T2, T3][No. of hrs. 11]

[T1, T2, T3][No. of hrs. 11]

### **Text Books:**

- [T1] M.H. Rashid, "Power Electronics: Circuits, Devices and Applications" Pearson Publications.
- [T2] Daniel W. Hart, "Power Electronics "Tata McGraw-Hill
- [T3] H.C. Rai, "Power Electronics Devices, Circuits, Systems and Application", Galgotia Publications, 3<sup>rd</sup> Edition

- [R1] Singh, Kanchandani, "Power Electronics", Tata McGraw-Hill.
- [R2] Ned Mohan, Tore M. Undeland and Robbins, "Power Electronics: Converters, Applications and Design" Wiley India Publication
- [R3] V R Moorthi, "Power Electronics: Devices, Circuits and Industrial Applications", Oxford Publication.
- [R4] Kassakian, Schlecht, Verghese, "Principles of Power Electronics", Pearson Publications
- [R5] M.S. Jamil Asghar, "Power Electronics" PHI Publication
- [R6] P. S. Bimbhra "Power Electronics", Khanna Publishing.

## SENSORS AND TRANSDUCERS

Paper Code: ETEE-305	L	T/P	С
Paper: Sensors and Transducers	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:** 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective:-To provide the basic understanding about operational characteristics and applications of various sensors and transducers.

## UNIT I [Introduction to Sensors]

Definition and differences of sensors and transducers, Classification, static and dynamic characteristics, electrical characterization, mechanical and thermal characterization including bath-tub curve.

# Different Sensors:

Mechanical & Electromechanical: Potentiometer, Strain gauges, Inductive sensors—Ferromagnetic type, Transformer type, Electromagnetic, Capacitive sensors— parallel plate, variable permittivity, electrostatic, piezoelectric, Introduction to PZT family.

# UNIT-II

Thermal sensors: Gas thermometric sensors, Dielectric constant, refractive index thermo-sensors, nuclear thermometers, resistance change type thermometric sensors, Thermoemf sensors,

Magnetic sensors: Basic working principles, Magnetostrictive, Hall effect, Eddy current type, SQUID sensors. Radiation sensors: Photo-detectors, Photo-emissive, photomultiplier, scintillation detectors.

UNIT-III

Electroanalytical sensors: Electrochemical cell, SHE, Polarization, Reference electrode, Metal electrodes, Membrane electrodes, Electroceramics. Advancement in Sensor technology: Introduction to smart sensors, Film sensors, Introduction to semiconductor IC technology and Micro Electro Mechanical System(MEMS), Nanosensors. Bio-Sensors.

### UNIT-IV

LVDT, RTD, Thermistor, Wire anemometer, piezoresistors, Variable diaphragm Different Transducers: capacitance transducers, Angular movement transducers, seismic mass transducer, interferometer transducer. Feedback transducer system: Inverse transducer, Self-balancing transducer, Servo-operated manometer, Feedback pneumatic load cell, integrating servo.

# Text Books:

- [T1] D. Patranabis, "Sensors and Transducers", PHI Learning Pvt. Ltd., 2nd edition
- D V S Murty, "Transducers and Instrumentation", PHI Learning Pvt. Ltd. [T2]

### **Reference Book:**

- E.O.Doebelin, Dhanesh N Manik, "Measurement Systems", 6th Edition, Mcgraw Hill Edu. [R1]
- John P. Bentely, "Principles of Measurement System", 4th Edition, Pearson Prentice Hall [R2]

### MAXIMUM MARKS: 75

[T1][T2][No. of Hrs:11]

[T1][T2][No. of Hrs:11]

[T1][T2][No. of Hrs:12]

[T1][T2][No. of Hrs:11]

# SWITCHING THEORY AND LOGIC DESIGN

Paper Code: ETEE-307	L	T/P	С
Paper: Switching Theory and Logic Design	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.

### UNIT- I

Number Systems and Codes:- Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.

Switching Theory: - Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions-Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.

Combinational Logic Circuits: Review of basic gates- Universal gates, Adder, Subtractor Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

## UNIT- II

**Integrated circuits:** - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.

Sequential Logic Circuits: - Latches and Flip Flops- SR, D, T and MS-JK Flip Flops, Asynchronous Inputs. Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters, Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

[T2,T3][No. of hrs. 10]

[T2,T3][No. of Hrs. 14]

# UNIT- III

Synchronous Sequential Circuits:- State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and merger chart methods-concept of minimal cover table.

# [T1][No. of hrs. 10]

[T1][No. of hrs. 10]

### UNIT- IV

Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.

Fault Detection and Location: Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

### Text Book:

- Zyi Kohavi, "Switching & Finite Automata Theory", TMH, 2<sup>nd</sup> Edition Morris Mano, Digital Logic and Computer Design", Pearson [T1]
- [T2]
- R.P. Jain, "Modern Digital Electronics", TMH, 2<sup>nd</sup> Ed, [T3]

- [R1] A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
- Taub ,Helbert and Schilling, "Digital Integrated Electronics", TMH [R2]

Maximum Marks: 75

# COMMUNICATION SYSTEMS

Paper Code: ETEE-309	L	T/P	С
Paper: Communication Systems	3	1	4

# **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: The objective of the paper is to facilitate the students with the knowledge of electronic communication there by enabling the student to obtain the platform for studying in communication system.

### UNIT I

Introduction: Overview of Communication system, Communication channels, Mathematical Models for Communication Channels

Introduction of random Variables: Definition of random variables, PDF, CDF and its properties, joint PDF, CDF, Marginalized PDF, CDF, WSS wide stationery, strict sense stationery, non stationery signals, UDF, GDF, RDF, Binomial distribution, White process, Poisson process, Wiener process. [T1, T2][No. of Hrs. 11]

### UNIT II

Analog Modulation: Modulation- Need for Modulation, Amplitude Modulation theory: DSB-SC, SSB, VSB. Modulators and Demodulators. Angle Modulation, Relation between FM and PM Wave. Generation of FM wave-Direct and Indirect Methods. Bandwidth of FM (NBFM, WBFM)

**Pulse Analog Modulation:** Sampling-Natural and Flat top. reconstruction, TDM-Pulse Amplitude Modulation (TDM-PAM), Pulse Width Modulation (PWM), Pulse Position Modulation(PPM), Generation and Recovery.

Pulse Digital Modulation: Pulse Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), ADPCM.

### UNIT III

[T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs. 11]

**Digital Modulation and Transmission:** Advantages of digital communication. Modulation schemes: ASK, PSK, FSK. Spectral Analysis. Comparison. Digital Signaling Formats-Line coding.

**Information and Coding Theory:** Entropy, Information, Channel Capacity. Source Coding Theorem: Shannon Fano Coding, Huffman Coding.

# UNIT IV

**Fiber Optical System:** Basic Optical Communication System. Optical fibers versus metallic cables, Light propagation through optical fibers. Acceptance angle and acceptance cone, Fiber configurations. Losses in optical fibers. Introduction to Lasers and light detectors. Applications: Military, Civil and Industrial applications.

Advanced Communication Systems: Introduction to cellular radio telephones. Introduction to satellite Communication.

### Text Books:

- [T1] George Kennedy, "Electronics Communication System", TMH 1993
- [T2] B.P. Lathi, "Analog& Digital Communication", Oxford University Press 1999.

- [R1] Simon Haykin, "Introduction to Analog & Digital Communication", Wiley, 2000
- [R2] Tannenbaum, "Computer networks", PHI, 2003
- [R3] K. Sam Shanmugam, "Digital & Analog Communication system", John Wiley & Sons 1998.

#### INDUSTRIAL MANAGEMENT

Paper Code: ETMS-311	L	T/P	С
Paper: Industrial Management	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The course provides a broad introduction to some aspects of business management and running of business organization.

#### UNIT I

Industrial relations- Definition and main aspects. Industrial disputes and strikes. Collective bargaining. Labour Legislation- Labour management cooperation/worker's participation in management. Factory legislation. International Labour Organization.

#### UNIT II

**Trade Unionism-** Definition, Origin, Objectives of Trade Unions. Methods of Trade unions. Size and finance of Indian Trade unions-size, frequency distribution, factors responsible for the small size. Finance-sources of income, ways of improving finance.

[T1,T2][No. of Hrs. 10]

[T1,T2][No. of Hrs. 10]

[T1,T2][No. of Hrs. 10]

[T1,T2][No. of Hrs. 10]

#### UNIT III

**Work Study**-Method study and time study. Foundations of work study. Main components of method study. Time study standards. Involvement of worker's unions. Work Sampling. Application of work study to office work.

UNIT IV

**Quality Management-** What is Quality? Control Charts. Quality is everybody's job. Taguchi Philosophy. Service Quality. What is Total Quality Management (TQM)? Roadmap for TQM. Criticism of TQM. Six Sigma.

#### Text Books:

- [T1] Sinha, P.R.N., Sinha I.B. and Shekhar S.M.(2013), Industrial Relations, Trade Unions and Labour Legislation. Pearson Education
- [T2] Chary, S.N. (2012), Production and Operations Management. Tata McGraw Hill Education.

#### **Reference Books:**

- [R1] Srivastava, S.C. (2012), Industrial Relations and Labour Laws, Vikas Publishing
- [R2] Shankar R (2012), Industrial Engineering and Management. Galgotia Publications
- [R3] Telsang, M. (2006), Industrial Engineering and Production Management. S.Chand
- [R4] Thukaram, Rao (2004), M.E. Industrial Management. Himalaya Publishing House

# INDRAPRASTHA

UNIVERSIT

### SENSORS AND TRANSDUCERS LAB

Paper Code: ETEE-351	L	T/P	С
Paper: Sensors and Transducers Lab	0	2	1

#### **List of Experiments:**

- 1. Study of various sensors e.g., Thermocouple, RTD, Thermistor, Magnetic Sensorns, Load Cells, Film Sensors.
- 2. Characteristics of (Resistive and Thermo emf) temperature sensor
- 3. Measurement of displacement using LVDT
- 4. Measurement of strain and torque using strain gauges
- 5. Measurement of speed using photoelectric sensors, tachogenerators and stroboscope.
- 6. Calibration and measurement of temperature using PRT.
- 7. Static and Dynamic Characteristics of sensors.
- 8. Liquid level measurement using capacitive measurement system.
- 9. Pressure measurement using load cell.
- 10. Study and operation of Electrochemical Cell.

NOTE:- At least 8 Experiments out of the list must be done in the semester.



#### POWER ELECTRONICS LAB

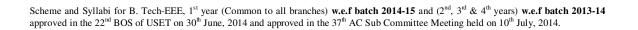
Paper Code: ETEE-353	
Paper: Power Electronics Lab	

L	T/P	С
0	2	1

#### List of Experiments:

- 1. To study and analyze V-I characteristics of SCR and TRIAC.
- 2. To study the switching characteristics of MOSFET and IGBT
- 3. To study R and RC and UJT based firing circuits using SCR.
- 4. To study single phase Semi-converter and Full converters feeding R and RL load
- 5. To study A.C phase control using SCR (half and full wave) using DIAC and TRIAC for dimmer application.
- 6. To study single-phase cyclo- converter feeding R and RL loads.
- 7. To study the operation and duty cycle control of buck and boost converter feeding R loads.
- 8. To study the operation and duty cycle control of Type-C chopper.
- 9. To study the THD in operation of single phase Square wave and Quasi square wave Inverter.
- 10. To study the operation of SPWM Inverter.

NOTE:- At least 8 Experiments out of the list must be done in the semester.



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UNIVERSITY

### SWITCHING THEORY AND LOGIC DESIGN LAB

Paper Code: ETEE-355	L	T/P	С
Paper: Switching Theory and Logic Design Lab	0	2	1

#### List of Experiments:

- 1. Realize all gates using NAND & NOR gates
- 2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
- 3. Realize a BCD adder
- 4. Realize a Serial Adder
- 5. Realize a four bit ALU
- 6. Realize Master-Save J K Flip-Flop, using NAND/NOR gates
- 7. Realize Universal Shift Register
- 8. Realize Self-Starting, Self Correcting Ring Counter
- 9. Realize Multiplexer and De-Multiplexer
- 10. Realize Carry Look ahead Adder / Priority Encoder
- 11. Simulation of PAL and PLA
- 12. Simulation Mealy and Moore State machines

#### NOTE: - At least 8 Experiments out of the list must be done in the semester

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#### COMMUNICATION SYSTEMS LAB

Paper Code: ETEE-357	L	T/P	С
Paper: Communication Systems Lab	0	2	1

#### List of Experiments:

- 1. Generation of DSB-SC AM signal using balanced modulator.
- 2. Practical study of amplitude demodulation by linear diode detector
- 3. Generation of SSB AM signal.
- 4. Practical study of envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
- 5. To generate FM signal using voltage controlled oscillator.
- 6. To generate a FM Signal using Varactor & reactance modulation.
- 7. Detection of FM Signal using PLL & foster seelay method.
- 8. Practical study of Super heterodyne AM receiver and measurement of receiver parameters viz.sensitivity, selectivity & fidelity.
- 9. Practical study of Pre-emphasis and De-emphasis in FM.
- 10. Generation of Phase modulated and demodulated signal.

Simulations study of some of the above experiments using P-spice or Multisim softwares

NOTE: - At least 8 Experiments out of the list must be done in the semester



#### **ELECTRICAL & ELECTRONIC WORKSHOP**

Paper Code: ETEE-359	L	T/P	С
Paper: Electrical & Electronic Workshop	0	2	1

#### **IN-HOUSE WORKSHOP FOR EE/EEE**

**Week – 1**: Identification of hand tools, their specifications and purpose, safety precautions, first aid for electric shock, identification, specification of various types of resistors, capacitors, inductors, diodes, zener diodes, transistors, thyristors, LDR, VDR, UJT. Soldering and desoldering practice on wire and PCB.

Design and fabricate dc power supply using single diode half wave rectifier, two diode full wave rectifier, 4 diode bride rectifier, capacitor filter, without and with regulator.

**Week – 2**: Introduction to various electrical components and accessories used in wiring installation for example fuse, MCB, ELCB, switches etc. Introduction of different types of electrical wiring and wiring diagrams, selection (gauges, size etc.) and ratings of wires. Introduction to domestic and industrial wiring installations.

**Week – 3**: Fabrication of different types of extension board. Study and wiring of a tube light circuit. Connection of fan with regulator circuit. Demonstration of various types of illumination devices like lamp, tube light, CFL and LED lamps. Trouble shooting of various home appliances.

Week - 4 : Study of various components of a small single phase step down transformer & its fabrication and testing. Safety measures regarding electric fire. Introduction to relays, contactors and starters, their specification and applications. Connecting a 3-phase induction motor through (a) D.O.L. starter (b) Star/delta starter, running & reversing the direction of rotation of motor.

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#### COMMUNICATION SKILLS FOR PROFESSIONALS LAB

Paper Code: ETHS-351	L	T/P	С
Paper: Communication Skills for Professionals Lab	0	2	1

**Objective:** To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision .These activities will enhance students' communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

#### Lab Activities to be conducted:

- Listening and Comprehension Activities Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.
- 2. **Reading Activities** -- Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.
- 3. **Conversation Activities**-- Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.
- 4. **Making an Oral Presentation**–Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.
- Making a Power Point Presentation -- Structure and format; Covering elements of an effective presentation; Body language dynamics.
- 6. Making a Speech -- Basics of public speaking; Preparing for a speech; Features of a good speech; Speaking with a microphone. Famous speeches may be played as model speeches for learning the art of public speaking. Some suggested speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawahar Lal Nehru, Atal Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.
- 7. **Participating in a Group Discussion** -- Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others' views / ideas; Arguing against others' views or ideas, etc.
- Participating in Mock Interviews -- Job Interviews: purpose and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.
   Suggested Lab Activities:
- 1. Interview through telephone/video-conferencing
- 2. Extempore, Story Telling, Poetry Recitation
- 3. Mock Situations and Role Play; Enacting a short skit
- 4. Debate (Developing an Argument), News Reading and Anchoring.

#### **Reference Books:**

1. Patnaik, Priyadarshi. Group Discussion and Interview Skills: With VCD. Cambridge University Press India (Foundation Books), 2012 edition.

1.

- 2. Kaul, Asha. Business Communication. PHI Learning: 2009.
- 3. Hartman and Lemay. Presentation Success: A Step-by-Step Approach. Thomson Learning, 2000.

**Note:** The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.

#### **POWER SYSTEM-II**

Paper Code: ETEE-302	L	T/P	С
Paper: Power System-II	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to enable the Electrical Engineering students to have knowledge of Power System-II, an important aspect of overall Electricity Supply System.

#### Unit – I: Protective Relays, CTs and PTs.

**Classification of Relays:** Electromechanical, static and numerical relays: Construction, operating characteristic and their applications. Constructions and Characteristic of CTs and PTs, capacitance voltage transformer.

[T1,T2][No. of Hrs.: 10]

#### Unit – II: Protection of Generators and Transformers

Differential Protection, protection of stator windings, rotor earth fault protection, protection against unbalanced loading, loss of excitation and prime mover failure; Protection of motors (induction and synchronous) and bus bars.

#### Unit – III: Protection of Transmission lines

Over current protection, Grading of over current relays, distance protection, types of distance relays and their characteristics, carrier current protection, protection against surges, surge diverters, surge absorbers, use of ground wires on transmission lines, methods of grounding.

#### Unit – IV: Fuses and Circuit Breakers

Types & Applications of Fuse and MCB, Current interruption theories, types of Circuit Breakers: Air, air-blast, Oil, SF6 and Vacuum circuit breakers-Principle, ratings and applications.

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#### **Text Books:**

- [T1] Paithanker, Bhide, "Fundamentals of Power System Protection " PHI 2014
- [T2] Badri Ram"Power System Protection and Switchgear" TMH Publications 2<sup>nd</sup> Edition

#### **Reference Books:**

- [R1] J. J. Grainger & W.D. Stevenson, "Power System Analysis" TMH Publication, 2003
- [R2] Paul M. Anderson "Power System Protection" IEEE Press.
- [R3] C L Wadhva, "Electrical Power System" Wiley Eastern Ltd., 3<sup>rd</sup> edition 2000
- [R4] D.P. Kothari and I.J. Nagrath "Modern Power System Analysis" TMH 4<sup>th</sup> Edition

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#### MAXIMUM MARKS: 75

[T1,T2][No. of Hrs. 12]

[T1,T2][No. of Hrs.: 10]

[T1,T2][No. of Hrs.: 10]

#### **UTILIZATION OF ELECTRICAL ENERGY & ELECTRIC TRACTION**

Paper Code: ETEE-304	L	T/P	С
Paper: Utilization of Electrical Energy & Electric Traction	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To clearly understand the basic concepts related to use of electric energy in various industrial, commercial and residential applications.

## UNIT I

Illumination

Introduction, terms used in illumination, laws of illumination, polar curves, photometry, integrating sphere, sources of light, discharge lamps, Mercury Vapour and Sodium Vapour lamps- their characteristic and applications. Performance comparison between tungsten filament lamps, fluorescent tubes, CFL and LED Lights. Basic principles of light control, types and design of lighting schemes and flood lighting. [T1][No. of Hrs. 10]

#### UNIT II

Electrical Heating : Principle and application of resistance, induction and dielectric heating;,Infrared or radiant heating, High frequency eddy current heating, arc furnaces, induction furnace, electric supply for high frequency heating applications.

**Welding:** Resistance welding; arc welding, welding generator and welding transformer, properties of arcing electrode, comparison between resistance and arc welding, comparison between A.C. and D.C. welding.

#### [T2][No. of Hrs. 10]

#### UNIT III

#### Electric Traction

Advantages of electric traction, requirements of an ideal traction system, different system of electric traction; comparison between D.C. and A.C. systems of railway electrification; speed – time curves, different types of traction motors and their characteristics; parallel operation of traction motors.

Starting and speed control of 3 phase induction motors, braking, advantages and disadvantages of regenerative braking. Calculation of energy returned during regeneration.

#### [T1,R1][No. of Hrs. 10]

#### UNIT IV

**Electroplating:** Principles and applications of electrolysis. Faraday's law of electrolysis, electroplating; calculation of current required for depositing given amount of metal, current efficiency, voltage-energy efficiency, extraction of metals electro deposition, factors governing deposition process.

**Energy Storage Devices:** Constructional details, principle of operation of Rechargeable Alkaline, Nickel – Cadmium, Nickel-Metal Hydride, Lithium ion and Lead-acid batteries, their comparison and applications. Charging of batteries and rating. Fuel cell and use of electric double layer capacitor (super capacitor) as battery bank.

#### [T2,R2][No. of Hrs. 10]

#### Textbooks:

- [T1] Pratab. H. "Art and Science of Utilization of Electrical Energy": Dhanpat Rai & Sons.
- [T2] N.V. Suryanarayana, "Utilization of Electrical Power including Electric Drives and Electric Traction", New Age International (P) Limited.

#### **Reference Books:**

- [R1] C.L. Wadhwa, "Generation, Distribution and Utilization of Electrical Energy", New Age International (P) Limited.
- [R2] E. Openshaw Taylor, "Utilization of Electric Energy", Orient Longman, Universities Press

# Scheme and Syllabi for B. Tech-EEE, 1<sup>st</sup> year (Common to all branches) w.e.f batch 2014-15 and $(2^{nd}, 3^{nd} \& 4^{th} years)$ w.e.f batch 2013-14 approved in the $22^{nd}$ BOS of USET on $30^{th}$ June, 2014 and approved in the $37^{th}$ AC Sub Committee Meeting held on $10^{th}$ July, 2014.

#### **DIGITAL SIGNAL PROCESSING**

Paper Code: ETEC-306	L	T/P	С
Paper: Digital Signal Processing	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objectives:** The aim of this course is to provide in depth knowledge of various digital signal processing techniques and design of digital filters, learn the concept of DFT FFT algorithms, and design of digital filters using different approximations, DSP processor and architecture. The prerequisites of this subject are basic knowledge of signal and systems.

#### UNIT-I:

Frequency Domain Sampling: The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based of the DFT.

Efficient computation of the DFT: Principal Of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT.

Application of DFT, Design of Notch filter

#### UNIT-II:

**Design & Structure of IIR filters from analog filters:** Impulse Invariance; Bilinear transformation and its use in design of Butterworth and Chebyshev IIR Filters; Frequency transformation in Digital Domain, Direct, Cascade, Parallel & transposed structure

**Design & structure of FIR filters:** Symmetric and anti-symmetric FIR filters; Design of Linear Phase FIR filters using windows, Frequency Sampling Method of FIR design, Direct, Cascade, Frequency Sampling, transposed structure

[T1,T2] [No. of Hours: 11]

[T1,T2] [No. of Hours: 10]

[T1, T2][No. of Hours: 10]

[T2,T1][No. of Hours: 11]

#### UNIT-III:

#### Implementation of Discrete Time Systems:

Lattice structures, Lattice and Lattice-Ladder Structures, Schur - Cohn stability Test for IIR filters; Discrete Hilbert Transform.

#### Linear predictive Coding:

Lattice filter design, Levension Darwin Technique, Schur Algorithm

#### UNIT-IV:

Quantization Errors in Digital Signal Processing: Representation of numbers, Quantization of filter coefficients, Round-off Effects in digital filters.

**Multirate Digital Signal Processing**: Decimation, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Polyphase decomposition.

#### Text Books:

- [T1] Oppenheim & Schafer, Digital Signal Processing, PHI-latest edition.
- [T2] Proakis and Manolakis, Digital Signal Processing, PHI Publication

#### **Reference Books:**

- [R1] S. K. Mitra, Digital Signal Processing, TMH edition 2006
- [R2] Johny. R. Johnson, Introduction to Digital Signal Processing, PHI-latest edition
- [R3] R.Babu ,Digital Signal Processing , Scitech Publication.

## short answer type questions. It should be of 25 marks.

Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have 2. two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The prerequisite are analog devices, STLD, Digital system design and micro-electronics. The students are introducing to MOS technology, design rules and some applications.

### UNIT I

1.

Paper Code: ETEC-308

**INSTRUCTIONS TO PAPER SETTERS:** 

Paper: VLSI Design

Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage, MOS device design equations, MOSFET scaling and small geometry effects, MOSFET capacitances.

NMOS inverter, CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, static & dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, body effect, latch up in CMOS.

#### UNIT II

Stick diagram and design rules, lambda based design rules, switching characteristics & inter connection effects: rise time, fall time delays, noise margin.

CMOS logic gate design: NAND, NOR, XOR and XNOR gates, Transistor sizing, combinational MOS logic circuits: pass transistor and transmission gate designs, Pseudo NMOS logic.

[T1,T2][No. of Hours: 11]

[T1,T2][No. of Hours: 11]

[T1,T2][No. of Hours: 11]

Sequential MOS logic circuits: SR latch, clocked latch and flip flop circuits, CMOS D latch and edge triggered flip flop, dynamic logic circuits; basic principle, non ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution.

#### UNIT IV

UNIT III

VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

#### Text Books:

- Basic VLSI Design Pucknell Douglas A., Eshraghian Kamran, PHI Learning Pvt Limited, 2013. [T1]
- [T2] N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective - 4th Edition", Pearson Education, India.

#### **Reference Book:**

- [R1] S. M. Kang, Y. Lebiebici, "CMOS digital integrated circuits analysis & design" Tata McGraw Hill, 3<sup>rd</sup> Edition.
- Digital Integrated Circuit Design- Ken Martin, Oxford University Press [R2]
- [R3] The MOS Transistor- Yaniiis Tsividis and Colin Mcandrew, Oxford University Press, 2013
- J. M. Rabaey, "Digital Integrated Circuits" PHI Learning Pvt Limited, India [R4]
- J. P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Inc., New York, NY [R5]
- Neelam Sharma, "Digital Logic Design", Ashirwad Publication 2013-14 [R6]

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4

#### **MAXIMUM MARKS: 75** Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or

T/P

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3

#### [T1,T2][No. of Hours: 11]

#### MICROPROCESSORS AND MICROCONTROLLERS

Paper Code: ETEE-310	L	T/P	С
Paper: Microprocessors and Microcontrollers	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the knowledge of microprocessor systems and microcontroller.

#### UNIT- I

Introduction to Microprocessor Systems: Architecture and PIN diagram of 8085, Timing Diagram, memory organization, Addressing modes, Interrupts. Assembly Language Programming. [T1][No. of hrs. 10]

#### UNIT- II

**8086 Microprocessor:** 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts.

#### UNIT- III

Interfacing of 8086 with 8255, 8254/ 8253, 8251, 8259: Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

#### UNIT-IV

**Overview of Microcontroller 8051:** Introduction to 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming.

[T3][No. of hrs. 11]

[T2][No. of hrs. :12]

[T1][No. of hrs. :12]

#### Text Books:

- [T1] Muhammad Ali Mazidi, "Microprocessors and Microcontrollers", Pearson, 2006
- [T2] Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" Tata McGraw Hill, 2006
- [T3] Ramesh Gaonkar, "MicroProcessor Architecture, Programming and Applications with the 8085", PHI

#### **References Books:**

- [R1] Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay "The 8051 Microcontroller and Embedded Systems", 2<sup>nd</sup> Edition, Pearson Education 2008.
- [R2] Kenneth J. Ayala, "The 8086 Microprocessor: Programming & Interfacing The PC", Delmar Publishers, 2007.
- [R3] A K Ray, K M Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill, 2007.
- [R4] Vaneet Singh, Gurmeet Singh, "Microprocessor and Interfacing", Satya Prakashan, 2007.

#### POWER STATION PRACTICE

Paper Code: ETEE-312	L	T/P	С
Paper: Power Station Practice	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to enable the Electrical Engineering students to have knowledge of Power Stations an important aspect of overall Electricity Supply System.

#### UNIT I

Different form energy sources: Fossils fuels, Nuclear energy and Hydro power,-Renewable Energy Sources: Introduction to Solar energy, geo-thermal energy, tidal energy, wind energy, bio-gas energy and M.H.D. Power generation. Thermal Power Plant: Location and Site selection, general layout and working of plant, boilers, economizers, super heaters, draft equipments, fuel and ash handling plants. [T1,T2] [No. of Hrs. 12]

#### UNIT II

Gas Turbine Power Plant: Lay out, Working and components of gas turbine power plant, combined gas and steam turbine plant.

**Hydro Electric Plant:** Location and site selection, general layout and operation of plant, Types of Hydro Turbines and their characteristics – Impulse and reaction type (Pelton Wheel, Francis and Kaplan turbines,), speed governing system. **Diesel Power Plant:** Layout and components of plant auxiliary equipments.

[T1,T2][No. of Hrs. 10]

#### UNIT III

Nuclear Power Plant: Location and site selection, general layout and operation of plant, brief description of reactors, moderators and reflectors.

**Economic Operation Of Power System:** Performance curves, Economic generation scheduling neglecting losses and generator limits, Economic generation scheduling Economic Dispatch including transmission losses – approximate penalty factor, iterative technique for solution of economic dispatch with losses; Derivation of transmission loss formula.

#### [T1,T2][No. of Hrs. 10]

#### UNIT IV

**Substation Layout:** Types of substations, typical layout and constructional details of pole mounted, Indoor, Outdoor sub-stations, hybrid gas insulated sub stations, bus bar arrangements, application of substation equipment like transformer, circuit breaker, isolator, metering equipments and protecting equipment, substation grounding.

#### [T1,T2][No. of Hrs.10]

#### Text Books:

- [T1] M. V. Deshpande, "Elements of Electric Power Station Design", Wheeler Publishing Co.
- [T2] B. G. A. Skrotzki & W. A. Vopat, "Power Station Engineering and Economy", Tata McGraw Hill. 5<sup>th</sup> edition 2013

4.0

[T3] Harish. C. Rai, "Power Plant Engineering", I.K. International Publishers.

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#### **Reference Books:**

[R1] S. L. Uppal, "Electrical Power", Khanna Publishers. 13<sup>th</sup> edition 2003

M L

- [R2] M. L. Soni, P. V. Gupta and U. S. Bhatnagar, "A Course in Electrical Power", Dhanpat Rai & Sons, 1<sup>st</sup> edition 2005
- [R3] B. R. Gupta, "Generation of Electrical Energy", Eurasa Publishing House
- [R4] C.L. Wadhva, "Generation distribution and utilization Electrical Engg."

## POWER SYSTEM-II LAB

Paper Code: ETEE-352	L	T/P	С
Paper: Power System-II Lab	0	2	1

### List of Experiments:

Exp-1.	To study single line to Ground fault as practical application in transmission lines. (Using Experimental setup)
Exp-2.	To study three phase fault as practical application in transmission lines. (Using Experimental setup)
Exp-3.	To determine the characteristics of the given differential relay and to apply the relay for the protection of a transformer against internal faults. (Using Experimental setup)
Exp-4.	To study instantaneous over current relay. (Using Experimental setup)
Exp-5.	<ol> <li>Study the construction of relay.</li> <li>Study the operating and deoperating of relay.</li> <li>Study the current vs. time characteristics.</li> <li>To study over voltage relay static type and draw its characteristics. (Using Experimental setup)</li> </ol>
Exp-6.	To study the characteristics of miniature-circuit breaker. (Using Experimental setup)
Exp-7.	To study the operating characteristics of HRC fuse. (Using Experimental setup)
Exp-8.	To obtain the characteristics of thermal bimetallic relay. (Using Experimental setup)
Exp-9.	To study the characteristics of IDMT Earth fault relay. (Using Experimental setup)
LIST OF A	DVANCE EXPERIMENTS
Exp-1.	Simulation based on Load flow analysis.
Exp-2.	Simulation based on Short circuit analysis.
Exp-3.	Simulation based on Transient stability study.
Exp-4.	Simulation based on Relay co-ordination.
Exp-5.	Simulation based on Voltage instability analysis.
Exp-6.	Simulation based on Harmonic analysis.
Exp-7.	Simulation based on Line and cable parameter.
Exp-8.	Simulation based on Long-term load forecast.
Exp-9.	Simulation based on Electromagnetic Transient Analysis.
Exp-10.	Simulation based on Network Reduction.
NOTE:- At	least 8 Experiments out of the list must be done in the semester.

## **UTILIZATION OF ELECTRICAL ENERGY LAB**

Paper Code: ETEE-354	L	T/P	С
Paper: Utilization of Electrical Energy Lab	0	2	1

#### List of Experiments:

- 1. Demonstration and calculation of current for electro plating process used to different metals.
- 2. Demonstration of large size cut model of different types of batteries.
- 3. Study of charging methods of batteries and calculation of their life cycle.
- 4. Charging and discharging of super capacitors.
- 5. To plot polar curves for various lamps.
- 6. Verification of illumination laws.
- 7. Performance comparison of MV lamps, SV lamps, filament lamps, CFL & LED lights.
- 8. Design of lighting schemes for house / commercial complex / industry / street light / flood light.
- 9. Demonstration of resistance / inductance / dielectric heatings.
- 10. Characteristics of welding transformer.
- 11. Speed control of various traction motors.
- 12. Braking schemes for traction motors.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

# GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### DIGITAL SIGNAL PROCESSING LAB

Paper Code: ETEC-356	L	T/P	С
Paper: Digital Signal Processing Lab	0	2	1

#### List of Experiments:

#### Software Experiments:

a.

- 1. Generation of basic signals sine, cosine, ramp, step, impulse and exponential in continuous and discrete domains using user defined functions.
- 2. Write a MATLAB program to find convolution (linear/circular) and correlation of two discrete signals.
- 3. Perform linear convolution using circular convolution and vice versa.
- 4. Write a MATLAB program to
- Find 8 point DFT, its magnitude and phase plot and inverse DFT.
- b. Find 16 point DFT, its magnitude and phase plot and inverse DFT.
  - 5. Perform the following properties of DFT-
- a. Circular shift of a sequence.
- b. Circular fold of a sequence.

#### 6. Write a MATLAB Program to design FIR Low pass filter using

- a. Rectangular window
- b. Hanning window
- c. Hamming window
- d. Bartlett window
  - 7. Write a MATLAB program to
- a. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Butterworth Approximation.

b. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Chebyshev Approximation.

### Hardware Experiments using Texas Instruments Kits-DSK 6713:

- 8. Introduction to Code composer Studio.
- 9. Write a program to generate a sine wave and see the output on CRO
- 10. Write a Program to Generate ECHO to give audio file.
- 11. Write a program to demonstrate Band Stop filter by FIR.

#### Additional Experiments:

- 12. Write a program to generate a cos wave and see the output on CRO
- 13. Write a program to blink the LED
- 14. Write a program to display a string on LCD.

#### NOTE:- At least 8 Experiments out of the list must be done in the semester.

JDRAPRASTI

UNIVERSIT

## MICROPROCESSORS AND MICROCONTROLLERS LAB

Paper Code: ETEE-358	L	T/P	С
Paper: Microprocessors and Microcontrollers Lab	0	2	1

#### List of Experiments:

1. Write a program to add and subtract two 16-bit numbers with/ without carry using 8086.

- 2. Write a program to multiply two 8 bit numbers by repetitive addition method using 8086.
- 3. Write a Program to generate Fibonacci series.
- 4. Write a Program to generate Factorial of a number.
- 5. Write a Program to read 16 bit Data from a port and display the same in another port.
- 6. Write a Program to generate a square wave using 8254.
- 7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1(using 8051).
- 8. Write a Program to transfer data from external ROM to internal (using 8051).
- 9. Design a Minor project using 8086 Micro processor (Ex: Traffic light controller/temperature controller etc)
- 10. Design a Minor project using 8051 Micro controller

#### NOTE: - At least 8 Experiments out of the list must be done in the semester.



Paper Code: ETEE-401	L	T/P	С
Paper: Electrical Drives	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Electrical Drives that are required for an engineering student.

#### UNIT- I

**Dynamics of Electric Drives:** Types of loads, quadrant diagram of speed time characteristics, Basic and modified characteristics of dc and ac motors, equalization of load, steady state stability, calculation of time and energy loss, control of electric drives, modes of operation, speed control and drive classifications, closed loop control of drives, selection of motor power rating, class of duty, thermal considerations. **T1,T2**[No. of hrs. 11]

#### UNIT- II

DC Motor Drives: DC motor speed control, Methods of armature control, field weakening, semiconductor controlled drives, starting, braking, transient analysis, controlled rectifier fed dc drives, chopper controlled dc drives. [T1],[T2][No. of hrs. 10]

#### UNIT- III

**Induction Motor Drives:** Three phase induction motor starting, braking, transient analysis, speed control from stator and rotor sides, stator voltage control, variable frequency control from voltage sources and current sources, static rotor resistance control, slip power recovery, static Scherbius and static Kramer drive.

[T1], [T2][No. of hrs. 11]

**UNIT-IV Drives with Special Machine:** Introduction to permanent magnet machines, thermal properties of PM, concept of BLDC motor, 120° and 180° operation, rotor position detection, open loop voltage control, closed loop current control, high speed single pulse operation, permanent magnet synchronous machines, rotor position detection and synchronization, sinusoidal PWM excitation, closed and open loop control, PMSG and its application to wind energy, stepper motor, current and voltage control, drive circuits, SRM drive, modeling and analysis of SRM, different configurations of converters, closed and open loop operation, high speed operation with angle of advance.

[T1],[T2][No. of hrs. 12]

#### Text Books:

- [T1] G K Dubey, "Principle of Electrical Drives", Narosa Publishing House
- [T2] Vedam Subrahmanyam, "Electrical Drives", Tata McGraw-Hill

#### References Books:

- [R1] R Krishnan, "Electrical Motor Drives" PHI Publications.
- [R2] Ned Mohan, "Electrical Machines And Drives" Wiley India Publication
- [R3] Bimal K Bose, "Modern Power Electronics and AC Drives", PHI Publications.
- [R4] De, Sen, "Electric Drives", PHI Publications.
- [R5] Bimal K Bose, "Power Electronics and Variable Frequency Drives" Wiley India Publication

#### MAXIMUM MARKS: 75

## ADVANCED CONTROL SYSTEMS

#### L С Paper Code: ETEE-403 T/P Paper: Advanced Control Systems 3 1 4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To impart knowledge of state space, discrete systems, non-linear systems and adaptive control.

#### UNIT – I: State Space Analysis

Introduction, state space representation of continuous LTI systems, transfer function and state variables, transfer matrix, EIGEN values and EIGEN vectors, Solution of State equations, controllability and observability, canonical forms (CCF, OCF, DCF, JCF). [T1,T2][No. of Hrs.10]

#### UNIT – II: Discrete System

Introduction to discrete time systems, sampling process, Z-transform and inverse Z-transforms and hold circuits, presentation by difference equation and its solution, pulse transfer function, transient and steady state responses, Dead beat response, steady state error, Representation of discrete systems in state variable form and its solution, stability of digital control system, digital equivalent of conventional controller/compensator.

#### [T1,T2][No. of Hrs.12]

#### UNIT – III: Non-Linear System

Introduction, Non-linear system behavior and different types of non-linearities, Describing function analysis, assumptions and definitions, DF of common non-linearities, Phase Plane Analysis, singular points, construction of phase portrait, phase plane analysis of linear/non-linear systems, existence of limit cycles, jump phenomenon, stability analysis:

[T1,T2][No. of Hrs.10]

[T1,T2][No. of Hrs.10]

#### UNIT – IV: Lyapunoy Theory and Adaptive Control

Lyapunov direct method, positive definite functions and Lyapunov functions, existence of Lyapunov functions, Lyapunov analysis of LTI systems, variable gradient method, Krasvoskii method, performance analysis, Popov's stability criteria.

Introduction to basic approaches to adaptive control - Model reference adaptive control systems, self tuning regulators, Applications of adaptive control.

#### Text Books:

- Dorf-State Space Analysis, Modern Control System, Pearson 4th edition, 2002 [T1]
- M. Gopal-Digital Control and State Variable Methods, TMH 4<sup>th</sup> Edition. [T2]

#### Reference Books:

J. J. Stoline, Nonlinear Control System. [R1]

N I

- [R2] Brian D.O.Adnerson & John B. Moore, Optimal Control
- [R3] R.C. Sukla - Control Stystems, Dhanpat Rai & Co. (P) Ltd.
- [R4] Shastri & Badson, Adaptive Control, PHI
- [R5] S. Das Gupta, Control System Theory, Khanna Publications.

**MAXIMUM MARKS: 75** 

#### **EHV AC & HVDC TRANSMISSION**

Paper Code: ETEE-405	L	T/P	С
Paper: EHV AC & HVDC Transmission	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective 1. or short answer type questions. It should be of 25 marks.

2 Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of EHV AC and HVDC Transmission that are required for an engineering student.

#### UNIT- I

EHV AC Transmission System: Fundamental design aspects of EHV AC transmission lines and their power carrying capabilities; EHV AC Transmission lines analysis – nominal and equivalent circuits; Problems related with long lines: corona loss, audible noise generation and characteristic corona pulses, RI effect, ferro-resonance, principle of half wave transmission. [T1,T2][No. of hrs. 11]

#### UNIT- II

Reactive Power Management in EHV AC System: Reactive power management of power system, reactive power problems associated with EHV AC systems; Reactive power devices – their operation and control, series and shunt compensation of EHV AC system, different equipment and scheme details with analysis, application of FACTS Technology. Extra High Voltage Testing: Characteristics and generation of impulse voltage, generation of high AC and DC voltages, measurement of high voltage by sphere gaps and potential dividers.

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 10]

HVDC Transmission: Fundamental aspects of HVDC systems and their comparison with EHV AC Systems; Different types of HVDC Schemes with their basic details, HVDC Equipment and their ratings, construction and characteristics; Power Converter circuits associated with HVDC systems, design aspects of 12- pulse converters, simple design problems of HVDC Systems.

#### UNIT-IV

UNIT-III

HVDC System Control: Types of DC link, principle of dc link control, converter controls characteristics, firing angle control, current and excitation angle control, power control, starting and stopping of dc link, Harmonic Filters -HVDC current and voltage filters, different types of filters, Fundamental aspects of HVDC circuit breaking, MTDC systems: types, control and application.

[T2][No. of hrs. 12]

- [T1] S.Rao, "EHV AC & HVDC Transmission Engineering & Practice", Khanna Publishers.
- Padiyar, K.R, "HVDC power Transmission System", New Age Publication. [T2]

#### **References:**

Text:

- R.D.Begamudre,"Extra high Voltage AC transmission Engineering", Wiley Eastern. [R1]
- Naidu, Kamaraju "High Voltage Engineering", ,5 ed., TMH Publishing [R2]
- [R3] Kamakshaiah, Kamaraju,"HVDC Transmission", McGraw-Hill Publication.
- Nagsarkar, Sukhija, "Power System Analysis", Oxford Publication [R4]

#### **RENEWABLE ENERGY RESOURCES**

Paper Code: ETEE-419	L	T/P	С
Paper: Renewable Energy Resources	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to introduce the knowledge of upcoming and future promising area of renewable energy resources to the students, which is developing rapidly.

#### UNIT- I

Solar Energy: radiation – extra terrestrial, spectral distribution, solar constant, solar radiation on earth, measurements; solar thermal system – solar thermal power and its conversion, solar collectors, flat plate, solar concentrating collectors, - types and applications; photovoltaic (PV) technology - photovoltaic effect, efficiency of solar cells, semi-conductor materials, solar PV system, standards and applications, tracking.

#### UNIT- II

Wind and Small Hydropower Energy: wind data, properties, speed and power relation, power extracted, wind distribution and speed prediction, wind map of India; wind turbines and electric generators. fundamentals – types of machines and their characteristics, horizontal and vertical wind mills, elementary design principle, wind energy farms, off-shore plants; small, mini and micro hydro power plants and their resource assessment, plant layout with major components shown.

#### UNIT- III

Other Non-conventional Energy Sources: biomass – photosynthesis and origin of biomass energy, resources, cultivated resources, waste to biomass, terms and definitions – incineration, wood and wood waste, harvesting super tree, energy forest, phyrolysis, thermo-chemical biomass conversion to energy, gasification, anaerobic digester, fermentation, gaseous fuel; geothermal – resources, hot spring, steam system, principle of working, site selection, associated problems in development; ocean and tidal energy – principle of ocean thermal energy conversion, wave energy conversion machines, problems and limitations, fundamentals of tidal power, conversion systems and limitations; hydrogen energy – properties of hydrogen, sources, production and storage, transportation, problems for use as fuel; fuel cells – introduction with types, principle of operation and advantages.

#### UNIT-IV

Grid Connectivity: wind power interconnection requirement - low-voltage ride through (LVRT), ramp-rate limitations, supply of ancillary services for frequency and voltage control, load following, reserve requirement, impact of connection on stead-state and dynamic performance of power system; interfacing dispersed generation of solar energy with the grid, protective relaying, islanding, voltage flicker and other power quality issues; role of non-conventional energy system in smart grid.

#### Text Books:

- [T1] Tiwari and Ghosal, "Renewable Energy Resources: Basic Principle & Application", Narosa Pub.
- [T2] S N Bhadra ,D, Kastha, 'Wind Electrical Systems' Oxford Publication 2014

#### References Books:

- [R2] John Twidell, "Renewable Energy Sources", Taylor and Francis
- [R3] Godfrey Boyle, "Renewable Energy: Power for a Sustainable Future", Oxford University Press
- [R4] Ewald F. Fuchs, "Power Conversion of Renewable Energy Systems", Springer
- [R5] B. H. Khan, "Non Conventional Energy", Tata McGraw Hill
- [R6] D P kothari, "Wind energy System and applications" Narosa Pub 2014

#### MAXIMUM MARKS: 75

[T1][No. of hrs. 10]

[T2][No. of hrs. 10]

[T1,R2][No. of hrs. 12]

[T2,R3][No. of hrs. 10]

#### POWER DISTRIBUTION SYSTEM

Paper Code: ETEE-409	L	T/P	С
Paper: Power Distribution System	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to enable the Electrical Engineering students to have knowledge of Power Distribution System, an important aspect of overall Electricity Supply System.

#### UNIT- I

Introduction to sub-transmission and distribution system; classification of loads – residential, commercial, agricultural, industrial and their characteristics; distribution system planning – short-term, mid-term, long-term, load modeling and characteristics; definition of demand factor, utilization factor, load factor, plant factor, diversity factor, loss factor; computer applications to distribution system automation; tariff.

#### UNIT- II

UNIT- III

Distribution feeders, transformers and sub-stations; primary feeders – voltage level, radial and loop types, uniformly distributed and non-uniformly distributed load; design considerations for secondary system – voltage level, location of substation, rating, service area with primary feeders, optimal location; existing system improvement.

#### [T1,T2][No. of hrs. 10]

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 10]

[T1,T2][No. of hrs. 10]

System analysis – voltage drop and power loss calculation; methods of solution for radial networks, three-phase balanced primary lines, non-three-phase primary lines; loss reduction, voltage regulation, voltage control and improvement, issues in quality of service – voltage sag, swell and flicker; application of capacitors to distribution system – effect of series and shunt capacitors, power factor correction, economic justification for capacitor with cost-benefit analysis aiming at most economic power factor, optimum location of capacitor.

#### UNIT-IV

Distribution sub-station bus schemes, description and comparison of switching schemes; types of common faults and procedure for system fault calculation; protection – objectives, over current protection devices – fuses, automatic circuit re-closers, automatic line sectionalizing, coordination of protective devices – fuse to fuse, fuse to circuit breaker, re-closer to circuit breaker.

#### Text:

[T1] Turan Gonen, "Electric Power Distribution System Engineering", McGraw Hill

[T2] Dale R. Patrick," Electrical Distribution System", 2<sup>nd</sup> Edition, CRC Press

#### **References:**

[R1] James A. Momoh, "Electric Power Distribution Automation, Protection and Control", CRC Press

[R2] A. S. Pabla, "Electric Power Distribution", Tata McGraw Hill

#### MAXIMUM MARKS: 75

#### **TELEMETRY & DATA ACQUISITION SYSTEM**

Paper Code : ETEE-411	
Paper: Telemetry & Data Acquisition System	

## L T/P C 3 0 3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: Telemetry is the study of data communication between a numbers of locations. Data Acquisition system deals with acquiring the data from different sources, processing the data so that it can be made compatible to be used with the controlling systems. So, the study of this subject is very useful for the students who are to work in automation industries.

#### UNIT – I

#### Telemetry Concepts

Introduction: Methods of data transmission, general telemetry system, types of telemetry systems, voltage, current, position, landline, radio frequency telemetry systems.

Sampling fundamentals: Introduction to sampling theorem and sampling process, convolution, computing minimum sampling rate, Aliasing Errors.

**Digital Modulation Techniques:** AM, FM, Review of PCM, DPCM, DM code converters, PSK, QPSK, FSK, Probability of error, Phase ambiguity Resolution and differential encoding, Error detection, Error correction, Error correcting codes.

#### [T1 T2][No. of Hrs. 12]

#### UNIT – II

#### Data Communication Systems

**Data Transmission system:** Methods of binary data transmission, data formats, Block schematic, Sensors, Signal conditioners, Multiplexing – high level and low level, ADC – Range and Resolution, Word Format, Frame format, Frame of Synchronizer codes, RF links, X24, RS422, RS423, RS232C interfaces, Multi terminal configuration, Multiplier & concentrator, Data Modems, Data transmission over telephone lines, power line carrier communication.

Data reception systems: Bit Synchronizers, Frame Synchronizers, Sub frame Synchronizers, PLL, Display System.

[T1 T2][No. of Hrs. 10]

#### UNIT – III

**Remote Control:** Communication Based Processing Control Systems, Pipelines, Operational security system components, Pipeline control, Power system control, Programmable controllers for factory automation.

Command: Tone Command system, Tone Digital Command system, ON/OFF command and Data commands.

Aerospace Telemetry: Signal Formation and Conversion, Multiplexing Techniques in Telecontrol installations, Reliability in Telecontrol installations. Optoelectronics/Fiber cable based scheme.

[T1 T2][No. of Hrs. 10]

#### UNIT – IV

Text Books:

#### Data Acquisition System (DAS)

Introduction, Analog and digital data acquisition system, Importance of DAS, building blocks of DAS, sample and hold circuits, A/D, D/A, multiplexer. Microprocessor based DAS.

#### [T1 T2][No. of Hrs. 10]

- [T1] Patranabis, "Telemetry Principles", TMH.
- [T2] H. Rosemary Taylor, "Data Acquisition for Sensor Systems", Chapman & Hall

#### Reference Books:

- [R1] William Schweber, "Data Communication," TMH Edition-1999
- [R2] Frank Cardon, Russell Jedlicka and Robert Henry, "Telemetry Systems Engineering" Artech House, Boston, London

# - IV

#### PLC & SCADA SYSTEMS

Paper Code: ETEE-413	L	T/P	С
Paper: PLC & SCADA Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this paper is to introduce the students about the knowledge of programmable logic controller, principles of PLC and functions and SCADA and its elements and functions.

#### UNIT-I

**Programmable Logic Controller (PLC) Basics:** Introduction, Parts of PLC, Principles of operation, PLC size and applications, PLC Advantages and Disadvantages, PLC Manufacturers, PLC hardware components, I/O section, Analog I/O modules, Digital I/O modules, CPU- Processor memory module, Programming devices, Devices which can be connected to I/O modules, Relay, Contactor, SPST, Push Buttons, NO/NC Concept

#### UNIT-II

**Programming of Programmable Logic Controller**: General PLC Programming Procedures, Contacts and Coils, Program SCAN, Programming Languages, Ladder Programming, Relay Instructions, Instruction Addressing, Concept of Latching, Branch Instructions, Contact and Coil I/O Programming Examples, Relation of Digital Gate Logic to Contact/Coil Logic.

#### [T1,T2] [No of Hrs 12]

[T1,T2] [No of Hrs 12]

[T1,T2] [No of Hrs 10]

UNIT-III Programmable Logic controller Functions: Timer Instructions: ON DELAY Timer and OFF DELAY timer, Counter Instructions: UP/DOWN Counters, Timer and Counter Applications, Program Control Instructions: Master Control Reset, Jump and Subroutine,

Math Instructions- ADD, SUB. Data Handling: Data Move, Data Compare, Data Selection, Electro-pneumatic Sequential Circuits and Applications.

#### UNIT-IV

**SCADA:** Definition of SCADA, Applicable Processes, Elements of SCADA System, A Limited Two-Way System. Real Time Systems: Communication Access and Master-Slave determining scan interval. Introduction to Remote Control, Communications-A/D Conversion, Long Distance Communication, Communication System components in brief- Protocol, Modems, Synchronous/Asynchronous telephone cable/radio, Half Duplex, Full Duplex System, Brief introduction to RTU and MTU, Applications-Automatic Control, Advisory Applications.

[R1] [No of Hrs 10]

#### Text Books:

- [T1] Frank D. Petruzella "Programmable Logic Controllers", McGraw-Hill Book Company.
- [T2] John w. Webb and Ronald A. Reis, "Programmable Logic Controllers", PHI

#### **Reference Books:**

- [R1] Stuart A.Boyer "Supervisors Control and Data Acquisition", ISA
- [R2] William I. Fletcher "An Engineering Approach to Digital Design", PHI.
- [R3] Simpson, Colin "Programmable Logic Controllers", Englewood Cliffs NJ PHI.
- [R4] Gray Dunning, "Introduction to Programmable Logic Controllers", Delmar Thompson Learning
- [R5] Stenerson, John "Fundamentals Logic Controllers Sensors, & Communications", Englewood Cliffs, NJ, 1993. Prentice Hall.
- [R6] Programmable Logic Controllers, W.Bolton, Elsevier

#### **MECHATRONICS**

Paper Code: ETAT-403	L	T/P	С
Paper: Mechatronics	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: Mechatronics is the combination of mechanical and electronics automation and computers. Nowadays all the mechanical machines have been made computer controlled. The Subject details the basic hardware and software elements used for proper and successful operation of various equipments. The knowledge of this subject will be helpful to students while working in industries.

#### UNIT - I

Mechanical Actuating Systems: Types of motion, Degrees of freedom, constraints, Kinematic Chains, Cam, Gear and gear trains, Ratchet and pawl Belt drive, chain drive, Bearing, pre loading.

Hydraulic & Pneumatic Actuation Systems: Fluid power systems, hydraulic systems, Pneumatic systems, system structure and signal flow, hydraulic pumps and Pressure Control Valves and regulation, air compressors and treatment, Cylinders, Direction Control Valves, Process control valves, Rotary Actuators, Accumulators, Amplifiers, and Pneumatic Sequencing Problems.

#### UNIT - II

**Electrical Actuation Systems:** Switching Devices, Mechanical Switches – SPST, SPDT, DPDT, keypads; Relays, Electronic sensors, Diodes, Thyristors, Transistors, solenoid operating Valve, Solenoid Operated Hydraulic and Pneumatic Valves, Electro-Pneumatic Sequencing Problems. Control of DC Motors, Permanent Magnet DC Motors, Bush less Permanent Magnet DC Motors, AC Motors and speed controls, Stepper Motors and Controls, Servo Motors.

#### **Digital Electronics and systems:**

Number Systems, Binary Mathematics, Boolean Algebra, Gates and Integrated Circuits Like 7408, 7402, Karnaugh Maps, Application of Logic Gates as: Parity Generators, Digital Comparators, BCD to Decimal Decoders, Flip Flops and applications, sequential logic, Microprocessor and microcontrollers, programming, instruction set, assembly language, C programming for Intel 8051 / 8082 micro-controller.

#### UNIT - III

**Sensors, transducers and application:** Performance Terminology, Static and Dynamic Characteristics, Displacement, Position and Proximity Sensors, Potentiometer Sensors, Strain Gauge Element, LVDT, Optical Encoders, Pneumatic Sensors, Hall Effect Sensors, Tachogenerators, Strain Gauge Load Cell, Thermostats, Photo Darlington. Interfacing Sensors in Mechatronic System.

#### System Interfacing and data acquisition:

Data acquisition systems, Data loggers, SCADA, Interfacing requirements, Buffers, Darlington Pair, Handshaking, Serial and Parallel Port Interfacing, Peripheral Interface Adapters, Analog to Digital Conversion, Digital To Analog Conversion, Sample and Hold Amplifiers, Multiplexers, Time Division Multiplexing, Digital Signal Processing, Pulse Modulation, Component Interconnection and Impedance Matching, Interfacing Motor drives. Electrical power supply and protection.

**Introduction to signal conditioning:** Signal Conditioning Processes, Inverting Amplifiers, Non Inverting Amplifiers, Summing, Integrating, Differential, Logarithmic Amplifiers, Comparators, Amplifiers Error, Filtering, wheatstone Bridge, Temperature Compensation, Thermocouple Compensation,

[T1] [T2] [No. of Hrs: 11]

#### UNIT - IV

#### Programmable logic controllers:

Programmable logic controllers (PLC) Structure, Input / Output Processing, principles of operation, PLC versus computer, Programming Languages, programming using Ladder Diagrams, Logic Functions, Latching, Sequencing, Timers, Internal Relays And Counters, Shift Registers, Master and Jump Controls, Jumps, Data Movement, Code Conversion, Data handling and manipulation, selecting a PLC.

[T1] [T2] [No. of Hrs: 11]

[T1] [T2] [No. of Hrs: 11]

**Case studies:** Mechatronic approach to design, Boat Auto pilot, high speed tilting train, automatic car park system, coin counter, engine management system, autonomous mobile system, antilock brake system control, Auto-Focus Camera, Printer, Domestic Washing Machine, Optical Mark Reader, Bar Code Reader and Pick and Place robot Arm, Using PLC for extending and retracting a pneumatic piston and two pneumatic pistons in different combinations, control of vibrating machine, control of process tank, control of conveyor motor, detecting, sorting and packaging unit.

#### Text Book:

[T1] [T2] [No. of Hrs: 11]

- [T1] W. Bolton, "Mechatronics Electronic control systems in Mechanical & Electrical Engineering", Pearson Education Ltd., 2003.
- [T2] K. P. Ramachandran, G.K. Vijayaraghavan, M.S. Balasundaram, Mechatronics Integrated Mechanical Electronic Systems, Wiley;

#### **Reference Books:**

- [R1] Joji P, Pneumatic Controls, Wiley.
- [R2] Dan Necsulescu, Mechatronics, Pearson
- [R3] David g Alciatore, Michael B Histand, "Introduction to Mechatronics and measurement systems", Mc Graw Hill Education.
- [R4] A Smaili, F Mrad, "Mechatronics Integrated Technologies for Intelligent Machines, Oxford Higher Education.
- [R5] Nitaigour Premchand Mahalik, "Mechatronics Principles, Concepts & Application", Tata McGraw Hill Publishing Co.Ltd., 2003.



#### **HIGH VOLTAGE ENGINEERING**

Paper Code: ETEE-417	L	T/P	С
Paper: High Voltage Engineering	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To understand the various types of over voltages in power system ,protection methods, measurement of over voltages, nature of Breakdown mechanism in solid, liquid and gaseous dielectrics and Testing of power apparatus and insulation coordination.

#### UNIT I

#### High Voltage and Breakdown Phenomenon

Electric field stress due to high voltage, gas vacuum, liquid, solids and composites as dielectrics and insulator, estimation and control of electric stress and numerical methods for its computation, surge voltages and their distribution and control, application of insulating materials in transformer, rotating machines, circuit breakers, cable, power capacitors, bushings; breakdown in gaseous and liquid dielectrics, collision process, ionization process, Townsend's Criteria of breakdown in gases, Paschen's law, breakdown in pure and commercial liquids as insulator; intrinsic, electromechanical and thermal breakdown of solid dielectrics, breakdown in composite dielectrics.

UNIT II

#### Generation of High Voltages and Currents

Generation of high direct current voltages and high alternating current voltages, generation of impulse voltages and impulse currents, tripping and control of impulse generators.

#### UNIT III

#### Measurement of High Voltages and Currents

Measurements of high voltages - direct, alternating and impulse, measurements of high currents-direct, alternating and impulse, Oscilloscope for impulse voltage and current measurements.

#### UNIT IV

#### Over Voltage, Insulation Coordination and Testing

Causes of over voltage – lightning, switching, faults and other abnormal conditions, principles of insulation coordination in high voltage, extra high voltage and ultra high voltage power systems, measurement of DC resistivity, dielectric constant, loss factor and partial discharge, testing of insulators and bushings, isolators and circuit breakers, cables, transformers, surge arresters, measurement of Radio Interference.

#### Text Books:-

- [T1] M. S. Naidu & V. Kamaraju, "High Voltage Engineering", Tata McGraw Hill Publications, 3rd Edition.
- [T2] E. Kuffel, W.S. Zaengl & J. Kuffel, "High Voltage Engineering Fundamentals", Elsevier, 2nd Edition.

#### Reference Books:

- [R1] C. L. Wadhwa, "High Voltage Engineering", New Age International (P) Ltd, 1997.
- [R2] Ravindra Arora & Wolfgang Mosh, "High Voltage Insulation Engineering", New Age International (P) Ltd, 1995.

[T2][No. of Hrs. 10]

[T1][No. of Hrs. 12]

[T1][No. of Hrs. 10]

#### [T1,T2][No. of Hrs. 10]

#### SELECTED TOPICS IN EEE

Paper Code: ETEE-421	L	T/P	С
Paper: Selected Topics in EEE	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this paper is to introduce the student about induction Generator, Harmonics in Electrical Machine, Solar photovoltaic system and other related functions

#### UNIT I

Induction Generator: Torque-speed characteristics of an induction machine under generation mode, Line/grid Connected Induction Generator : Operation and limitations, Self Excited Induction Generator (SEIG) : Process of self excitation, conditions of self excitation, critical capacitance curve, no load characteristics (terminal capacitance vs induced voltage at constant speed), load characteristics (terminal voltage vs load current at fixed terminal capacitance & constant speed), frequency characteristics (frequency of generated voltage vs resistive load current) and voltage characteristic improvement using additional capacitor (capacitance vs resistive load current keeping terminal voltage and speed constant).

#### UNIT II

Harmonics in Electrical Machines: Harmonics in 3-phase transformers, Space distribution of magnetic field produced by direct current in stator field coils of a D.C. machine, Space distribution of magnetic field produced by current in armature windings of a D.C. machine, Effect of armature MMF on main field of a D.C. machine, Space distribution of magnetic field produced by 3-phase distributed stator winding of a 3-phase induction machine, Space harmonics and their effects in a 3-phase induction machine, Operation of 3-phase induction motor on unbalanced supply.

#### UNIT III

Solar Photovoltaic System: Introduction, Standards, SPV Water Pumping System, SPV Cell for Communication Equipment and other application of SPV, PV Hybrid System, Grid Interactive Solar PV System, Solar Photovoltaic in India, Roof top Solar Plant, Introduction of JNNSM, Possibilities and Limitations of Solar Energy in India.

[T2,R1,R2] [No. of Hrs. : 10]

#### UNIT IV

Electrical Energy Conservation: Modern compact fluorescent lamps, energy audit methods of saving electricity in drives, lighting, air conditioning, pumps and distributions systems metering, KW, KWh and KVAR meters, Standby power generation: DG sets, UPS, online Inverters and their maintenance.

#### Text Books:

- [T1] Chapman - "Electrical Machine Fundamentals", McGraw Hill.
- [T2] D.P. Kothari - "Renewable Energy Sources and Emerging Technologies", PHI, Second Edition.

#### References:

- Tiwari and Ghosal, "Renewable Energy Resources: Basic Principle & Application", Narosa Publication [R1]
- John Twidell, "Renewable Energy Sources", Taylor and Francis [R2]
- A Fitzgerald, Charles Kingsley, Stephen Umans, Electric Machinery, Tata McGraw Hill Education, 6<sup>th</sup> [R3] Edition, 2002
- [R4] K. Venkataratnam, "Special Electrical Machines", Oxford University Press, Hydearbad, 2008
- W.C. Turner, Energy Management Handbook, 2e, Fairmont press, 1993. [R5]
- [R6] UNESCAP – Guide Book on Promotion of Sustainable Energy Consumption.

#### [T1,R3] [No. of Hrs. : 10]

[T1,R4] [No. of Hrs. : 10]

## [T2,R5,R6] [No. of Hrs. : 10]

# **MAXIMUM MARKS: 75**

#### **OPTOELECTRONICS AND OPTICAL COMMUNICATIONS**

Paper Code: ETEC-403	L	T/P	С
Paper: Optoelectronics and Optical Communications	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: The objective of this paper is to introduce the student about Optical Fiber, Wave propagation, Detectors and its structures and functions.

#### UNIT I

Introduction: Optical Fiber :-Structures, Wave guiding and Fabrication – Nature of light, Basic optical laws and Definition, Optical fiber modes and Configuration, Mode theory for circular waveguides, Single mode fibers, Graded index fiber, Fiber materials, Fabrication and mechanical properties, Fiber optic cables, Basic Optical Communication System, Advantage of Optical Communication System.

#### UNIT – II

Attenuation in Optical Fibers: Introduction, Absorption, Scattering, Very Low Loss Materials, All Plastic & Polymer-Clad-Silica Fibers.

**Wave Propagation:** Wave propagation in Step-Index & Graded Index Fiber, Overall Fiber Dispersion-Single Mode Fibers, Multimode Fibers, Dispersion-Shifted Fiber, Dispersion, Flattened Fiber, Polarization.

#### [T1, T2][No. of Hrs.11]

[T1, T2][No. of Hrs.11]

[T1, T2][No. of Hrs.12]

UNIT – III

**Source & Detectors:** Design & LED's for Optical Communication, Semiconductor Lasers for Optical Fiber Communication System and their types, Semiconductor Photodiode Detectors, Avalanche Photodiode Detector & Photo multiplier Tubes. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling. Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

#### UNIT – III

**Optical Fiber Communication Systems:** Data Communication Networks – Network Topologies, Mac Protocols, Analog System. Advanced Multiplexing Strategies – Optical TDM, Sub carrier Multiplexing, WDM Network. Architectures: SONET/SDH. Optical Transport Network, Optical Access Network, Optical Premise Network. **Applications**-Military Applications, Civil, Consumer & Industrial Applications.

#### Text Books:

- [T1] J. Gowar, "Optical Communication System", IEEE Press 2<sup>nd</sup> Edition.
- [T2] R.P.Khare "Fiber Optics and Opto Electronics" Oxford Publication

#### **Reference Books:**

- [R1] Optical Information Processing F. T. S. Yu Wiley, Newyork, 1983
- [R2] G. P. Agrawal, Fiber optic Communication Systems, John Wiley & sons, New York, 1992
- [R3] A. Ghatak, K. Thyagarajan, "An Introduction to Fiber Optics", Cambridge University Press
- [R4] J. H. Franz & V. K. Jain, "Optical Communication Components & Systems", Narosa Publish, 2013
- [R5] John M. Senior, "Optical Fiber Communications", PEARSON, 3rd Edition, 2010.

#### DATABASE MANAGEMENT SYSTEMS

Paper Code: ETCS-425	L	T/P	С
Paper: Database Management Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The concepts related to database, database techniques, SQL and database operations are introduced in this subject. This creates strong foundation for application data design.

**UNIT-I**: Introductory Concepts of DBMS: Introduction and application of DBMS. Data Independence. Database System Architecture – levels, Mapping, Database users and DBA, Entity – Relationship model, constraints, keys, Design issues, E-R Diagram, Extended E-R features- Generalization, Specialization, Aggregation, Translating E-R model into Relational model.

#### [T1, T2][No. of Hrs. 10]

UNIT-II : Relational Model: The relational Model, The catalog, Types, Keys, Relational Algebra, Fundamental operations, Additional Operations-, SQL fundamentals, DDL,DML,DCL PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Integrity – Triggers.

#### [T2, R3][No. of Hrs. 10]

UNIT-III: Functional Dependencies, Non-loss Decomposition, First, Second, Third Normal Forms, Dependency Preservation, Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

#### [T2, R1][No. of Hrs. 10]

[T1, T2, R2][No. of Hrs. 12]

UNIT-IV: Transaction Management: ACID properties, serializability of Transaction, Testing for Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Database recovery management.

Implementation Techniques: Overview of Physical Storage Media, File Organization, Indexing and Hashing, B+ tree Index Files, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Materialized views, Database Tuning.

#### Text Books:

- Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 5th Edition, Tata [T1] McGraw Hill, 2006
- Elmsari and Navathe, "Fundamentals of Database Systems", 4th Ed., A. Wesley, 2004 [T2]

#### **References Books:**

C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson [R1] Education, 2006.

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J. D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999. [R2]

#### **BIOMEDICAL INSTRUMENTATION**

Paper Code: ETIC-403	L	T/P	С
Paper: Biomedical Instrumentation	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1.. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective:-The objective of teaching this subject is to make students understand the applications of electronics in diagnostic and therapeutic area. Further the methods of recording various bio potentials; measurement of biochemical and physiological information are explained. The topics such as Patient Monitoring systems, Audiometers, imaging systems, Patients safety are also included. The emerging Computer Applications in Biomedical field are also dealt with.

#### UNIT I

**Biomedical signals & Physiological transducers:** Source of biomedical signal, Origin of bioelectric signals, recording electrodes, Electrodes for ECG, EMG & EEG .Physiological transducers: Pressure, Temperature, photoelectric & ultrasound Transducers. Measurement in Respiratory system: Physiology of respiratory system, Measurement of breathing mechanics Spiro meter, Respiratory therapy equipments Inhalators ventilators & Respirators, Humidifiers, Nebulizers Aspirators, Biomedical recorders: ECG, EEG & EMG.

#### UNIT II

Patient Monitoring systems & Audiometers: Cardiac monitor, Bedside patient monitor, measurement of heart rate, blood pressure, temperature, respiration rate, Arrhythmia monitor, Methods of monitoring fatal heart rate, Monitoring labor activity. Audiometers: Audiometers, Blood cell counters, Oximeter, Blood flow meter, cardiac output measurement, Blood gas analyzers.

[T1, T2][No of Hours:-11]

#### UNIT III

Modern Imaging systems: Introduction, Basic principle & Block diagram of x-ray machine, x- ray Computed Tomography (CT), Magnetic resonance imaging system (NMR), ultrasonic imaging system. Eco-Cardiograph, Eco Encephalography, Ophthalmic scans, MRI. Therapeutic Equipments: Cardiac pacemakers, cardiac defibrillators, Hemodialysis machine, Surgical diathermy machine. [T1, T2][No of Hours:-11]

#### UNIT III

Patients safety & Computer Applications in Biomedical field: Precaution, safety codes for electro medical equipment, Electric safety analyzer, Testing of biomedical equipment, Use of microprocessors in medical instruments, Microcontrollers, PC based medical instruments, Computerized Critical care units, Planning & designing a computerized critical care unit. Physiotherapy: Software Diathermy, microwave diathermy, Ultrasound therapy unit. Electrotherapy Equipments, Ventilators.

#### Text Books:

- [T1] Joseph J. Carr & John M. Brown, "Introduction to Biomedical Equipment Technology", Pearson.
- [T2] Shakti Chatterjee, "Textbook of Biomedical Instrumentation System", Cengage Learning

#### **Reference Books:**

- [R1] R.S.Khandpur, "Hand book of Biomedical Instrumentation", TMH
- [R2] Walter Welko- Witiz and Sid Doutsch, "Biomedical Instruments: Theory and Design" Wiley
- [R3] Lesile Cromwell, Fred J. Weibell & Erich A. Pfeiffer, "Biomedical Instrumentation & Measurements", PHI

### [T1, T2][No of Hours:-11]

#### **DIGITAL SYSTEM DESIGN**

Paper Code: ETEC-427	L	T/P	С
Paper: Digital System Design	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To enhance the knowledge and skill of the students in digital system design with emphasis on Hardware Description Language (VHDL HDL)

#### UNIT I

Introduction to VHDL, design units, data objects, signal drivers, inertial and transport delays, delta delay, VHDL data types, concurrent and sequential statements. Subprograms – Functions, Procedures, attributes, generio, generate, package, IEEE standard logic library, file I/O, test bench, component declaration, instantiation, configuration.

#### UNIT II

Combinational logic circuit design and VHDL implementation of following circuits –first adder, Subtractor, decoder, encoder, multiplexer, ALU, barrel shifter, 4X4 key board encoder, multiplier, divider, Hamming code encoder and correction circuits.

[T1][No. of Hrs.: 10]

[T1][No. of Hrs.: 12]

#### UNIT III

Synchronous sequential circuits design – finite state machines, Mealy and Moore, state assignments, design and VHDL implementation of FSMs, Linear feedback shift register (Pseudorandom and CRC).

[T2][No. of Hrs.: 10]

#### UNIT IV

Asynchronous sequential circuit design – primitive flow table, concept of race, critical race and hazards, design issues like metastability, synchronizers, clock skew and timing considerations

Introduction to place & route process, Introduction to ROM, PLA, PAL, Architecture of CPLD (Xilinx/Altera).
[T2][No. of Hrs.: 12]

## Text Books:

- [T1] Douglas Perry,"VHDL" 4th Edition, TMH
- [T2] Stephen Brown, Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL design", TMH.

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#### **Reference Books:**

- [R1] Charles. H.Roth ,"Digital System Design using VHDL", PWS (1998)
- [R2] John F. Wakerley, "Digital Design Principles And Practices", Pearson Education
- [R3] Navabi Z, "VHDL-Analysis & Modelling of Digital Systems", McGraw Hill.
- [R4] William I. Fletcher, "An Engineering Approach To Digital Design", Prentice Hall
- [R5] Bhasker, "A VHDL Primmer", Prentice Hall 1995.

#### POWER LINE CARRIER COMMUNICATION

Paper Code: ETEE-431	L	T/P	С
Paper: Power Line Carrier Communication	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the knowledge of communication through power lines.

#### UNIT- I

Channel Characterization: Introduction, channel modelling fundamentals, model for outdoor channel, models for indoor channels, noise and disturbances ,measuring techniques, PLC channel emulation tools. Coupling: Introduction, filtering basics, transformer and capacitor coupler design, impedance adaptation concepts. [T1,T2] [No. of hrs. 11]

#### UNIT- II

**Digital Transmission Techniques:** Introduction, Architecture of PLC system, Narrowband and broadband PLC systems, Modulation and coding for narrow band and broad band PLC systems, Error Handling.

#### UNIT- III

**PLC Networks :** Introduction, Organisation and structure of PLC networks, Media Access Control layer, Multiple Access Schemes, Protocols for PLC, Traffic control, Supporting Energy Management Systems, Quality of service(QOS), International standards on PLC networking Technology.

[T1,T2][No. of hrs. 11]

[T1,T2] [No. of hrs. 11]

#### UNIT-IV

Systems and Implementations: PLC smart grid systems, PLC broadband Access systems, Multimedia PLC systems, DC-PLC systems, PLC in emerging countries

[T1,T2] [No. of hrs. 11]

#### Text:

- [T1] Hendrik C. Ferreira, Lutz Lampe John Newbury, Theo G.Swart, "PLC: theory and Applications for narrow band and broad band communication over power lines". Wiley and Sons.
- [T2] Halid Hrasnica, Abdelfatteh Haidine, Ralf Lehnert" Broad Band Power line Communications: Network Design" Wiley and sons.

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#### **References**:

[R1] Gilbert Held,"Understanding Broadband over Power line", Auerbach Publications.

# Scheme and Syllabi for B. Tech-EEE, 1<sup>st</sup> year (Common to all branches) **w.e.f batch 2014-15** and (2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> years) **w.e.f batch 2013-14** approved in the 22<sup>nd</sup> BOS of USET on 30<sup>th</sup> June, 2014 and approved in the 37<sup>th</sup> AC Sub Committee Meeting held on 10<sup>th</sup> July, 2014.

#### ELECTRICAL MACHINES DESIGN

Paper Code: ETEL-405	L	T/P	С
Paper: Electrical Machines Design	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

**Objective:** Providing sound knowledge about the principles of operation of various electrical machines, their constructional features, and their behavior and Design concepts of various components of each electrical machine so that machines after manufacturing operate at optimum efficiency and economy under various condition of operation.

#### UNIT I

**General Concepts:** Major considerations in Design of Electrical Machines Electrical Engineering Materials, Space factor, Choice of Specific Electrical and Magnetic loadings, Thermal considerations, Heat flow, Temperature rise, Rating of machines, Standard specifications.

DC Machines : Output Equations, Main Dimensions, Magnetic circuit calculations, Carter's Coefficient, Net length of Iron, Real & Apparent flux densities, Selection of number of poles, Design of Armature, Design of commutated and brushes, performance prediction using design values.
[T1, T2][No. of Hrs. 10]

#### UNIT II

**Transformers:** Output Equations, Main Dimensions, KVA output for single and three phase transformers, Window space factor, Overall dimensions, Operating characteristics, Regulation, No load current, Temperature rise in Transformers, Design of Tank, Methods of cooling of Transformers.

[T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

#### UNIT III

**Induction Motors:** Output equation of Induction motor, Main dimensions, Length of air gap, Rules for selecting rotor slots of squirrel cage machines, Design of rotor bars & slots, Design of end rings, Design of wound rotor, Magnetic leakage calculations, leakage reactance of poly phase machines, Magnetizing current, Short circuit current, Circle diagram, Operating characteristics.

#### UNIT IV

**Synchronous Machines:** Output equations, choice of loadings, Design of salient pole machines, Short circuit ratio, shape of pole face, Armature design, Armature parameters, Estimation of air gap length, Design of rotor, Design of damper winding, Determination of full load field mmf, Design of field winding, Design of turbo alternators, Rotor design.

#### Text Books:

- [T1] Electrical Machine Design the Design and Specification of Direct and Alternating Current Machinery, Alexander Gray, Nabu Press, First reprint edition, 2014
- [T2] Electric Machines Steady State, Transients, and Design with MATLAB, IonBoldea, Lucian Tutelea, CRC Press, Taylor & Francis, First edition, 2010.

#### Reference

- [R1] Principles of Electrical Machine Designs with Computer Programmes, Sen, S.K., Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi, 1987.
- [R2] Electrical Machine Design Data Book, A. Shanmugasundaram, G. Gangadharan, R. Palani, New Age International Pvt. Ltd., Reprint 2007.
- [R3] Design and Testing of Electrical Machines, M.V. Deshpande, PHI, 2013.
- [R4] Sawhney, A.K., 'A Course in Electrical Machine Design', Dhanpat Rai & Co., New Delhi, 6<sup>th</sup> Edition, 2013.

#### SOCIOLOGY AND ELEMENTS OF INDIAN HISTORY FOR ENGINEERS

Paper Code: ETHS-419	L	T/P	С
Paper: Sociology and Elements of Indian History for Engineers	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

#### UNIT I

*Module 1A*: Introduction to Elements of Indian History: What is History? History Sources-Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.

[3 Lectures] Module 1B: Introduction to sociological concepts-structure, system, organization, social institution, Culture social stratification (caste, class, gender, power). State & civil society.

> [7 Lectures] [T1][No. of Hrs. 10]

#### UNIT II

*Module 2A:* Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.

[3 Lectures] Module 2B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim. [7 Lectures]

#### UNIT III

*Module 3A:* From Feudalism to colonialism-the coming of British; Modernity & struggle for independence. [3 Lectures]

Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[9 Lectures] [T1][No. of Hrs. 12]

[T1][No. of Hrs. 13]

[T1][No. of Hrs. 10]

#### UNIT IV

*Module 4A:* Issues & concerns in post-colonial India (upto 1991); Issues & concerns in post-colonial India 2<sup>nd</sup> phase (LPG decade post 1991).

[3 Lectures]

*Module 4B:* Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.
[10 Lectures]

IIVERSI

#### Text Books:

- [T1] Desai, A.R. (2005), Social Background of Indian Nationalism, Popular Prakashan.
- [T2] Giddens, A (2009), Sociology, Polity, 6<sup>th</sup> Edition

#### Reference Books:

- [R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan
- [R2] Haralambos M, RM Heald, M Holborn, (2000), Sociology, Collins

#### **ELECTRICAL DRIVES LAB**

Paper Code: ETEE-451	L	T/P	С
Paper: Electrical Drives Lab	0	2	1

#### List of Experiments:

- 1. Load equalization by flywheel for intermittent duty loads.
- 2. Comparison of various braking methods and their range of braking for induction motor.
- 3. Open loop AC voltage Control of single phase capacitor run induction motor.
- Verification of linear relationship between duty cycle vs speed in open loop step down chopper controlled DC motor drive.
- 5. Single phase thyristorised full converter fed closed loop speed control of DC motor drive.
- 6. Closed loop speed control of 4 quadrant DC motor drive.
- 7. Closed Loop constant v/f speed control of Induction motor drive.
- 8. Closed Loop speed control through static rotor resistance controlled slip ring Induction motor.
- 9. Closed loop speed control of **BLDC** motor drive.
- 10. Closed Loop speed control of SRM drive.

NOTE:- At least 8 Exp<mark>eriment</mark>s out of the list must be done in the semester.



#### ADVANCED CONTROL SYSTEMS LAB

Paper Code: ETEE-453	L	T/P	С
Paper: Advanced Control Systems Lab	0	2	1

#### List of Experiments:

- 1. Study of open loop and closed loop time/ frequency responses of first/second order LTI system
- 2. Conversion of transfer functions to state model of LTI system and vice versa
- 3. Determine State Space Model of a given system and determine its controllability and observability.
- 4. Analysis of Zero order hold and first order hold circuits.
- 5. Conversion of transfer functions to state model of discrete time system.
- 6. To determine state transition matrix of a given system.
- 7. Study of saturation and dead zone non-linearity using describing function technique of a relay control system.
- 8. To draw phase trajectory of a given non-linear system.
- 9. Experiments based on PLC applications e.g. Lift control models, pick and place module etc.
- 10. Study of operation of a stepper motor interface with microprocessor.

NOTE:- At least 8 Experiments out of the list must be done in the semester.



#### ELECTRICAL MACHINES DESIGN LAB

Paper Code: ETEE-455(ELECTIVE)	L	Т	С
Paper: Electrical Machines Design Lab	3	0	3

#### **List of Experiments:**

To design the following parts of the electrical machines by using C++/MATLAB or any other related software.

- 1. Design of Armature
- 2. Design of Commutator
- 3. Design of Armature winding
- 4. Design of Magnetic Core of Transformer
- 5. Design of rotor bars and slots of squirrel cage induction motor
- 6. Design of rotor core of slip ring induction motor
- 7. Design of salient pole rotor of synchronous machine
- 8. Design of stator core and winding for synchronous machine
- 9. Design of rotor for turbo alternators
- 10. Design of damper winding

#### **Reference:**

[R1] Computer aided design of electrical machines by K.M. Vishnu Murthy, BS publications, Hyderabad, 2008.

NOTE:- At least 8 Experiments out of the list must be done in the semester.



#### **DIGITAL SYSTEM DESIGN LAB**

Paper Code: ETEE-455(ELECTIVE)	L	T/P	С
Paper: Digital System Design Lab	0	2	1

#### **List of Experiments:**

- 1. Design all gates using VHDL.
- Write VHDL programs for the following circuits, check the wave forms and the hardware generated

   a. half adder
  - b. full adder
- 3. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
  - c. multiplexer
  - d. demultiplexer

4. Write VHDL programs for the following circuits, check the wave forms and the hardware generated

- a. decoder b. encoder
- 5. Write a VHDL program for a comparator and check the wave forms and the hardware generated
- 6. Write a VHDL program for a code converter and check the wave forms and the hardware generated
- 7. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated
- 8. Write a VHDL program for a counter and check the wave forms and the hardware generated
- 9. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
  - a. register
    - b. shift register

NOTE:- At least 8 Experiments out of the list must be done in the semester.

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#### DATABASE MANAGEMENT SYSTEMS LAB

#### Paper Code: ETEE-455(ELECTIVE) Paper: Database Management Systems Lab

#### L T/P C 0 2 1

#### LAB BASED ON DBMS

Lab includes implementation of DDL, DCL, DML i.e SQL in Oracle.

#### List of Experiments:

- 1. Design a Database and create required tables. For e.g. Bank, College Database
- 2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- 3. Write a SQL statement for implementing ALTER, UPDATE and DELETE
- 4. Write the queries to implement the joins
- 5. Write the queries for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()
- 6. Write the queries to implement the concept of Integrity constrains
- 7. Write the queries to create the views
- 8. Perform the queries for triggers
- 9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints

#### **TEXT BOOK:**

[T1] SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications

#### NOTE:- At least 8 Experiments out of the list must be done in the semester.



#### HUMAN VALUES & PROFESSIONAL ETHICS – II

Paper Code: ETHS-402	L	Т	С
Paper : Human Values & Professional Ethics-II	1	0	1

#### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Ouestion No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

3. Two internal sessional test of 10 marks each and one project report\* carrying 5 marks.

#### **Objectives:**

- 1. The main object of this paper is to inculcate the skills of ethical decision making and then to apply these skills to the real and current challenges of the engineering profession.
- To enable student to understand the need and importance of value-education and education for Human 2. Rights.
- 3. To acquaint students to the National and International values for Global development

#### UNIT I - Appraisal of Human Values and Professional Ethics:

Review of Universal Human Values: Truth, Love, Peace, Right conduct, Non violence, Justice and Responsibility, Living in harmony with 'SELF', Family, Society and Nature. Indian pluralism - the way of life of Islam, Buddhism, Christianity, Jainism, Sikhism and Hinduism, Greek - Roman and Chinese cultural values. Sensitization of Impact of Modern Education and Media on Values:

a) Impact of Science and Technology

b) Effects of Printed Media and Television on Values

c) Effects of computer aided media on Values (Internet, e-mail, Chat etc.)

d) Role of teacher in the preservation of tradition and culture.

e) Role of family, tradition & community prayers in value development.

Review of Professional Ethics: Accountability, Collegiality, Royalty, Responsibility and Ethics Living. Engineer as a role model for civil society, Living in harmony with 'NATURE', Four orders of living, their intercorrectness, Holistic technology (eco-friendly and sustainable technology).

### [T1] [T2] [R1] [R5] [R4][No. of Hrs. 03]

UNIT II – Engineers responsibility for safety: Safety and Risks, Risk and Cost, Risk benefit analysis, testing methods for safety. Engineer's Responsibility for Safety Social and Value dimensions of Technology - Technology Pessimism - The Perils of Technological Optimism – The

Promise of Technology – Computer Technology Privacy

Some Case Studies: Case Studies, BHOPAL Gas Tragedy, Nuclear Power Plant Disasters, Space Shuttle Challenger, Three Mile Island Accident, etc.

#### UNIT III – Global Issues:

Globalization and MNCs: International Trade, Issues.

Case Studies: Kelleg's, Satyam, Infosys Foundation, TATA Group of Companies

Business Ethics: Corporate Governance, Finance and Accounting, IPR.

Corporate Social Responsibility (CSR): Definition, Concept, ISO, CSR.

Environmental Ethics: Sustainable Development, Eco-System, Ozone depletion, Pollution.

Computer Ethics: Cyber Crimes, Data Stealing, Hacking, Embezzlement.

#### UNIT IV - Engineers Responsibilities and Rights and Ethical Codes:

Collegiality and loyalty, Conflict of interests, confidentiality, occupational crimes, professional rights, responsibilities. To boost industrial production with excellent quality and efficiency, To enhance national economy, To boost team spirit, Work Culture and feeling of job satisfaction, National integration, Examples of some illustrious professionals.

Need for Ethical Codes, Study of some sample codes such as institution of Electrical and Electronics Engineers, Computer Society of India etc., Ethical Audit.

Development and implementation of Codes: Oath to be taken by Engineering graduates and its importance\*\*. [T1] [T2] [R4][R2][No. of Hrs. 05]

## [T1] [T2] [R4] [R2][No. of Hrs. 03]

# [T1] [T2] [R4] [No. of Hrs. 05]

#### **Text Books:**

- [T1] Professional Ethics, R. Subramanian, Oxford University Press.
- [T2] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

#### **References Books:**

- [R1] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers" Manual by the same author
- [R2] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press
- [R3] Values Education: The paradigm shift, by Sri Satya Sai International Center for Human Values, New Delhi.
- [R4] Professional Ethics and Human Values M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi
- [R5] A Textbook on Professional Ethics and Human Values R.S. Naagarazan New Age International (P) Limited, Publishers New Delhi.
- [R6] Human Values & Professional Ethics- S B Gogate- Vikas publishing house PVT LTD New Delhi.
- [R7] Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill
- [R8] Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning
- [R9] PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications
- [R10] Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press
- [R11] Charles D Fleddermann, "Engineering Ethics", Prentice Hall.
- [R12] George Reynolds, "Ethics in Information Technology", Cengage Learning
- [R13] C, Sheshadri; The Source book of Value Education, NCERT
- [R14] M. Shery; Bhartiya Sanskriti, Agra (Dayalbagh)

\*Any topic related to the experience of the B.Tech student in the assimilation and implementation of human values and professional ethics during the past three years of his/her studies in the institute OR A rigorous ethical analysis of a recent case of violation of professional ethics particularly related to engineering profession.

\*\*All students are required to take OATH in writing prior to submission of major project and the record of the same is to be maintained at the college level and/or, this oath may be administered by the head of the institutions during the graduation ceremonies. The draft for the same is available along with the scheme and syllabus.

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#### **OATH TO BE TAKEN BY ENGINEERING GRADUATES**

In a manner similar to the Hippocratic Oath taken by the medical graduates, Oath to be taken by the engineering graduates is as given below.

- 1. I solemnly pledge myself to consecrate my life to the service of humanity.
- 2. I will give my teacher the respect and gratitude, which is their due.
- 3. I will be loyal to the profession of engineering and be just and generous to its members.
- 4. Whatever project I undertake, it will be for the good of mankind.
- 5. I will exercise my profession solely for the benefit of humanity and perform no act for criminal purpose and not contrary to the laws of humanity.
- 6. I will keep away from wrong, corruption and avoid tempting others to vicious practices.
- 7. I will endeavor to avoid waste and consumption of non-renewable resources.
- 8. I will speak out against evil and unjust practices whenever and wherever I encounter them.
- 9. I will not permit considerations of religion, nationality, race, party politics or social standing to intervene between my duty and my work, even under threat.
- 10. I will practice my profession with conscience, dignity and uprightness.
- 11. I will respect the secrets, which are confided to me.

I make these promises solemnly, freely and upon my honor.

	(Name of the Student
Correspondence Address:	
Email:	
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#### NEURO & FUZZY SYSTEMS

Paper Code: ETEE-404	L	T/P	С
Paper: Neuro & Fuzzy Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To impart knowledge of soft computing techniques and applications in engineering systems.

#### UNIT -I

Neural Networks: Fundamental of neural network, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning Methods, Learning Paradigms-Supervised, Unsupervised and reinforcement Learning, ANN training Algorithms-perceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perception Model, Radial Basis functions, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

#### UNIT-II

Fuzzy sets: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Extension principle and fuzzy relationsFuzzy Logic: Fuzzification and defuzzification, Membership Function, Linguistic Variables, Linguistic hedges, Fuzzy rules and reasoning, lamda cut-sets. Arithmetic operations on Fuzzy numbers.

#### UNIT-III

Fuzzy Inference System: Fuzzy Modeling, Mamdani Fuzzy model, TSK Fuzzy model, Fuzzy Controller, Industrial Applications.

Introduction of Neuro-Fuzzy Systems, Architecture of Neuro Fuzzy Networks, Hybrid learning algorithms, Neuro-fuzzy Control. [**T1, T2**][No. of Hrs. 11]

#### UNIT-IV

Introduction to Evolutionary Techniques: Genetic Algorithm, Basic Concepts, Flow Chart of GA, Genetic representations (Encoding), Initialization and Selection, Genetic Operators, Mutation, Generational Cycle, Convergence of GA and Applications.

[T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

#### Text Books:

[T1] Neural Network, Fuzzy Logic and Genetic Algorithms by S.Rajasekaran PHI Learning India 2011

[T2] Principles of Soft Computing by S. N. Sivanandam, S.N. Deepa, Wiley India.

#### References Books:

- [R1] Artificial Intelligence, Patricks Henry, Winston, Pearson Education, 2001
- [R2] Artificial Intelligence, Nilsson, Morgon, Kufmann 1998.
- [R3] Neuro-Fuzzy and Soft Computing by J.-S.R.Jung, c.T.Sun PHI Learning India 2011
- [R4] Hagan Demuth, Beale" Neural Network Design "Cengage Learning 2013
- [R5] S N Sivanandam, "Neural Network using Matlab" TMH 2013

#### **POWER SYSTEM OPERATION & CONTROL**

Paper Code: ETEE-406	L	T/P	С
Paper: Power System Operation & Control	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the importance of Optimal Control and Stability Concerns in Power Systems.

#### UNIT- I

### AUTOMATIC GENERATION CONTROL:

Introduction: Load frequency control (single area case), load frequency (Two Area Case) control, load frequency control with GRC, Speed Governor Dead Band and its effects.

UNIT- II

#### ECONOMIC LOAD DESPATCH:

Introduction, System constraint, Economic Dispatch Neglecting losses, Optimum load dispatch including transmission losses, Exact Transmission loss formula, Automatic load dispatching. [T1], [T2][No. of Hrs. 10]

#### UNIT- III

#### RESTRUCTURING OF POWER SYSTEM:

Introduction: Reason for restructuring or deregulation of power industry, Understanding the restructuring process, introduction to issues involved in deregulation, reasons and objectives of deregulation of various power system across the world, Transmission Congestion management.

[T3][No. of hrs. 10]

[T1][T2][T4][No. of hrs. 10]

[T1], [T2][No. of Hrs. 10]

#### UNIT-IV

#### REACTIVE POWER AND VOLTAGE CONTROL:

Bases of reactive power control, Excitation System, Modeling. Generation and Absorption of Reactive Power, Relation between voltage, power and reactive power at node, methods of voltage control.

#### Text Books:

- [T1] I.J. Nagrath & D.P. Kothari, Power System Engineering, Mc Graw Hill, 2007.
- [T2] S. Sivanagaraju, Power System Operation and Control, Pearson Education India, 2009.
- [T3] Loi Lei Lai "Power System Restructuring and deregulation: Trading Performance & Information Technology, John Wiley & Sons.

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[T4] Chakravarti & Halder, Power System Analysis: Operation & control Prentice Hall of India.

#### **Reference Books:**

- [R1] P.Kundur, Power System Control and Stability, Mc Graw Hill.
- [R2] Power System Stability Volume-I: E.W. Kimbark, John Wiley & Sons.
- [R3] Dr. K. Uma Rao, Power System: Operation and Control, Wiley-India.

#### **APPLICATION OF POWER ELECTRONICS TO POWER SYSTEMS**

Paper Code: ETEE-408	L	T/P	С
Paper: Application of Power Electronics to Power Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the basics of Application of Power Electronic to Power Systems that are required for an engineering student.

#### UNIT- I

**Overview of Power Quality :** Classification of power quality issues, characterization of electric power quality, power acceptability curves, power quality problems, poor load power factor, nonlinear and unbalanced loads, transients, voltage sags and swells, over voltages and under voltages, outage, harmonic distortion, voltage notching, flicker, electrical noise, power quality indices, distortion index, IEEE guidelines and recommendations, harmonics creating loads, characterization of nonlinear loads, modelling of nonlinear loads, harmonic prorogation series and parallel resonances, harmonic power flow.

#### UNIT- II

**Compensation of Power Quality Problems:** Passive Filters, various types, analysis and design, basics of P-Q theory, Clarke's and Park transformations (abc-dq), Synchronous Reference Frame theory (SRF), comparison between SRF and pq theory, application to 3 ph- 3 wire and 3ph-4wire system, harmonic, reactive power and current unbalance compensation by DSTATCOM, voltage regulation, distortion and voltage unbalance compensation by DVR, Hybrid power filters and Unified Power Quality Conditioner.

[T2][No. of hrs. 12]

[T3][No. of hrs. 11]

[T1][No. of hrs. 10]

[T2][No. of hrs. 11]

#### UNIT-III

**Compensation with FACTS Controllers:** Reactive power control in power systems, static series and shunt compensators, objectives of shunt and series compensation, methods of controllable VAR generation, Voltage sourced converters and current source converters, SVC and STATCOM for transmission lines, comparison between SVC and STATCOM, principles of TCSC and SSSC, basic operating principles of UPFC, applications for power flow control.

#### UNIT- IV

**DC** Power Transmission and System Control: Introduction, comparison of AC and DC transmission, application of DC transmission. General principles of DC link control, converter control characteristics, combined rectifier and inverter characteristics, alternative inverter control modes, mode stabilization, system control hierarchy, harmonics and filters.

#### Text:

- [T1] Padiyar, K.R, "HVDC power Transmission System", New Age Publication.
- [T2] Arindam Ghosh, Gerard Ledwich, "Power Quality Enhancement using custom Power Devices" Penguin Books Limited
- [T3] Mathur, Verma, "Thyristor-Based FACTS Controllers For Electrical Transmission System", Wiley India Publication

#### References:

- [R1] E. Acha, "Power Electronic control in Electrical Power System", Penguin Books Limited
- [R2] P. Kundur, "Power System Stability and Control " TMH Publication
- [R3] Lecture Series on Power Quality- NPTEL

#### DIGITAL IMAGE PROCESSING

Paper Code: ETIT-418	L	T/P	С
Paper: Digital Image Processing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The aim of this course is to provide digital image processing fundamentals, hardware and software, digitization, encoding, segmentation, feature extraction etc. It will enhance the ability of students to apply tools in image restoration, enhancement and compression and to apply the techniques in both the spatial and frequency domains. It will enhance the ability of students to identify the quality characteristics of medical images, differences between computer vision and image processing and help in studying the remote sensing images of the environmental studies.

#### UNIT-I:

Introduction and Digital Image Fundamentals: The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

**Image Enhancement in the Spatial Domain:** Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

[T1, T2][No. of Hrs: 10]

#### UNIT-II:

Filtering in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters.

**Image Restoration:** A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

#### UNIT-III:

**Image Compression**: fundamentals of compression, coding redundancy, Lossy and lossless compression, Spatial and temporal redundancy, Image compression models. Some basic compression methods

**Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Region Oriented Segmentation, Motion based segmentation.

#### UNIT- IV:

**Representation and Description:** Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms. **Object Recognition:** Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

#### Text Books:

- [T1] Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3<sup>Rd</sup> edition, Pearson Education, 2002.
- [T2] A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

#### **Reference Books:**

- [R1] Bernd Jahne, "Digital Image Processing", 5<sup>th</sup> Ed., Springer, 2002.
- [R2] William K Pratt, "Digital Image Processing: Piks Inside", John Wiley & Sons, 2001.

#### [T1, T2][No. of Hrs. 12]

### [T1, T2][No. of Hrs. 12]

#### [T1, T2][No. of Hrs: 10]

#### **RELIABILITY ENGINEERING & APPLICATION TO POWER SYSTEMS**

Paper Code: ETEE-412	L	T/P	С
Paper: Reliability Engineering & Application to Power Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the concept of probability theory and Reliability modelling of a generation system.

#### UNIT- I

#### Basics of Probability theory & Distribution:

Basic probability theory – rules for combining probabilities of events – Bernoulli's trials – probabilities density and distribution functions – binomial distribution – expected value and standard deviation of binomial distribution.

#### UNIT- II

#### Network Modelling and Reliability Analysis:

Analysis of Series, Parallel, Series-Parallel networks – complex networks – decomposition method. Reliability functions f(t), F(t), R(t), h(t) and their relationships – exponential distribution – Expected value and standard deviation of exponential distribution – Bath tub curve – reliability analysis of series parallel networks using exponential distribution – reliability measures MTTF, MTTR, MTBF.

[T1],[T2][No. of hrs. 10]

#### UNIT- III

Markov Modelling:

Markov chains – concept of stochastic transitional probability Matrix, Evaluation of limiting state Probabilities. – Markov processes one component repairable system – time dependent probability evaluation using Laplace transform approach – evaluation of limiting state probabilities using STPM – two component repairable models.

#### [T1][No. of hrs. 10]

#### UNIT-IV

#### Generation System Reliability Analysis:

Reliability model of a generation system- recursive relation for unit addition and removal – load modeling -Merging of generation load model – evaluation of transition rates for merged state model – cumulativeProbability, cumulative frequency of failure evaluation – LOLP, LOLE

#### [T1],[T2][No. of hrs. 10]

#### Text Books:

- [T1] Reliability Evaluation of Engg. System R. Billinton, R.N.Allan, Plenum Press, New York, reprinted in India by B.S.Publications, 2007.
- [T2] Reliability Evaluation of Power systems R. Billinton, R.N.Allan, Pitman Advance Publishing Program, New York, reprinted in India by B.S.Publications, 2007

#### **Reference Books:**

- [R1] Sharles E. Ebeling An Introduction to Reliability and Maintainability Engineering, McGraw Hill, 2006
- [R2] E. Balagurusamy, "Reliability Engineering", Tata McGraw Hill PC, 2002.

### [T1], [T2][No. of hrs. 10]

#### ELECTRICAL MACHINES-III

Paper Code: ETEE-414	L	T/P	С
Paper: Electrical Machines–III	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

**Objective:** Providing sound knowledge about the principles of operation of various electrical machines, their constructional features, and their behavior and characteristics under various conditions of operation.

#### UNIT I:

**Induction Generator:** Torque-speed characteristics of an Induction machine under generation mode, Line/grid Connected Induction Generator: Operation and Limitations, Self-Excited Induction Generator: Process of selfexcitation, conditions of self-excitation, critical capacitance curve, No load characteristics, load characteristics, frequency characteristics, Voltage characteristics improvement using additional terminal capacitors. Doubly fed Induction generator, Induction voltage regulator.

#### UNIT II:

**Stepper Motors:** Principle of operation, characteristics and analysis of variable reluctance, permanent magnet and hybrid stepper motors, torque equation, drive circuits and switching diagrams, Open-Loop Control of Stepper Motor, Microprocessor-Based Control of Stepper Motor.

Switched Reluctance Motors: Construction, principle of operation, torque production, modes of operation, drive circuits, microprocessor based control of SRM and sensor less control.

[T1, T2] [No. of Hrs. 10]

[T1, T2] [No. of Hrs. 10]

#### UNIT III:

**Permanent Magnet Machines:** Construction, working principle, torque equation, equivalent circuit, performance characteristics and applications of permanent magnet brushed DC motors (PMBDC), PMBLDC Motors, permanent magnet synchronous motors, reluctance motors, synchronous reluctance motors. DC and AC tacho generators.

#### UNIT IV:

**Special Electrical Machines:** Construction, principle of operation, characteristics and analysis of fractional horse power universal motor, hysteresis motor. Construction, principle of operation of Linear Induction Motors and applications,

#### [T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 10]

#### Text Books:

- [T1] Electric Machinery, A Fitzgerald, Charles Kingsley, Stephen Umans, Tata McGraw Hill Education, 6<sup>th</sup> edition, 2002
- [T2] Special Electrical Machines by K Venkatratnam, Universities Press 2014

#### **Reference Books:**

- [R1] Electric Machines Steady State, Transients, and Design with MATLAB, IonBoldea, Lucian Tutelea, CRC Press, Taylor & Francis, First edition, 2010.
- [R2] Dynamic Simulations of Electric Machinery: Using MATLAB/SIMULINK, <u>Chee-Mun Ong</u>, Prentice Hall, 1<sup>st</sup> edition, 1997
- [R3] Principles of Electrical Machines and Power Electronics, P.C. Sen, John Wiley, 2002.
- [R4] Special Electrical Machines, E.G. Janardanan, PHI, 2014.
- [R5] Generalized Theory of Electrical Machines, P.S. Bimbhra, Khanna Publishers.
- [R6] Special Electrical Machines by K Venkatratnam, Universities Press 2014

#### ELECTRICAL ENERGY CONSERVATION

Paper Code: ETEE-416	L	T/P	С
Paper: Electrical Energy Conservation	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS :**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objectives: To impart knowledge on Electrical energy conservation, energy auditing and power quality, Principle and design of illumination systems and methods of heating and their performance.

#### UNIT I

#### Energy Conservation and Energy Policies

Energy policies of India and their development, Central and estate Policies on the consumption and wastage of energy, need of renewable energy in India, Energy efficiency, Energy accounting, monitoring and control, Electricity audit and related instruments, Energy consumption models, Specific Energy Consumption, ECO assessment and Evaluation methods Energy conservation schemes, Investment in energy saving equipments, subsidies and tax rebates, Development of Energy Management System. [T1,R1][No. of Hrs. 10]

#### UNIT II

#### **Energy Conservation in Electrical Installations**

Electric loads of air conditioning and refrigeration, Energy conservation, Power consumption in compressors, Energy conservation measures, Electrolytic process, Electric heating, Furnace operation and scheduling, Transformer loading ,efficiency analysis, Feeder loss evaluation, Reactive Power, Power factor and its improvement, Capacitor sizing, Capacitor losses, location, placement and maintenance, Case studies.

[T1,R1][No. of Hrs. 10]

#### UNIT III

#### Energy Efficient Motors

Types and operating characteristics of electric motors, Energy efficient control and starting – Load matching, Selection of motors, Efficiency and load analysis, Energy efficiency, High efficiency motors, Industrial drives, Control schemes, Variable speed drives and Energy conservation schemes, Pumps and fans, Efficient control strategies, Over-sizing Case studies.

#### [T1,R1][No. of Hrs. 10]

[T2,R5][No. of Hrs. 10]

#### UNIT IV

#### Energy Efficient Building / Green Building

Energy Conservation in Buildings Air conditioning, monitoring and control systems of energy efficient buildings. Principle of Energy efficient building design water heading system, photovoltaic systems and Energy conservation in lighting schemes, Energy efficient light sources, Domestic, commercial and industrial lighting, Lighting controls, Luminaries.

#### Text Books:-

- [T1] H. Partab, "Art and Science of Utilisation of Electrical Energy", Pritam.
- [T2] S.C. Tripathy, "Electric Energy Utilization and Conservation", Tata McGraw Hill

#### **Reference Books:**

- [R1] Bureau of Energy efficiency of India.
- [R2] IEEE Bronze Book: IEEE Standard 739-1984 Recommended Practice for Energy Conservation and Cost Effective Planning in Industrial Facilities, IEEE Publications, 1996.
- [R3] A.P.W. Thumann: Plant Engineers and Managers Guide to Energy conservation, 7e, UNR, 1977.
- [R4] W.C. Turner, Energy Management Handbook, 2e, Fairmont press, 1993.
- [R5] UNESCAP Guide Book on Promotion of Sustainable Energy Consumption.

#### POWER SYSTEM ANALYSIS & STABILITY

Paper Code: ETEL-402	L	T/P	С
Paper: Power System Analysis & Stability	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with detailed study of flow of power in the network, subsequent faults and the stability limits in the system.

#### UNIT- I

#### LOAD FLOW STUDIES

Type of buses , bus admittance method , load flow equation , GS method , NR method , Fast decoupled load flow.
[T1], [T2], [T3][No. of hrs. 10]

#### UNIT- II

#### FAULT CALCULATIONS

Symmetrical Components, symmetrical faults, unsymmetrical faults, Sequence networks for synchronous Machines, Transformers and Transmission Line, Sequence impedance.

#### UNIT- III

#### POWER SYSTEM STABILITY

Introduction, swing equation, steady state stability, equal area criteria, critical clearing angle, point by point method, factors affecting Steady State and Transient Stability and Methods of Improvements.

[T1], [T2], [T3][No. of hrs. 10]

[T1], [T2], [T3][No. of hrs. 10]

**MAXIMUM MARKS: 75** 

#### UNIT-IV

#### OPTIMAL POWER FLOW

Problem statement, solution of optimal power flow, gradient method, Newton method, Linear sensitivity analysis, LP methods- with real power variables only, LP method with ac power flow variable and detailed cost functions, security constraint optimal power flow

Text Books:

[T1], [T2], [T3][No. of hrs. 10]

[T1] J. J. Grainger & W.D. Stevenson , Power System Analysis, TMH Publication, 2006.

- [T2] D.P. Kothari& I.J. Nagrath, Power System Engineering, TMH Publication, 2007.
- [T3] P.Kundur, Power system stability and control, TMH Publication.

#### **Reference Books:**

[R1] Computer- Aided Power System Analysis, George L. Kusic, PHI Publication.

- [R2] Hadi Saadat, Power System Analysis, PSA Publishing, 2010.
- [R3] D.P. Kothari, INagrath, Modern Power System Analysis, TMH Publication.
- [R4] L.P Singh, Advanced power system analysis and dynamics, New age International Ltd.
- [R5] C. L. Wadhwa, Electrical Power Systems, New age International Ltd.

### UNIVERSIIT

#### ELECTRICAL SYSTEM DESIGN

Paper Code: ETEE-418	L	T/P	С
Paper: Electrical System Design	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marls

Objective: The objective of the paper is to facilitate the student with detailed Design aspects of Electrical Systems.

#### UNIT-I

Design of D.C Machines: Design specifications – output equation – output coefficient – specific loadings – choice of speed and number of poles – calculation of D and L – Armature design – choice of type of winding – number of sots – number of conductors per slot – current density – cross sectional area – slot insulation – length of air gap – field winding design – field ampere turns – excitation voltage per coil – conductor cross section – height of pole – design of ventilating ducts – design of commutator and brushes – Carter's coefficient – real and apparent flux density.

#### [T1],[T2][No. of hrs. 10]

Transformers: Design – single phase and three phase – output equation – specific magnetic loading – core design – single, stepped core – windings – number of turns – current density – area of cross section of conductors – types of coils – insulation – window area – window space factor – overall dimensions – cooling – design of cooling tank with tubes – design of distribution and power transformers – design of small transformers like 230V/6-0-6V. Heating, cooling and temperature rise calculation – Continuous, short time and intermittent rating.

#### [T1][T2][No. of hrs. 10]

#### UNIT-III

UNIT-II

Design of Synchronous Machines: Specific loading – output equation – output coefficient – main dimensions – types of winding – design of field system – turbo alternator – main dimensions – stator design – rotor design – damper winding design – comparison of water wheel and turbo alternators, cooling of turbo alternator.

Design of three phase Induction motors: output equation – output coefficient – main dimensions – rotor bar currents.

#### [T1],[T2][No. of hrs. 10]

#### UNIT-IV

Estimate the quantity of materials required and draw the electrical wiring layout of (a) residential building (b) Multi-storied building using rising mains (c) factory with one number of small and high rating motor at LT of HT supply and many number of connected loads with suitable starters/switches and control panels (d) Cinema hall design, layout and estimation of power supply arrangement for (1). A bulk Industrial consumer (2) An Over head line underground power supply (3) An to а rural consumer. Estimate and draw the layout of (1) indoor (2) outdoor 11KV transformer station with all accessories - single line diagram and physical layout Design and draw the typical earthing installation like (1) pipe earthing (2) Plate earthing (3) earth mat/grid.

#### Text Books:

[T1],[T2][No. of hrs. 10]

- [T1] A.K Sawhney, "Electrical Machine Design", 4<sup>th</sup> Edition, Dhanpat Rai & Sons.
- [T2] M.G Say, "Performance and Design of A.C Machines", CBS Publisher.

#### Reference Books:

- [R1] Performance and Design of D.C Machine: Clayton
- [R2] Design of Electrical Machines: V. N Mittal

#### EMBEDDED SYSTEMS

Paper Code: ETIC-410	L	T/P	С
Paper: Embedded Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to enable a student to design an embedded system for specific tasks..

#### UNIT- I

**Overview of Embedded Systems:** Characteristics of Embedded Systems, Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 micro controllers.

PIC Microcontrollers: Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals. [T1][No. of hrs. 12]

#### UNIT- II

ARM Processors: Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture.

Bus structure: Time multiplexing, serial, parallel communication bus structure. Bus arbitration, DMA, PCI. AMBA, I2C and SPI Buses.

[T2][No. of hrs. 12]

#### UNIT-III

Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System

[T3][No. of hrs. 10]

[T3][No. of hrs. 10]

#### **UNIT-IV**

RTOS: Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RT-Linux introduction, RTOS kernel, Real-Time Scheduling.

#### Text book:

- Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002 [T1]
- ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss, [T2] Dominic Symes, Chris Wright, , Morgan Kaufman Publication, 2004.
- [T3] Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

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#### **References Books:**

- [R1] The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
- [R2] Embedded System Design, Marwedel ,Peter , Kluwer Publishers , 2004.

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#### **DATA COMMUNICATION & NETWORKS**

Paper Code: ETEC-420	L	T/P	С
Paper: Data Communication & Networks	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of the paper is to provide an introduction to the fundamental concepts on data communication and the design, deployment, and management of computer networks.

#### UNIT- I

**Data Communications :** Components, protocols and standards, Network and Protocol Architecture, Reference Model ISO-OSI, TCP/IP-Overview ,topology, transmission mode, digital signals, digital to digital encoding, digital data transmission, DTE-DCE interface, interface standards, modems, cable modem, transmission mediaguided and unguided, transmission impairment, Performance, wavelength and Shannon capacity. Review of Error Detection and Correction codes.

Switching: Circuit switching (space-division, time division and space-time division), packet switching (virtual circuit and Datagram approach), message switching.

#### UNIT- II

**Data Link Layer:** Design issues, Data Link Control and Protocols: Flow and Error Control, Stop-and-wait ARQ. Sliding window protocol, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to –Point Access: PPP Point – to-Point Protocol, PPP Stack,

**Medium Access Sub layer:** Channel allocation problem, Controlled Access, Channelization, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Token ring, Token Bus, FDDI based LAN, Network Devices-repeaters, hubs, switches bridges.

#### [T1, T2,R1][No. of Hours: 11]

[T1, T2, R1, R4] [No. of Hours: 11]

#### UNIT- III

**Network Layer:** Design issues, Routing algorithms, Congestion control algorithms, Host to Host Delivery: Internetworking, addressing and routing, IP addressing (class full & Classless), Subnet, Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6.

[T1, T2,R1][No. of Hours: 11]

[T2, T1, R1, R4][No. of Hours: 11]

#### UNIT- IV

**Transport Layer:** Process to Process Delivery: UDP; TCP, congestion control and Quality of service. **Application Layer:** Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP), file transfer (FTP), HTTP and WWW.

#### Text Books:

- [T1] A. S. Tannenbum, D. Wetherall, "Computer Networks", Prentice Hall, Pearson, 5<sup>th</sup> Ed
- [T2] Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, 4<sup>th</sup> Ed

#### **Reference Books:**

- [R1] Fred Halsall, "Computer Networks", Addison Wesley Pub. Co. 1996.
- [R2] Larry L, Peterson and Bruce S. Davie, "Computer Networks: A system Approach", Elsevier, 4 Ed
- [R3] Tomasi, "Introduction To Data Communications & Networking", Pearson 7<sup>th</sup> impression 2011
- [R4] William Stallings, "Data and Computer Communications", Prentice Hall, Imprint of Pearson, 9<sup>th</sup> Ed.
- [R5] Zheng, "Network for Computer Scientists & Engineers", Oxford University Press
- [R6] Data Communications and Networking: White, Cengage Learning

#### **OBJECT ORIENTED PROGRAMMING USING C++**

Paper Code: ETCS-430	L	T/P	С
Paper: Object Oriented Programming Using C++	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

*Objective: The objective of the paper is to facilitate the student with the basics of Object Oriented Programming that are required for an engineering student.* 

#### UNIT- I

Object oriented programming concepts, Benefits of OOP, Applications of OOP, Introduction to C++, History of C++, Structure of C++, Difference between C and C++, Basic data types, Derived data types, Symbolic constants., Dynamic initialization, Type modifiers, Type Casting, Operator and control statements, Input and Output statements in C++. Classes and objects, class specification, member function specification, scope resolution operator, Access qualifiers, Instance creation, Member functions. Function prototyping, Function components, Passing parameters, call by reference, Return by reference, Inline functions, Default arguments, Overloaded function.

#### [T1], [T2][No. of hrs. 12]

#### UNIT- II

Array of objects, pointers to objects, this pointer, Dynamic allocation operators, Dynamic objects., Constructors, default constructor, Parameterized constructors, Constructor with dynamic allocation, copy constructor, destructors, operator overloading, friend functions, overloading through friend functions, overloading the assignment operator, static members Objects, pointers and objects, constant objects, nested classes, local classes

[T1],[T2][No. of hrs. 11]

#### UNIT- III

Inheritance, Defining derived classes, Single inheritance, protected data with private inheritance, multiple inheritance, multi level inheritance, hierarchical inheritance, hybrid inheritance, multipath inheritance, Constructors in derived and base class, Abstract classes, virtual function and dynamic polymorphism, pure virtual functions, virtual destructor, Exception Handling, principle of Exception handling, Exception handling mechanism, multiple catch, Nested try, Rethrowing the exception.

#### UNIT-IV

Streams in C++, Stream classes, Formatted and Unformatted data, manipulators, User defined manipulators, file streams, file pointer manipulation, file open and close, Templates, Template functions and Template classes.

#### [T1],[T2] [No. of hrs. 10]

[T1], [T2][No. of hrs. 12]

#### Text Books:

- [T1] S. B. Lippman & J. Lajoie, "C ++ Primer" 3<sup>rd</sup> Edition, Addison Wesley, 2000.
- [T2] A.R. Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH.
- [T2]. R. Lafore, "Object Oriented Programming using C++", BPB Publications.

#### **References:**

- [R1] A.K. Sharma," Object Oriented Programming," Pearson Publication, 2014
- [R2] Schildt Herbert, "C++ Programming", 2<sup>nd</sup> Edition, Wiley DreamTech.
- [R3] D. Parasons, "Object Oriented Programming with C++", BPB Publication.
- [R4] Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication.
- [R5] Yashwant Kanethkar, "Object Oriented Programming using C++", BPB Publications.
- [R6[ B. Stroustrup, "The C++ Programming language", Third edition, Pearson Education.

#### POWER PLANT INSTRUMENTATION

Paper Code: ETEE-426	L	T/P	С
Paper: Power Plant Instrumentation	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

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#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with detailed survey of methods of power generation, monitoring and control. 11

#### UNIT I

Power plant: Unit, overview, Types of boiler, Exhaust Gas Boilers and Incinerators, turbine generators, condensers, material handling systems. Comparison of thermal power plant, hydroelectric power plant, Nuclear power plant, solar power plant, Wind power plant.

#### UNIT II

Boiler Instrumentation: Control and optimization, Combustion control, air to fuel ratio control, 3-element drum level control, steam temperature and pressure control, oxygen/CO2 in flue gases, furnace draft, boiler interlocks, sequence event recorder, supervisor control, data acquisition controls, burner management systems and controllers. Start-up and shut-down procedures, Boiler safety standard, Boiler inspection procedures. Boiler load calculation, boiler efficiency calculation.

#### [T1], [T2][No. of hrs. 10]

[T1],[T2][No. of hrs. 10]

#### **UNIT IIII**

UNIT IV

Turbine instrumentation and control, start-up and shut-down, thermal stress control, condition monitoring & power distribution instrumentation. Synchronous, Induction generators.

#### [T1], [T2][No. of hrs. 10]

Hydroelectric power generation, regulation & monitoring of voltage & frequency of output power. Pollution & effluent monitoring & control. Energy Management, electrical sub-station controls

Power Generation using non-conventional energy sources viz. Wind Power, solar Power, Tidal Power, Plant safety & redundancies. Nuclear Power Generation & control Station. Diesel Generator Controls.

#### [T1], [T2][No. of hrs. 10]

#### Text Books:

- E. L. Wakil, M. M. Power Plant Technology, McGraw Hill [T1]
- [T2] Krishnaswamy/Ponni Bala, Power Plant Instrumentation, PHI Learning

#### Reference Books:

An Introduction to Reliability and Maintainability Engineering. Sharles E. Ebeling, McGraw Hill [R1]

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E. Balagurusamy, "Reliability Engineering", Tata McGraw Hill PC, 1984. [R2]

#### INTELLIGENT AND SMART INSTRUMENTATION

Paper Code ETEE-428	L	T/P	С
Paper: Intelligent and Smart Instrumentation	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective:- To introduce modern devices and techniques used in instrumentations, especially in automation and critical applications.

#### UNIT-I

Recent Trends in Sensor Technologies: Introduction; Film sensors (Thick film sensors, Thin film sensors); Semiconductor IC technology – standard methods; Microelectro-mechanical systems (Micro-machining, some application examples); Nano-sensors. Bulk Micromachining. Micromachining Surface Micromachining. Other Micromachining Techniques. (LIGA Process) Micromilling. Micromachined Materials, Digital transducers. [T1][T2][No. of Hrs. 12]

#### UNIT-II

Sensors:- Primary sensors; Excitation; Amplification; Filters; Converters; Compensation (Nonlinearty: look up table method, polygon interpolation, polynomial interpolation, cubic spline interpolation, Approximation & regression; Noise & interference; Response time; Drift; Cross-sensitivity); Information Coding/ Processing; Data Communication; Standards for smart sensor interface.

#### [T1][T2][No. of Hrs. 11]

**UNIT-III VI and Data Acquisition:** Introduction to virtual Instrumentation, VI programming using LabVIEW, Signal Conditioning, DAQ Hardware Configuration, DAQ Hardware, DAQ Software Architecture, DAQ Assistant, Channel and Task configuration, Selecting and Configuring a DAQ device, Serial interfacing - RS 232C, RS 422, RS 423, RS 485.

#### [T2][No. of Hrs. 12]

#### UNIT IV

**Instrumentation Systems:** Types of Instrumentation systems, Intelligent Instrumentation, Component of Intelligent Instrumentation System, Concept of real time system and its industrial application, realization of real time system using microcontroller and typical applications.

[T2][No. of Hrs. 10]

#### Text Books:

- [T1] Mathivanan, "PC Based Instrumentation", 1<sup>st</sup> Ed., PHI
- [T2] D.Patranabis, "sensors and Transducers" 2<sup>nd</sup> Edition, PHI

#### **Reference Books:-**

- [R1] J.Jerome, "Virtual Instrumentation using LabVIEW", PHI
- [R2] P.Rai Choudhury, MEMS and MOEMS Technology and Application, PHI
- [R3] Barney, "Intelligent Instrumentation, Microprocessor Applications in measurement and Control", PHI

6 .

[R4] M.Bhuyan, "Intelligent Instrumentation: Principles and Applications", CRC Press

#### DIGITAL COMMUNICATION

Paper Code: ETEC-430	L	T/P	С
Paper: Digital Communication	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enable the students

- 1. To distinguish between analog and digital communication.
  - . To understand the concept of digital communication system.
- 3. To understand the concept of random variables and random process.
- 4. To learn the digital modulation techniques.

#### UNIT- I

#### Introduction to Digital Communication:

Line coding: NRZ, RZ, Manchester encoding, differential Manchester encoding, AMI coding, high density bipolar code, binary with n-zero substitution codes,

Review of sampling theorem, uniform and non- uniform quantization, companding,  $\mu$  Law and A- law compressors, Concept and Analysis of PCM, DPCM, DM and ADM modulators and demodulators, M-ary waveforms, S/N ratio for all modulation, probability of error for PCM in AWGN Channel and other modulation techniques, Duo Binary pulse.

[T1, R2][No. of Hours: 11]

### UNIT- II

### Random Signal Theory:

Probability, Concept of Random variable (Stationary, Non stationary, WSS, SSS), Random process, CDF, PDF, Joint CDF, Joint PDF, marginal PDF, Mean, Moments, Central Moment Auto-correlation & Cross-correlation, covariance functions, ergodicity, power spectral density, Gaussian distribution, Uniform distribution, Rayleigh distribution, Binomial distribution, Poisson's distribution, Weiner distribution, Wiener-khinchin theorem, Central limit Theorem.

#### [T1, T2, R2][No. of Hours: 11]

#### UNIT- III

#### **Designing of Receiver:**

Analysis of digital receiver, Prediction Filter, Design and Property of Matched filter, Correlator Receiver, Orthogonal Signal, Gram-Schmidt Orthogonalization Procedure, Maximum likelihood receiver, Coherent receiver design, Inter Symbol Interference, Eye Pattern.

[T1, T2, R1, R2][No. of Hours: 11]

[T1, T2, R2][No. of Hours: 11]

#### UNIT- IV

#### Digital modulation schemes:

Coherent Binary Schemes: ASK, FSK, PSK, QPSK, MSK, G-MSK. Coherent M-ary Schemes, Incoherent Schemes (DPSK and DEPSK), Calculation of average probability of error for different modulation schemes, Power spectra of digitally modulated signals, Performance comparison of different digital modulation schemes. Review of 2 Latest Research Paper.

#### Text Books:

- [T1] Simon Haykin, "Communication Systems" John Wiley & Sons, Inc, 4th Edition.
- [T2] Taub Schilling, "Principles of Communication Systems" TMH, 2nd Edition

#### **Reference Books:**

- [R1] George Kennedy, "Communication System" TMH 4th Edition
- [R2] B. P. Lathi, "Modern Digital and Analog Communication System" Oxford University Press 3rd Edition.
- [R3] Digital Communications by John G.Proakis; McGraw Hill.

#### ELECTRICAL POWER QUALITY

Paper Code: ETEE-432	L	T/P	С
Paper: Electrical Power Quality	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the importance of Power Quality and methods to improve it that are required in the power industry.

#### UNIT I

Introduction: Power Quality (PQ), PQ problems, Sags, Swells, Transients, Harmonics, Interruptions, Flicker, Voltage fluctuations, Notch. PQ Issues, Assessing PQ: Remedies -Customer side of meter, Utility side of the meter. Power quality monitoring – Monitoring considerations, Historical Perspective of PQ Measuring Instruments, PQ measurement equipment, Assessment of PQ measurement data, Application of intelligent systems, PQ monitoring standards.

#### UNIT II

Voltage Sag Analysis: Voltage sag characteristics - Methodology for computation of voltage sag magnitude and occurrence — Accuracy of sag analysis — Duration & frequency of sags — Faults behind transformers — Effect of pre-fault voltage — Simple examples — Voltage dip problems, fast assessment methods for voltage sags in distribution systems.

#### [T1],[T2],[T3][No. of hrs. 10]

[T1],[T2],[T3][No. of hrs. 10]

PQ Consideration in Industrial Power Systems: Adjustable speed drive (ASD) systems and applications — Sources of power system harmonics — Mitigation of harmonics — Characterization of voltage sags experienced by three-phase ASD systems — Types of sags and phase angle jumps — Effects of momentary voltage dips on the operation of induction and synchronous motors.

#### UNIT IV

Harmonics: Harmonic distortion, Voltage versus current distortion, Harmonics versus Transients, Harmonic Indices, Harmonic sources from commercial loads, Harmonic sources from industrial loads, Locating Harmonic sources, System response characteristics, Effects of Harmonic distortion, Inter harmonics, Devices for controlling harmonic distortion.

#### [T1],[T2],[T3][No. of hrs. 10]

[T1],[T2],[T3][No. of hrs. 10]

#### Text Books:

- [T1] Math H.J. Bollen, Understanding Power Quality Problems, IEEE Press, 1999.
- [T2] Roger C.Dugan, Mark F.McGranaghan, Surya Santoso, H.Wayne Beaty, Electrical Power Systems Quality, Second Edition, Tata McGraw-Hill Edition.
- [T3] C.Sankaran, Power Quality, CRC Press, 2002.

#### **References Books:**

- [R1] N. G. Hingonani, Gyugi, Understanding FACTS concepts, Technology of flexible AC Transmission systems, IEEE Press, 1999
- [R2] T.J.E Milles Reactive Power Control in electric systems, John Wiley & Sons 1982
- [R3] J. Arrillaga, D.A Bradely and P.S. Bodger, Power System Harmonics. New York: Wiley, 1985

#### NEURO & FUZZY SYSTEMS LAB

Paper Code: ETEE-452	L	T/P	С
Paper: Neuro & Fuzzy System Lab	0	2	1

#### List of Experiments:

- Design a neural network using neural network toolbox, which identify the given data set. P= [0 1 2 3 4 5 6 7 8 9 10]; (Given input data) T= [0 1 2 3 4 3 2 1 2 3 4]; (Given output data)
- 2. Write a program to implement AND function using perception networks with bipolar inputs and outputs.
- 3. Write a program to implement AND function using ADALINE with bipolar inputs and outputs.
- 4. Implement a Back Propagation network for a given input pattern by a suitable MATLAB program. Perform 3 epochs of operation.
- 5. Write a program to construct and test auto-associative network for input vector using HEBB/Outer Product Rule.
- 6. Write a program to construct and test hetero associative network for binary inputs and targets using HEBB/Outer Product Rule
- 7. Consider the following fuzzy sets

$$A = \left\{ \frac{1}{2} + \frac{0.4}{3} + \frac{0.6}{4} + \frac{0.3}{5} \right\}$$
$$B = \left\{ \frac{0.3}{2} + \frac{0.2}{3} + \frac{0.6}{4} + \frac{0.5}{5} \right\}$$

Calculate  $A \cup B, A \cap B, A, B$ , by using a MATLAB program.

8. Find the fuzzy relation using fuzzy max-min method for the following Using MATLAB program

0.2	0.3	0.4	~	0.1	1	
0.3	0.5	0.7	S=	0.4	0.2	
1	0.8	0.6		0.3	0.7	

- 9. Using MATLAB programming to draw triangular and Gaussian membership function. Given x=0 to 10 with increment of 0.1. Triangular membership function is defined between [5 6 7] and Gaussian membership is defined between 2 and 4.
- 10. Using MATLAB program find the crisp lambda cut set relation for lambda=0.6.

The	e fuzzy	matrix	cis giv	en by:	PA
			0.8		120
R=	1	0.7	0.4 1	0.2	NIV
К-	0	0.6	1	0.5	
	0.1	0.5	1	0.9	

11. Write a Matlab program/GATOOL for maximizing/minimizing a function.

12. Design a Controller using Fuzzy /Neural Network/ANFIS Editor

#### NOTE:- At least 8 Experiments out of the list must be done in the semester.

#### ELECTRICAL ENERGY CONSERVATION LAB

Paper Code: ETEE-454 (ELECTIVE)	L	T/P	С
Paper: Electrical Energy Conservation	0	2	1

#### **List of Experiments:**

- 1. Experimental study of solar PV pumping system.
- 2. Experimental study of solar lighting systems.
- 3. Efficiency evaluation of pumps/fans/compressors.
- 4. Power quality measurements of electrical appliances.
- 5. Design of measurement and control systems using virtual instrumentation software for motors, PV and lighting systems.
- 6. Life Cycle Analysis (LCA) using software.
- 7. Building energy analysis using software.

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.

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#### ELECTRICAL MACHINES-III LAB

Paper Code: ETEE-454 (ELECTIVE)	L	T/P	С
Paper: Electrical Machines–III Lab	0	2	1

#### List of Experiments:

EXP. 1 To plot following characteristics of self-excited Induction generator.

- a) No load characteristics (terminal capacitance vs. induced voltage at no load and constant speed)
- b) Load characteristics (terminal voltage vs. load current at fixed terminal capacitance & constant speed).
- c) Frequency characteristics (frequency of generated voltage vs. resistive load current at constant speed)
- EXP. 2 To plot load-voltage characteristics of doubly fed Induction generator.
- EXP. 3 To Study Induction voltage regulator.
- EXP. 4 To draw torque speed characteristic of variable reluctance motor.
- EXP. 5 To control the Speed of stepper motor.

EXP. 6 To draw the torque speed characteristic of hysteresis motor.

- EXP. 7 To draw the torque speed characteristic of universal motor.
- EXP. 8 To draw the torque speed characteristic of repulsion motor.
- EXP. 9 To draw the torque speed characteristic of linear induction motor.
- EXP. 10 To draw the Torque speed characteristic of doubly fed induction motor.

#### **Reference Books:**

R1. Laboratory Operations for Rotating Electric Machinery and Transformer Technology, Donald V. Richardson, Prentice Hall, 1980

R2. Electric Machinery Experiments: Laboratory Practices and Simulation Studies, Sailendra Nath Bhadra, Alpha Science International Ltd, 2013

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#### NOTE:- At least 8 Experiments out of the list must be done in the semester.

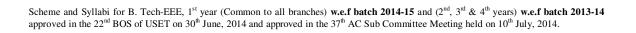
#### EMBEDDED SYSTEMS LAB

Paper Code: ETEE-454 (ELECTIVE)	L	T/P	С
Paper: Embedded Systems Lab	0	2	1

#### **List of Experiments:**

- 1. Introduction to microcontroller and interfacing modules.
- 2. To interface the seven segment display with microcontroller 8051
- 3. To create a series of moving lights using PIC on LEDs.
- 4. To interface the stepper motor with microcontroller.
- 5. To display character 'A' on 8\*8 LED Matrix.
- 6. Write an ALP to add 16 bits using ARM 7 Processor
- 7. Write an ALP for multiplying two 32 bit numbers using ARM Processor
- 8. Write an ALP to multiply two matrices using ARM processor

NOTE:- At least 8 Experiments out of the list must be done in the semester.



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### SCHEME OF EXAMINATION

and

SYLLABI	
for HHR	
Bachelor of Technology Electronics and Communication Engineering	

Offered by

## University School of Engineering and Technology

# 1<sup>st</sup> SEMESTER TO 8<sup>th</sup> SEMESTER



Guru Gobind Singh Indraprastha University Dwarka, Delhi – 110078 [INDIA] www.ipu.ac.in

#### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) FIRST SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	PERS					•
ETMA-101		Applied Mathematics-I	3	1	4	M
ETPH-103		Applied Physics-I	2	1	3	М
ETME-105		Manufacturing Processes	3	0	3	М
ETEE-107		Electrical Technology	3	0	3	М
ETHS-109		Human Values and Professional Ethics-I#	1	1	1	
ETCS-111	- 11	Fundamentals of Computing	2	0	2	
ETCH-113	X	Applied Chemistry	2	1	3	М
PRACTICAL	L/VIVA VOC	E		C.		
ETPH-151	77.0	Applied Physics Lab-I		2	1	l
ETEE-153		Electrical Technology Lab		2	1	М
ETME-155		Workshop Practice		3	2	М
ETME-157		Engineering Graphics Lab		3	2	
ETCS-157		Fundamentals of Computing Lab		2	1	
ETCH-161		Applied Chemistry Lab		2	1	
		NCC/NSS*#				
TOTAL			16	18	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

#### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) SECOND SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PAI	PERS					
ETMA-102		Applied Mathematics-II	3	1	4	М
ETPH-104		Applied Physics-II	2	1	3	
ETEC-106		Electronic Devices	3	0	3	М
ETCS-108	(	Introduction to Programming	3	0	3	М
ETME-110	(1)	Engineering Mechanics	2		3	
ETHS-112		Communication Skills	2	Ð.	3	
ETEN-114	× 6.	Environmental Studies	2	1	3	
PRACTICAL/	VIVA VOCE		1			
ETPH-152		Applied Physics Lab-II		2	1	
ETCS-154		Programming Lab		2	1	М
ETEC-156		Electronic Devices Lab		2	1	М
ETME-158		Engineering Mechanics Lab		2	1	
ETEN-160		Environmental Studies Lab		2	1	
		NCC/NSS*#				
TOTAL	<u> </u>		17	15	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

#### BACHELOR OF TECHNOLOGY (ELECTRONICS AND COMMUNICATION ENGINEERING) THIRD SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY I	PAPERS					
ETMA-201		Applied Mathematics – III	3	1	4	
ETEC-203		Analog Electronics - I	3	1	4	М
ETEC-205		Switching Theory and Logic Design	3	1	4	М
ETEC-207		Electronic Instruments and Measurements	3	1	4	М
ETCS-209	X	Data Structures	3	1	4	
ETEC-211	1	Signals and Systems	3	1	4	
PRACTICA	AL/VIVA VO	СЕ				
ETEC-251		*Analog Electronics-I Lab	0	2	1	
ETEC-253		Switching Theory and Logic Design Lab	0	2	1	
ETEC-257		Electronic Instruments and Measurements Lab	0	2	1	
ETCS-255		Data Structures Lab	0	2	1	
ETEC-259		Signals and Systems Lab *	0	2	1	
		NCC/NSS**	0	0	0	
TOTAL	1		18	16	29	

M: Mandatory for award of degree

\* Some lab experiments must be performed using any circuit simulation software e.g. PSPICE/Scilab/MATLAB/LabVIEW etc.

\*\* NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

#### BACHELOR OF TECHNOLOGY (ELECTRONICS AND COMMUNICATION ENGINEERING) FOURTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credit s	Status
THEORY PA	PERS					
ETMA 202		Applied Mathematics – IV	3	1	4	
ETEC 204		Analog Electronics – II	3	1	4	
ETEC 206		Network Analysis and Synthesis	3	1	4	М
ETEC 212		Communication Systems	3	1	4	М
ETEE 210		Electromagnetic Field Theory	3	0	3	
ETCS 204		Computer Organization and Architecture	3	0	3	
PRACTICAL	/VIVA VOCE			<u>S</u>		
ETMA 252		Applied Mathematics Lab	0	2	1	
ETEC 258		Network Analysis and Synthesis Lab	0	2	1	
ETEC 256		Communication System Lab	0	2	1	
ETEC 254		Analog Electronics – II Lab*	0	2	1	
ETCS 260		Computer Organization and Architecture Lab	0	2	1	
ETSS 250		NCC/NSS**	0	0	1	
TOTAL		·	18	14	28	

M: Mandatory for award of degree

\* Some lab experiments must be performed using any circuit simulation software e.g. PSPICE/Scilab/MATLAB/LabVIEW etc.

\*\* NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

**NOTE:** 4 weeks Industrial / In-house Electronic Workshop/PCB making and assembling/Use of CAD software (Lab needs to be developed) will be held after fourth semester. However, Viva-Voce will be conducted in the fifth semester.

#### BACHELOR OF TECHNOLOGY (ELECTRONICS AND COMMUNICATION ENGINEERING) FIFTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	PERS			•	•	•
ETHS-301		Communication Skills for Professionals	2	0	1	
ETEC-303		Digital Communication	3	1	4	М
ETEC-305		Microprocessors and Microcontrollers	3	1	4	М
ETEL-307		Control Systems	3	1	4	М
ETEC-309	0	Digital System Design	3		4	М
ETMS-311		Industrial Management	3	0	3	
PRACTICAI	/VIVA VOC	E		Y	$\sim$	
ETHS-351		Communication Skills for Professionals Lab	0	2	1	
ETEC-351		Digital System Design Lab	0	2	1	
ETEL-355		Control Systems Lab	0	2	1	
ETEC-355		Microprocessors and Microcontrollers Lab	0	2	1	
ETEC-357		Digital Communication Lab	0	2	1	
ETEC-359		Industrial training / In-house electronics Workshop#	0	0	1	
TOTAL		1	17	14	26	

M: Mandatory for award of degree

#Viva-Voce for evaluation of Industrial Training / In-house electronics workshop will be conducted in this semester.

**Note:** Minimum of 2 weeks of In-house training related to ECE will be held after 5<sup>th</sup> semester; however, viva-voce will be conducted in 6<sup>th</sup> Semester (ETEC 360).

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY P	APERS					
ETEC 302		Microwave Engineering	3	1	4	М
ETEC 304		Information Theory and Coding	3	1	4	
ETEC 306		Digital Signal Processing	3	1	4	М
ETEC 308		VLSI Design	3	1	4	М
ETEC 310		Data Communication and Networks	3	1	4	М
ETEC 314	X	Antenna and Wave Propagation	3	1	4	
PRACTICA	L/VIVA VO	CE		19	2	
ETEC 352	///\	Microwave Engineering Lab	0	2	1	
ETEC 354		VLSI Design Lab	0	2	1	
ETEC 356		Digital Signal Processing Lab	0	2	1	
ETEC 358		Data Communication Network Lab	0	2	1	
ETEC 360		Industrial/In-house Training#	0	0	1	
TOTAL			18	14	29	

**BACHELOR OF TECHNOLOGY** (ELECTRONICS AND COMMUNICATION ENGINEERING) SIXTH SEMESTER EXAMINATION

M: Mandatory for award of degree

Note: Minimum of 4-6 weeks of industrial training related to ECE will be held after 6<sup>th</sup> semester; however, viva-

voce will be conducted in  $7^{\text{th}}$  Semester (ETEC 461). **Important:-** Elective Paper will be offered in  $7^{\text{th}}$  Semester, if at-least one-third of the total students opt for the same. It is advised that the decision about the elective subject for  $7^{\text{th}}$  Semester is done before the  $15^{\text{th}}$  April every year before end of 6<sup>th</sup> semester.

#### BACHELOR OF TECHNOLOGY (ELECTRONICS AND COMMUNICATION ENGINEERING) SEVENTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits
THEORY PAP	ERS				•
ETEC-401		Embedded Systems	3	1	4
ETEC-403		Onte de stranice and Oction	3	1	4
ETEC-405		Optoelectronics and Optical Communication	3	1	4
ETEC-405		Wireless Communication	3	1	4
	LECT ANY I	WO (ONE FROM EACH GROUP)			
#GROUP-A	11				
ETEC-407	2	Advanced DSP	3	0	3
ETEC-409		Introduction to MEMS	3	0	3
ETEC-411	20	Advanced VLSI Design	3	0	3
ETIC-403		Biomedical Instrumentation	3	0	3
ETEE-413		PLC and SCADA Systems	3	0	3
ETEE-415		Power Electronics	3	0	3
ETEC-417		RF Devices and Circuits	3	0	3
ETCS-425		Database Management System	3	0	3
ETEE-419		Renewable Energy Resources	3	0	3
#GROUP-B					
ETEC-419		Radar and Navigation	3	0	3
ETMS-421		Project Management	3	0	3
ETMS-423		Economics for Engineers	3	0	3
ETIT-425		Grid Computing	3	0	3
ETCS-427		Parallel Computing	3	0	3
ETHS-419		Sociology and Elements of Indian History	3	0	3
		for Engineers			
ETEC 429		Selected topics in ECE**	3	0	3
PRACTICAL/V	IVA VOCE			-	
ETEC-451		Optical and Wireless Communication Lab	0	2	1
ETEC-453		Embedded System Lab	0	2	1
ETEC-455		Lab Based on Elective I and/or II	0	2	1
ETEC-457		Seminar	0	2	1
ETEC-459		Minor Project <sup>+</sup>	0	6	3
ETEC-461		Industrial Training <sup>@</sup>	0	0	1
TOTAL			15	17	26

\*\*Syllabus may be revised after 2 years.

+ The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.

@ Industrial training was conducted after sixth semester. However, Viva-Voce for evaluation of Industrial Training will be conducted in this semester.

**Important :-** #Elective Paper will be floated if atleast one-third of the total students opt for the same. It is advised that the decision about the elective subject is done before 15<sup>th</sup> November every year before end of seventh semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

#### BACHELOR OF TECHNOLOGY (ELECTRONICS AND COMMUNICATION ENGINEERING) EIGHTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits
THEORY PA	PERS	·			
ETHS-402		Human Values and Professional Ethics-II	1	0	1
ETEC-404		Satellite Communication	3	1	4
ETEC-406		Ad Hoc and Sensor Networks	3	0	3
ELECTIVE- SI	ELECT ANY	TWO (ONE FROM EACH GROUP)	I.		
#GROUP – A		2161 1177			
ETEC-408	5	Consumer Electronics	3	0	3
ETIT418	10	Digital Image Processing	3	0	3
ETEC-412		ASIC Design	3	0	3
ETIT-402		Mobile Computing	3	0	3
ETEC 416		Introduction to Nanotechnology	3	0	3
#GROUP-B				•	
ETIT-422		GPS and GIS	3	0	3
ETEC-424		Adaptive Signal Processing	3	0	3
ETMT-402		Robotics	3	0	3
ETIC-428		Computer Graphics and Multimedia	3	0	3
ETEC-428		Next Generation Networks	3	0	3
PRACTICAL	VIVA VOCE	•	1	1	1
ETEC-452		Satellite and Antenna Lab	0	2	1
ETEC-454		Practical Based on Elective or Compulsory Subject	0	2	1
ETEC-456		Major Project*	0	12	8
FOTAL			13	17	24
					1

#Elective Paper will be floated if atleast one-third of the total students opt for the same. It is advised that the decision about the elective subject is done before 15<sup>th</sup> November every year before end of seventh semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

\*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to major project should be delivered before one month, after the start of the Semester. The progress will be monitored through seminars and progress reports.

#### NOTE:

- 1. Total number of the credits of the B.Tech. (ECE) Programme = 216.
- 2. Each student shall be required to appear for examinations in all the papers. However, for the award of the degree a student shall be required to earn minimum of 200 credits including Mandatory papers (M).

### FOR LATERAL ENTRY STUDENTS:

- 1. Total number of the credits of the B.Tech. (ECE) Programme = 162.
- 2. Each student shall be required to appear for examinations in all the papers Third Semester onwards. However, for the award of the degree a student shall be required to earn minimum of 150 credits, including mandatory papers (M).

#### NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF B.TECH AND M.TECH

- 1. ET stands for Engineering and Technology.
- 2. PE stands for Power Engineering.
- **3. ME** stands for Mechanical Engineering.
- 4. MT stands for Mechatronics.
- 5. AT stands for Mechanical and Automation Engineering.
- 6. EE stands for Electrical and Electronics Engineering.
- 7. EL stands for Electrical Engineering.
- 8. IT stands for Information Technology
- 9. CS stands for Computer Science and Engineering
- 10. CE stands for Civil Engineering
- 11. EC stands for Electronics and Communications Engineering.
- 12. EN stands for Environmental Engineering
- **13. TE** stands for Tool Engineering
- **14. MA** stands for Mathematics
- 15. HS stands for Humanities and Social Sciences
- 16. SS stands for Social Services

С

4

#### APPLIED MATHEMATICS-I

# Paper Code : ETMA-101LTPaper : Applied Mathematics-I31

# INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks. 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.

#### UNIT- I

Successive differentiation: Leibnitz theorem for  $n^{th}$  derivative (without proof). Infinite series: Convergence and divergence of infinite series, positive terms infinite series, necessary condition, comparison test (Limit test), D'Alembert ratio test, Integral Test, Cauchy's root test, Raabe's test and Logarithmic test(without proof). Alternating series, Leibnitz test, conditional and absolutely convergence. Taylor's and Maclaurin's expansion(without proof) of function ( $e^x$ , log(1+x), cos x, sin x) with remainder terms ,Taylor's and Maclaurin's series, Error and approximation.

#### UNIT- II

Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar

Integration: integration using reduction formula for curves.

 $\int_0^{\frac{\pi}{2}} \sin^n\theta \,d\theta \,, \int_0^{\frac{\pi}{2}} \cos^n\theta d\theta$ 

. Application of integration : Area under the curve, length of the curve, volumes and surface area of solids of revolution about axis only .Gamma and Beta functions.

#### [T1],[T2][No. of hrs. 12]

[T1], [T2][No. of hrs. 12]

#### UNIT- III

**UNIT-IV** 

Matrices: Orthogonal matrix, Hermitian matrix, Skew-Hermitian matrix and Unitary matrix. Inverse of matrix by Gauss-Jordan Method (without proof). Rank of matrix by echelon and Normal (canonical) form. Linear dependence and linear independence of vectors. Consistency and inconsistency of linear system of homogeneous and non homogeneous equations . Eigen values and Eigen vectors. Properties of Eigen values (without proof). Cayley-Hamilton theorem (without proof). Diagonlization of matrix. Quadratic form, reduction of quadratic form to canonical form.

#### [T1], [T2][No. of hrs. 12]

Ordinary differential equations: First order linear differential equations, Leibnitz and Bernaulli's equation. Exact differential equations, Equations reducible to exact differential equations. Linear differential equation of higher order with constant coefficients, Homogeneous and non homogeneous differential equations reducible to linear differential equations with constant coefficients. Method of variation of parameters. Bessel's and Legendre's equations (without series solutions), Bessel's and Legendre's functions and their properties.

#### [T1],[T2][No. of hrs. 12]

#### Text:

- [T1] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
- [T2]. R. K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications.

#### **References:**

- [R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [R2] G.Hadley, "Linear Algebra" Narosa Publication
- [R3] N.M. Kapoor, "A Text Book of Differential Equations", Pitambar publication.
- [R4] Wylie R, "Advance Engineering mathematics", McGraw-Hill
- [R5] Schaum's Outline on Linear Algebra, Tata McGraw-Hill
- [R6] Polking and Arnold, "Ordinary Differential Equation using MatLab" Pearson.

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Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

С

3

#### <u>APPLIED PHYSICS – I</u>

#### Paper Code: ETPH – 103 L Paper: Applied Physics - I 2

INSTRUCTIONS TO PAPER SETTERS:	MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus.	This question should have objective or
short answer type questions. It should be of 25 marks.	
2. Apart from Question No. 1, rest of the paper shall consist of four unit	ts as per the syllabus. Every unit should
have two sweetland Henry at deat were he sched to attempt only 1	mand in farmer and mult Each mand in

have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

#### UNIT I

Interference: Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings.

Diffraction: Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra.

#### [T1], [T2](No. of Hrs. 8)

Т

1

#### **UNIT II**

Polarization: Introduction, Uniaxial crystals, Double refraction, Nicol prism, Quarter and half wave plates, Theory of production of plane, circularly and elliptically polarized lights, Specific rotation, Laurents half shade polarimeter.

Laser: Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its principle, He-Ne laser.

Fibre optics: Introduction, Single mode fibre, Step index and graded index multimode fibres, Acceptance angle and numerical aperture.

#### [T1], [T2](No. of Hrs. 8)

#### UNIT III

Theory of Relativity: Introduction, Frame of reference, Galilean transformation, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Mass energy relation

Ultrasonics: Introduction, Production of ultrasonics by magnetostriction and Piezoelectric methods, Applications.

#### [T1], [T2](No. of Hrs. 8)

UNIT IV

Nuclear Physics: Introduction, Radioactivity, Alpha decay, Beta decay, Gamma decay, Q value, Threshold energy, Nuclear reactions, Nuclear fission: Liquid drop model, Nuclear fusion, Particle accelerators: Linear accelerator, Cyclotron, Radiation detectors: Ionization chamber, Geiger Mueller Counter.

[T1](No. of Hrs. 8)

#### **Text Books:**

[T1]. Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009

A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6th Edition, 2013. [T2].

#### **Reference Books**

- A. Ghatak 'Optics', TMH, 5th Edition, 2013 [R1].
- G. Aruldhas 'Engineering Physics' PHI 1<sup>st</sup> Edition, 2010. [R2].
- Fundamentals of Optics : Jenkins and White, Latest Edition [R3].
- C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I. [R4].
- Feynman "The Feynman lectures on Physics Pearson Volume 3 Millennium Edition, 2013 [R5].
- Uma Mukhrji 'Engineering Physics' Narosa, 3<sup>rd</sup> Edition, 2010. [R6].
- H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], 1st Edition, 2009. [R7].

#### MANUFACTURING PROCESSES

Pa	per Code: ETME-105	L	Т	С
Pa	per: Manufacturing Processes	3	0	3
IN	STRUCTIONS TO PAPER SETTERS:	MAXIMU	JM MAI	RKS: 75
1.	Question No. 1 should be compulsory and cover the entire syllabus. This question	tion should	have ob	jective or
	short answer type questions. It should be of 25 marks.			
	short answer type questions. It should be of 25 marks.		-	

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: The Objective of the paper is to facilitate the student with the basic Manufacturing processes.* Unit-I

**Introduction**: Introduction of Manufacturing processes and their classification, Basic Metals & Alloys : Properties and Applications. Properties of Materials: Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness and hardness. Ferrous Materials: Carbon steels, its classification based on % carbon as low, mild, medium & high carbon steel, its properties & applications. Wrought iron. Cast iron. Alloy steels: stainless steel, tool steel. Elementary introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching & tempering and case- hardening.

Non-Ferrous metals & alloys: Properties and uses of various non-ferrous metals & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys such as Duralumin.

#### **Casting Processes:**

Principles of metal casting, Pattern materials, types and allowance, composition and properties of moulding sand, foundry tools, concept of cores and core print, elements of gating system, description and operation of cupola, special casting processes e.g. die-casting; permanent mould casting; centrifugal casting; investment casting; casting defects.

#### (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>) [No. of Hrs.12]

#### UNIT-II

#### **Smithy and Forging:**

Hot working and cold working, Forging tools and equipments, Forging operations, Forging types: Smith forging, Drop forging, Press forging, Machine forging; Forging defects; Extrusion, wire drawing, swaging.

#### **BENCH WORK AND FITTING:**

Fitting shop tools, operation: Fitting; sawing; chipping; thread cutting (with taps and dies); Marking and marking tools.

#### (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>) [No. of Hrs. 12]

#### Unit-III

**Metal joining:** Welding principles, classification of welding techniques, Oxyacetylene Gas welding, equipment and field of application, Arc-welding, metal arc, Carbon arc welding, submerged arc welding and atomic hydrogen welding, TIG and MIG welding, Electric resistance welding: spot; seam; flash; butt and percussion welding, Flux: composition; properties and function, Electrodes, Types of joints and edge preparation, Brazing and soldering, welding defects.

#### (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>)[No. of Hrs. 12]

#### Unit-IV

#### Sheet Metal Work:

Tools and equipments used in sheet metal work, metals used for sheets, standard specification for sheets, Types of sheet metal operations: shearing, drawing, bending. Other operations like spinning, stretch forming, embossing and coining.

**Powder Metallurgy:** Introduction of powder metallurgy process: powder production, blending, compaction, sintering.

#### **Text Books:**

- [T1]. Manufacturing Process by Raghuvanshi.(Dhanpat Rai and Co.)
- [T2]. Manufacturing Technology by P.N.Rao (TMH publications)

#### **Reference Books:**

- [R1]. Workshop Technology by Hazra-Chowdhary (Media Promoters and Publishers Pvt. Ltd.)
- [R2]. Production Engineering by R.K.Jain (Khanna Publishers)
- [R3]. Workshop Technology by Chapman (Elsevier Butterworth-Heinemann)
- [R4] Fundamentals of Modern Manufacturing by Mikell P. Groover (Wiley India Edition)
- [R5] Manufacturing Processes for Engineering Materials by Kalpakjian and Schmid (Pearson)

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#### (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>)[No. of Hrs. 12]

#### **ELECTRICAL TECHNOLOGY**

Paper Code: ETEE-107	L	Т	С
Paper : Electrical Technology	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

- 1. This is first introductory course in electrical technology to the students of all the branches of engineering in first year.
- 2. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 3. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To provide exposure to the students in respects of the basics of different aspects of electrical engineering with emphasis on constructional, measurement and applications of various types of instruments and equipments.

#### **UNIT – I: DC Circuits**

Introduction of Circuit parameters and energy sources (Dependent and Independent), Mesh and Nodal Analysis, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer and Millman's Theorems, Star-Delta Transformation and their Applications to the Analysis of DC circuits.

#### UNIT – II: A.C.Circuits

A.C. Fundamentals, Phasor representation, Steady State Response of Series and Parallel R-L, R-C and R-L-C circuits using j-notation, Series and Parallel resonance of RLC Circuits, Quality factor, Bandwidth, Complex Power, Introduction to balanced 3-phase circuits with Star- Delta Connections.

#### **UNIT – III: Measuring Instruments**

Basics of measuring instruments and their types ,Working principles and applications of moving coil, moving iron (ammeter & voltmeter) and Extension of their ranges, dynamometer- type Wattmeter , induction-type Energy Meter , Two-wattmeter method for the measurement of power in three phase circuits, Introduction to digital voltmeter, digital Multimeter and Electronic Energy Meter.

#### **UNIT – IV: Transformer and Rotating Machines**

Fundamentals of Magnetic Circuits, Hysteresis and Eddy current losses, working principle, equivalent circuit, efficiency and voltage regulation of single phase transformer and its applications. Introduction to DC and Induction motors (both three phase and single phase), Stepper Motor and Permanent Magnet Brushless DC Motor.

#### **Text Books:**

[T1] S.N Singh, "Basic Electrical Engineering" PHI India Ed 2012

[T2] Chakrabarti, Chanda, Nath "Basic Electrical Engineering" TMH India", Ed 2012.

#### **Reference Books:**

[R1] William Hayt "Engineering Circuit Analysis" TMH India Ed 2012

[R2] Giorgio Rizzoni "Principles and Application of Electrical Engineering" Fifth Edition TMH India.

# [T1],[T2][No. of Hrs. 14]

[T1],[T2][No. of Hrs. 11]

#### [T1],[T2],[R2][No. of Hrs. 12]

[T1],[T2],[R2][No. of Hrs. 11]

#### Maximum Marks: 75

#### HUMAN VALUES & PROFESSIONAL ETHICS

Paper Code: ETHS-109	L	Т	C
Paper : Human Values & Professional Ethics	1	1	1
Non-University Examination Scheme (NUES)			

Note: There will be no End-Term External University Examination. Marks are to be given on the basis of two internal sessional test of 30 marks each and one final Viva-voce project report Examination of 40 marks.

#### **Objectives:**

This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to a. ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a holistic perspective among students towards life, profession and b. happiness, based on the correct understanding of the Human reality and the rest of the Existence. Such a Holistic perspective forms the basis of value-based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, c. trustful and mutually satisfying human behaviour and mutually enriching interaction with Nature.

#### **UNIT-1: Introduction to Value Education**

1. Understanding the need, basic guidelines, content and process for value education.

2. Basic Human Aspirations: Prosperity and happiness

3. Methods to fulfil the human aspirations – understanding and living in harmony at various levels.

4. Practice Session – 1.

#### **UNIT-2: Harmony in the Human Being**

1. Co-existence of the sentient "I" and the material body – understanding their needs – Happiness & Conveniences.

2. Understanding the Harmony of "I" with the body - Correct appraisal of physical needs and the meaning of prosperity.

3. Programme to ensure harmony of "I" and Body-Mental and Physical health and happiness.

4. Harmony in family and society: Understanding Human-human relationship in terms of mutual trust and respect.

- 5. Understanding society and nation as extensions of family and society respectively.
- 6. Practice Session -02

#### **UNIT-3: Basics of Professional Ethics**

- 1. Ethical Human Conduct based on acceptance of basic human values.
- 2. Humanistic Constitution and universal human order skills, sincerity and fidelity.
- 3. To identify the scope and characteristics of people friendly and eco-friendly production system,
- Technologies and management systems.

4. Practice Session -03.

#### **UNIT-4: Professional Ethics in practice**

- 1. Profession and Professionalism Professional Accountability, Roles of a professional, Ethics and image of profession.
- Engineering Profession and Ethics Technology and society, Ethical obligations of Engineering 2. professionals, Roles of Engineers in industry, society, nation and the world.
- Professional Responsibilities Collegiality, Loyalty, Confidentiality, Conflict of Interest, Whistle 3. Blowing
- 4. Practice Session 04

#### **Text Books:**

- [T1] Professional Ethics, R. Subramanian, Oxford University Press.
- [T2] Professional Ethics & Human Values: S.B. Srivasthva, SciTech Publications (India) Pvt. Ltd. New Delhi
- Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education. [T3]

#### **References:**

[R1] Success Secrets for Engineering Students: Prof. K.V. SubbaRaju, Ph.D., Published by SMARTstudent.

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[T1],[R4]

[T2], [R1], [R2]

No. of lectures: 04+1

#### No. of lectures: 04+1

# [T1], [T2], [T3], [R3]

No. of lectures: 03+1

[T1], [R1], [R4]

No. of lectures: 05+1

- [R2] Ethics in Engineering Mike W. Martin, Department of Philosophy, Chapman University and Roland Schinzinger, School of Engineering, University of California, Irvine.
- [R3] Human Values: A. N. Tripathy (2003, New Age International Publishers)
- [R4] Value Education website, http://www.universalhumanvalues.info[16]
- [R5] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press.
- [R6] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books
  - (2010, New Delhi). Also, the Teachers" Manual by the same author.

**\*PRACTICAL SESSIONS OF 14 HOME ASSIGNMENTS** will be followed by the students pursuing this paper. (Ref: Professional Ethics & Human Values: S.B. Srivastava, SciTech Publications (India) Pvt. Ltd. New Delhi. )

## CONTENT OF PRACTICE SESSION

#### Module 1: Course Introduction – Needs, Basic Guidelines, Content and Process of Value Education

**PS-1:** Imagine yourself in detail. What are the goals of your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcoming in your life? Observe and analyze them.

#### **Expected Outcome:**

The students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

**PS-2:**Now a days there is lot of voice about techno-genie maladies such as energy and natural resource depletion, environmental Pollution, Global Warming, Ozone depletion, Deforestation, etc. – all these scenes are man-made problems threatening the survival of life on the earth – what is root cause of these maladies and what is the way out in your opinion?

On the other hand there is rapidly growing danger because of nuclear proliferation, arm race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression and suicidal attempts, etc - what do you think the root cause of these threats to human happiness and peace – what could be the way out in your opinion?

#### **Expected Outcome:**

The students start finding out that technical education with study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all the problems and the sustained solution could emerge only through understanding of human values and value based living. Any solutions brought out through fear, temptation or dogma will not be sustainable.

**PS-3:1**.Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of following:

a)What is naturally acceptable to you in relationship - feeling of respect or disrespect?

b)What is naturally acceptable to you - to nurture or to exploit others? Is your living the same as your natural acceptance or different?

2.Out of three basic requirements for fulfillment of your aspirations, right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time and efforts you devote for each in your daily routine.

#### **Expected Outcome:**

- 1. The students are able to see that verification on the basis of natural acceptance and experiential validation through living is the only way to verify the right or wrong, and referring to any external source life text or instrument or any other person cannot enable them to verify with authenticity, it will only develop assumptions.
- 2. The students are able to see that their practice in living is not in harmony with their natural acceptance at most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.
- 3. The students are able to see that lack of right understanding leading to lack of relationship is the

major cause of the problems in their family and the lack of physical facilities in most of the cases; while they have given higher priority to earning of physical facilities in their life ignoring relationship and not being aware that right understanding is the most important requirement for any human being.

#### Module 2: Understanding harmony in human being - Harmony in myself!

**PS-4:**Prepare the list of your desires. Observe whether the desires. Observe whether the desires are related with self "I" or body. If it appears to be related with the both, see which part of it is related to self "I" and which part is related to body.

#### **Expected Outcome:**

The students are able to see that they can enlist their desires and the desires are not vague, also they are able to relate their desires to "I" and "body" distinctly. If, any desire appears to be related with both, they are able to see that feeling is related to "I" while the physical facility is related to the body. They are also able to see that "I" and "body" are two realities, and most of their desires are related to "I" and not with the "Body"; while their efforts are mostly connected on the fulfillment of the need of the body assuming that it will meet the needs of "I" too.

#### **PS-5**:

- 1. {A}. Observe that any physical facilities you use, follows the given sequence with time; Necessary and tasteful unnecessary & tasteful unnecessary & tasteless.
  - {B}. In contrast, observe that any feelings in you are either naturally acceptable or not acceptable at all. If, naturally acceptable, you want it continuously and if not acceptable, you do not want it at any moment.
- 2. List Down all your activities. Observe whether the activity is of "I" or of "body" or with the participation both "I" and "body".
- 3. Observe the activities with "I". Identify the object of your attention for different moments (over a period say 5 to 10 minute) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

#### **Expected Outcome:**

- 1. The students are able to see that all physical facilities they use are required for limited time in a limited quantity. Also they are able to see that cause of feeling, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable eve for a single moment.
- 2. The students are able to see that activities like understanding, desires, thoughts and selection are the activities of "I" only; the activities like breathing, palpitation of different parts of the body are fully the activities of the body. With the acceptance of "I", while activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs, etc. are such activities that require the participation of both "I" and "body"
- 3. The students become aware of their activities of "I" and start finding their focus of attention at different moments. Also they are able see that most of their desires are coming from outsides (through preconditioning or sensation) and are not based on their natural acceptance.
- **PS-6:** 1.Chalk out the program to ensure that you are responsible to your body for the nurturing, protection and right utilization of the body.

2.Find out the plants and shrubs growing in and your campus. Find out their use for curing different diseases.

#### **Expected Outcome:**

The students are able to list down activities related to a proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing the different diseases.

#### Module 3: Understanding harmony in the family and society - Harmony in Human - Human relationship

S.No.	Intention (Natural Acceptance)	S.No.	Competence
<b>1.a.</b>	Do I want to make myself happy?	1.b.	Am I liable to make myself always Happy?
2.a.	Do I want to make the other happy?	2.b.	Am I liable to make the other always happy?
<b>3.</b> a.	Does the other want to make him happy?	3.b.	Is the other able to make him always happy?
4.a.	Does the other want to make me happy? What is answer?	4.b.	Is the other able to make me always happy? What is answer?

**PS-7:** Form small groups in the class and in that group initiate the dialogue and ask the eight questions related to trust. The eight questions are-

Let each student answer the question for himself and everyone else. Discuss the difference between intention and competence.

#### **Expected Outcome:**

The students are able to see that the first four questions are related to our natural acceptance i.e. intention and the next four to our competence. They are able to note that the intention is always correct, only competence is lacking. We generally evaluate ourselves on the basis of our intention and other on the basis of their competence. We seldom look at our competence and other's intention as a result we conclude that I am a good person and other is a bad person.

#### **PS-8:**

1. Observe that on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasion you are disrespecting by way of under evaluation, over evaluation or otherwise evaluation.

2. Also observe whether your feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

#### **Expected Outcome:**

The students are able to see that respect is right evaluation and only right evaluation leads to fulfilment of relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect) like gender biasness, generation gap, caste conflicts, class struggle, and domination through poor play, communal violence, and clash of isms and so on so forth.

All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

#### **PS-9:**

- 1. Write a note in the form of a story, poem, skit, essay, narration, dialogue, to educate a child. Evaluate it in a group.
- 2. Develop three chapters to introduce "social science", its needs, scope and content in the primary education of children.

#### **Expected Outcome:**

The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

#### Module 4: Understanding harmony in the nature and existence - Whole existence as Co - existence -

**PS-10:** Prepare the list of units (things) around you. Classify them into four orders. Observe and explain the mutual fulfilment of each unit with other orders.

#### **Expected Outcome:**

The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to their orders today and need to take appropriate steps to ensure right participation (in term of nurturing, protection and right utilization) in the nature.

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

#### **PS-11:**

- 1. Make a chart for the whole existence. List down different courses of studies and relate them to different or levels in the existence.
- 2. Choose any one subject being taught today. Evaluate and suggest suitable modifications to make it appropriate and holistic.

#### **Expected Outcome:**

The students are confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are liable to make out how these courses can be made appropriate and holistic.

#### Module 5: Implication of the above Holistic Understanding of Harmony at all Levels of Existence.

**PS-12:** Choose any two current problem of different kind in the society and suggest how they can be solved on the basis of the natural acceptance of human values. Suggest the steps you will take in present conditions.

#### **Expected Outcome:**

The students are liable to present sustainable solutions to the problem in society and nature. They are also able to see that these solutions are practicable and draw road maps to achieve them.

#### **PS-13:**

1. Suggest ways in which you can use your knowledge of engineering / technology / management for universal human order from your family to world family.

2. Suggest one format of humanistic constitution at the level of nation from your side.

#### **Expected Outcome:**

The students are able to grasp the right utilization of their knowledge in their streams of technology / engineering / management to ensure mutually enriching and recyclable production systems.

PS-14: The course is going to be over now. Evaluate your state before and after the course in terms of-

- Thoughts
- Behavior
- Work and
- Realization

Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

#### **Expected Outcome:**

The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for happy and prosperous society.

#### FUNDAMENTALS OF COMPUTING

Paper Code: ETCS-111	L	Т	С
Paper: Fundamentals of Computing	2	0	2

INSTRUCTIONS TO PAPER SETTERS:	Maximum Marks : 75
1. Question No. 1 should be compulsory and cover the entire syllabus.	This question should have objective
or short answer type questions. It should be of 25 marks.	
2. Apart from Question No. 1, rest of the paper shall consist of four	units as per the syllabus. Every unit

should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Objective: The objective of the paper is to facilitate the student with applied working knowledge of computers. This is the first course of computing and does not assume any pre-requisite.

#### UNIT-I

Five Component Model of a Computer, System and Application software (introduction) storage devices primary (RAM, ROM, PROM, EPROM, cache ) Memory and secondary (magnetic tape, hard disk, Compact disks) memory, peripheral devices, printers.

#### **UNIT-II**

Operating Systems: DOS Internal, External commands, Windows (2000 and NT), Overview of architecture of Windows, tools and system utilities including registry, partitioning of hard disk, Overview of Linux architecture , File system, file and permissions, concept of user and group, installation of rpm and deb based packages.

#### [T1], [T2][8 Hours]

[T1], [T2][8 Hours]

**UNIT-III** 

Basics of programming through flow chart, Networking Basics - Uses of a network and Common types of networks, Network topologies and protocols, Network media and hardware, Overview of Database Management System.

#### [T1],[T2],[R1][8 Hours]

[R2][R3] [8 Hours]

#### **UNIT-IV**

Libre / Open Office Writer : Editing and Reviewing, Drawing, Tables, Graphs, Templates

Libre / Open Office Calc : Worksheet Management , Formulas, Functions, Charts

Libre / Open Office Impress: designing powerful power-point presentation

#### Text:

[T1] Peter Norton, Introduction to computers, Sixth Edition Tata McGraw Hill (2007).

Andrews Jean, A+Guide to Managing & Maintaining Your PC, Cengage Publication 6/e [T2]

#### **References:**

- [R1] Anita Goel, Computer Fundamentals, Pearson Education.
- Joiner Associates Staff, Flowcharts: Plain & Simple: Learning & Application Guide, Oriel Inc [R2]
- [R3] http://www.openoffice.org/why/
- [R4] http://www.libreoffice.org/get-help/documentation/

#### Paper Code: ETCH – 113 **Paper : Applied Chemistry**

#### **INSTRUCTIONS TO PAPER SETTER:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Each unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Chemistry aspects that are required for his understanding of basic chemistry

#### UNIT I: FUELS

Definition, Classification & Calorific value of fuels (gross and net), Dulong's formula (Numericals), Determination of calorific value of fuels using bomb's calorimeter (Numericals), Determination of calorific value of fuels using Boy's Gas Calorimeter (Numericals), Cracking – Thermal & catalytic cracking, Octane & Cetane numbers with their significance. High & Low temperature carbonization, Manufacture of coke (Otto -Hoffmann oven) Proximate and ultimate analysis of Coal (Numericals) Combustion of fuels (Numericals).

## **UNIT II: THE PHASE RULE & CATALYSIS**

Definition of various terms, Gibb's Phase rule & its derivation, Application of phase rule to One component system- The water system, Application of phase rule to Two component system- The Lead-Silver system (Pattinson's process).

Catalyst and its characteristics, Types of catalysts, Concept of promoters, inhibitors and poisons. Theories of catalysis: Intermediate compound formation theory, adsorption or contact theory. Application of catalysts for industrially important processes Enzyme catalysis: Characteristics, Kinetics & Mechanism of enzyme catalysed reaction ( Michaelis-Menten equation), Acid-Base catalysis: Types, Kinetics & Mechanism, Catalysis by metals salts (Wilkinson's Catalyst), Auto-catalysis, Heterogeneous catalysis (Langmuir-Hinshelwood mechanism.

#### **UNIT III: WATER**

Introduction and specifications of water, Hardness and its determination by EDTA method (Numericals), Alkalinity and its determination (Numericals), Reverse Osmosis, Electrodialysis, Disinfection by break-point chlorination. Boiler feed water, boiler problems- scale, sludge, priming & foaming: causes & prevention, Boiler problems- caustic embrittlement & corrosion: causes & prevention, Water Softening by Internal Treatment: carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water Softening by External Treatment: Lime-Soda Process (Numericals) Zeolite & Ion-Exchange Process.

#### **UNIT IV: CORROSION & ITS CONTROL**

Causes, effects & consequences; Chemical or Dry corrosion & its mechanism (Pilling-Bedworth Rule) Electrochemial or Wet Corrosion & Its mechanism, Rusting of Iron Passivity, Galvanic series, Galvanic Corrosion, Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion. Factors Influencing Corrosion: Nature of metal and nature of corroding environment; Protective measures: Galvanization, Tinning Cathodic Protection, Sacrificial Anodic protection, Electroplating, Electroless plating, Prevention of Corrosion by Material selection & Design.

#### **Text Books:**

[T1] P. C. Jain & Monika Jain, Engineering Chemistry, Latest edition, Dhanpat Rai Publishing Co., 2002.

[T2] P. Mathew, Advance Chemistry, 1 & 2 Combined Editions, Cambridge University Press, 2003.

#### **Reference Books:**

- P. W. Atkins and J. De Paula, Atkins' Physical Chemistry, Oxford, 2010. [R1]
- [R2] T. Engel and P. Reid, *Physical Chemistry*, Pearson Education, 2013.
- K. Qanungo, Engineering Chemistry, PHI Learning Private Limited, New Delhi, 2009. [R3]
- [R4] O. G. Palanna, *Engineering Chemistry*, Tata McGraw Hill Education Private Limited, 2012.
- D. A. Jones, *Principles and Prevention of Corrosion*, Prentice Hall, 2<sup>nd</sup> Edition, 1996. [R5]
- H. K. Chopra and A. Parmar, Engineering Chemistry- A Text Book, Narosa Publishing House, 2012. [R6]
- S. Chawla, Engineering Chemistry-All India Edition, Dhanpat Rai & Co., 2003. [R7]
- R. Gadi, S. Rattan and S. Mohapatra, *Environmental Studies*, S.K. Kataria & Sons, 2<sup>nd</sup> Edition 2009. [R8]

Modified Scheme and Syllabus of B. Tech-ECE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

**MAXIMUM MARKS: 75** 

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2

[T1,T2][No. of hrs. 08]

[T1,T2][No. of hrs. 08]

[T1,T2][No. of hrs. 08]

[T1,T2][No. of hrs. 08]

#### **APPLIED PHYSICS LAB – I**

#### Paper Code: ETPH-151 Paper : Applied Physics Lab – I

P C 2 1

#### LIST OF EXPERIMENTS

- 1. To determine the wavelength of sodium light by Newton's Rings.
- 2. To determine the wavelength of sodium light by Fresnel's biprism.
- 3. To determine the wavelength of sodium light using diffraction grating.
- 4. To determine the refractive index of a prism using spectrometer.
- 5. To determine the dispersive power of prism using spectrometer and mercury source.
- 6. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
- 7. To find the wavelength of He-Ne laser using transmission diffraction grating.
- 8. To determine the numeral aperture (NA) of an optical fibre.
- 9. To plot a graph between the distance of the knife-edge from the center of the gravity and the time period of bar pendulum. From the graph, find
  - (a) The acceleration due to gravity

(b) The radius of gyration and the moment of inertia of the bar about an axis.

- 10. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil).
- 11. To verify inverse square law.
- 12. To determine Planck's constant.

#### **Text Books:**

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand

**Note**: Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.

#### **ELECTRICAL TECHNOLOGY LAB**

#### Paper Code: ETEE 153 Paper: Electrical Technology Lab

L	Р	С
0	2	1

#### LIST OF EXPERIMENTS

- 1. To Design the circuit for a given load and selection of its various Components and instruments from the safety point of view
- Study and applications of CRO for measurement of voltage, frequency and phase of signals. 2.
- 3. Connection of lamp by (1)Single Switch Method.(2) Two-way Switch Method. OR Performance comparison of of fluorescent Tube & CFL Lamp. To Verify Thevenin's & Norton's Theorem 4. OR To Verify Superposition & Reciprocity Theorem. OR To Verify Maximum Power Transfer Theorem. 5. To Measure Power & Power Factor in a Single-Phase A.C Circuit using Three Ammeters or three Voltmeters.
- 6. To Measure Power & Power Factor in a Balanced Three Phase Circuit using Two Single Phase Wattcmeters.
- 7. To study of Resonance in a series R-L-C or Parallel R-L-C Circuits.
- To perform open circuit and short circuit test on 1-phase transformer.
   Starting, Reversing and speed control of DC shunt Motor
- 10. Starting, Reversing and speed control of 3-phase Induction Motor
- 11. To Study different types of Storage Batteries & its charging system.
- 12. .To Study different types of earthing methods including earth leakage circuit breaker (GFCI)

#### Note:- Any 8-10 Experiments out of the list may be chosen.

WORKSHOP PRACTICE

#### Paper Code: ETME-155 L Р С **Paper: Workshop Practice** 0 3 2 LIST OF EXPERIMENTS Sheet Metal Shop 1. To study the tools and machineries used in sheet metal shop. 2. To make a tray using sheet metal tools. 3. To make a Funnel using sheet metal tools. 4. To make a cylindrical mug in sheet metal shop. Foundry Shop 5. To make a mould in Foundry Shop. 13 Carpentry Shop 6. To make a half lap T-joint in Carpentry Shop. 7. To make a half cross lap joint in Carpentry Shop. 8. To make a pattern using Carpentry Tools. Welding Shop 9. To study arc and gas welding equipments and tools. 10. To make Lap Joint, T-Joint and Butt Joint in Welding shop. Fitting Shop 11. To make V-Section and T-Slot in fitting shop. Machine Shop 12. To study basic operations on lathe, shaper, milling, drilling and grinding machines..

13. To perform step turning, knurling and threading operations on lathe.

14. To prepare a simple job on shaper.

Note:- Any 8-10 Experiments out of the list may be chosen.

#### **ENGINEERING GRAPHICS**

Paper Code: ETME-157	L	Р	С
Paper: Engineering Graphics Lab	0	3	2

#### LIST OF EXPERIMENTS

#### UNIT - I

**General**: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications,

**Projections of Point and Lines**: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

## $(T_1, T_2, R_1, R_2, R_3)$

## <u>Unit - II</u>

**Planes other than the Reference Planes**: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

**Projections of Plane Figures**: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

 $(T_1, T_2, R_1, R_2, R_3)$ 

<u>Unit - III</u>

**Projection of Solids:** Simple cases when solid are placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.  $(T_1, T_2, R_1, R_2, R_3)$ 

<u>Unit-IV</u>

Isometric Projection of plain surface and bodies. Text Books:

[T1] Engineering drawing by N.D.Bhatt (Charotar Publications).

[T2] Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications)

#### **Reference Books:**

[R1] Engineering Drawing by Venugopalan, (New Age International).

[R2] Engineering Drawing by P.S.Gill (S.K. Kataria & Sons)

[R3] Engineering Graphics by K.C.John (PHI)

Note:- Any 8-10 Experiments out of the list may be chosen.

## $(T_1, T_2, R_1, R_2, R_3)$

#### FUNDAMENTAL OF COMPUTING LAB

#### Paper Code: ETCS 157 Paper: Fundamental of Computing Lab

#### L P 0 2

#### LIST OF EXPERIMENTS

I

For program development an IDE e.g. CodeBlock<sup>[a]</sup>, Eclipse CDT <sup>[b]</sup>, Netbeans<sup>[c]</sup> is recommended

- 1. Dismantling a PC Part -1
- 2. Dismantling a PC Part -2
- 3. Internal and External commands of DOS
- 4. System utilities of windows including regedit
- 5. Installation of any rpm or debianlinux distribution with emphasis on drive partitioning
- 6. Installation of rpm and deb based packages
- 7. Understanding of File system of Linux
- 8. Creating user and group (through CLI)
- 9. Understanding and working knowledge of .Libre / Open Office Writer : Editing and Reviewing, Drawing, Tables, Graphs, Templates
- 10. Understanding and working knowledge of Libre / Open Office Calc
- 11. Understanding and working knowledge Libre / Open Office Impress
- 12. Understanding of flow chart development through Dia \*
- 13. Two Mini Projects based on the skills learned in experiments 1-12
  - [ Dia ] <u>http://projects.gnome.org/dia/</u>

Note:- Any 8-10 Experiments out of the list may be chosen.

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#### APPLIED CHEMISTRY LAB

#### Paper Code –ETCH-161 Paper : Applied Chemistry Lab

## P C 2 1

#### LIST OF EXPERIMENTS

1.	Determination of alkalinity of water sample.
2.	Determination of hardness of water sample by EDTA method.
3.	Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide
	and sodium chloride.
4.	Determine the amount of oxalic acid and Sulphuric acid in one litre of solution, given standard sodium
	hydroxide and Potassium Permanganate.
5.	Determine the amount of copper in the copper ore solution, provided hypo-solution (Iodometric
	Titration).
6.	Determine the amount of chloride ions present in water using silver nitrate (Mohr's Precipitation
	Method).
7.	Determine the strength of MgSO <sub>4</sub> solution by Complexometric titration.
8.	Determine the surface tension of a liquid using drop number method.
9.	Determine the viscosity of a given liquid (density to be determined).
10.	Determine the cell constant of conductivity cell and titration of strong acid/strong base
	conductometrically.
11.	To determine (a) $\lambda$ max of the solution of KMnO <sub>4</sub> . (b) Verify Beer's law and find out the concentration
	of unknown solution by spectrophotometer.
12.	Determination of the concentration of iron in water sample by using spectrophotometer.
13.	Determination of the concentration of Iron (III) by complexometric titration.
14.	Proximate analysis of coal.
15	Determination of eutectic point and congruent melting point for a two component system by method of

15. Determination of eutectic point and congruent melting point for a two component system by method of cooling curve.

(At least 8 to 10 experiments are to be performed)

#### **Suggested Books:**

- 1. <u>A. I. Vogel, G. H. Jeffery</u>, *Vogel's Text Book of Quantitative Chemical Analysis*, Published by Longman Scientific & Technical, 5<sup>th</sup> Edition, 1989.
- 2. S. Chawla, *Essentials of Experimental Engineering Chemistry*, Dhanpat Rai & Co., 3<sup>rd</sup> Edition, 2008.
- 3. S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria & Sons, 2<sup>nd</sup> Edition, 2003.
- 4. O. P. Pandey, D. N. Bajpai and S. Giri, *Practical Chemistry*, Published by S. Chand, 2005.
- 5. M. S. Kaurav, *Engineering Chemistry with Laboratory Experiments*, Published by PHI Learning Private Limited, 2011.
- 6. S. K. Bhasin and Sudha Rani, *Laboratory Manual on Engineering Chemistry*, Published by Dhanpat Rai Publishing Company, 2006.

Note:- Any 8-10 Experiments out of the list may be chosen.

#### **APPLIED MATHEMATICS-II**

Paper Code	: ETMA-102	L	Т	С
Paper: APPLIE	D MATHEMATICS-II	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

*Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.* 

#### Unit –I

Partial differentiation and its Applications: Partial derivatives of first and second order. Euler's theorem for homogeneous functions (without proof). Derivatives of Implicit Functions, total derivatives. Change of variables. Jacobian. Taylor's theorem for function of two variables(without proof). Error and approximation. Extreme values of function of several variables(maxima ,minima, saddle points). Lagrange method of undetermined multipliers. Partial differential equations: Formulation, solution of first order equations, Lagranges equations, Charpit's method.

#### Unit-II

Unit-III

Laplace Transformation: Definition, Laplace transformation of basic functions, existence condition for Laplace transformation, Properties of Laplace transformation(Linearity, scaling and shifting). Unit step function, Impulse Function, Periodic Functions. Laplace transformation of derivatives, Laplace transformation of integrals, differentiation of transforms, Integration of transforms, Convolution theorem ,inverse Laplace transformation. Solution of ordinary Differential equations.

#### [T1, T2][No. of 12hrs.]

[T2][No. of 12hrs.]

Complex Function: Definition, Derivatives, Analytic function, Cauchy's Riemann equation (without proof). Conformal and bilinear mappings, Complex Integration: Complex Line integration, Cauchy's integral theorem and integral formula(without proof). Zeros and Singularities, Taylor's and Laurent's series (without proof). Residues, Residue theorem (without proof). Evaluation of real definite integrals: Integration around the unit circle, Integration around a small semi circle and integration around rectangular contours.

## [T1,T2][No. of 12hrs.]

Multiple integrals: Double integrals, Change of order of integration, Triple integrals. Vector Calculus: Scalar and vector functions, Gradient, Divergence and curl. Directional derivatives, Line Integrals. Surface integrals, volume integrals. Green's theorem, Stoke's theorem and Gauss divergence theorem (without proof).

[T1, T2][No. of 12hrs.]

#### Text:

Unit-IV

- [T1]. E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [T2] Michael Greenberg, "Advance Engineering mathematics", Pearson.

#### **References:**

- [R1] R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications
- [R2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
- [R3] S. Ponnusamy, "Foundation of Complex Analysis" Narosa Publication
- [R4] G.B. Thomas and R. N. Finny "Calculus and Analytic Geometry" Addison Wesley/ Narosa
- [R5] Wylie R, "Advance Engineering mathematics", McGraw-Hill
- [R6] M. Spiegel, "Schaum's Outline on Laplace Transform, Tata McGraw-Hill

#### Maximum Marks: 75

#### <u>APPLIED PHYSICS – II</u>

Paper Code: ETPH-104	L	Т	С
Paper : APPLIED PHYSICS – II	2	1	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

#### UNIT I

**Electromagnetic Theory** : Gradient, Divergence, Curl, Gauss' law, Ampere's Law, Continuity equation, Maxwell's equations (differential and integral forms), Significance of Maxwell's equations, Poynting Theorem, Electromagnetic wave propagation in dielectrics and conductors.

#### [T1], [T2][No. of Hrs. 8]

#### UNIT II

**Statistical Physics:** Black body radiation, Planck's radiation formula, Wien's and Rayleigh-Jeans Laws, Distribution laws: Qualitative features of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics & their comparison (without derivation).

**Quantum Mechanics:** Postulates of Quantum mechanics, de-Broglie hypothesis, Davisson Germer experiment, Wave function and its physical significance, Wave Packet, Phase and group velocities, Uncertainty principle, Schrodinger equation for free particle, Time dependent Schrodinger equation, Particle in a box (1-D).

#### [T1][T2][No. of Hrs. 8]

[T1], [T2][No. of Hrs. 8]

#### UNIT III

**Crystal Structure:** Types of solids, Unit cell, Types of crystals, Translation vectors, Lattice planes, Miller indices, Simple crystal structures, Interplaner spacing, Crystal structure analysis: Bragg's law, Laue method, Point defects: Schottcky and Frankel defects.

#### UNIT IV

**Band Theory of Solids:** Introduction, Kronig-Penney model: E-k diagram, Effective mass of an electron, Intrinsic semiconductors: Electron concentration in conduction band, Hole concentration in valence band, Extrinsic semiconductor: p-type and n-type semiconductors, Fermi level, Hall Effect: Hall voltage and Hall coefficient.

#### [T1][T2][No. of Hrs. 8]

#### **Text Books:**

[T1]. Arthur Beiser 'Concepts of Modern Physics', [McGraw-Hill], 6<sup>th</sup> Edition 2009.

[T2]. A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6<sup>th</sup> Edition, 2013.

#### **Reference Books**

- [R1]. Richard Wolfson 'Essential University Physics' Pearson, Ist edition, 2009.
- [R2]. H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], I<sup>st</sup> Edition, 2009.
- [R3]. C. Kittle, 'Mechanics', Berkeley Physics Course, Vol.- I. Latest Edition.
- [R4]. Irving Kaplan 'Nuclear Physics' Latest Edition.
- [R5]. John R. Taylor, Chris D. Zafirator and Michael A. Dubson, 'Modern Physics For Scientists and Engineers', PHI, 2<sup>nd</sup> Edition.
- [R6]. D.J. Griffith, 'Introduction to Electrodynamics', Prentice Hall, Latest Edition.

# MAXIMUM MARKS: 75

Paper Code: ETEC-106	
<b>Paper : Electronic Devices</b>	

#### INSTRUCTIONS TO PAPER SETTERS:

#### MAXIMUM MARKS: 75

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- 1. This is the first introductory course in Electronics Engineering to the students of all the branches of engineering during the first year.
- 2. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions from each unit. It should be of 25 marks.
- 3. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Objective of the paper is to facilitate the student with the basics of electronic aspects that are required for his understanding and applications in their respective field of study. The pre-requisites are, to have a basic understanding of Applied Physics and Mathematics.

#### Unit-I

Evaluation Of Electronics: Introduction & Application Of Electronics, Energy Band Theory Of Crystals, Energy Band Structures In Metals, Semiconductors And Insulators, Theory Of Semiconductors: Classification Of Semiconductors, Conductivity Of Semiconductors, Carrier Concentration In Intrinsic & Extrinsic Semiconductors, Properties Of Intrinsic And Extrinsic Semiconductors, Variation In Semiconductors Parameters With Temperature, Fermi-Dirac Function, Fermi Level In A Semiconductor Having Impurities, Band Structure Of Open-Circuited P-N Junction, Drift And Diffusion Currents, Carrier Life Time, Continuity Equation (Elementary Treatment Only)

#### [T1][T2][T3][No. Of Hours: 12]

#### Unit – II

**Theory of p-n junction Diode:** Diode Current Equation, Diode Resistance, Transition Capacitance, Diffusion Capacitance, (Elementary treatment only), Effect of Temperature on p-n Junction Diode, Switching Characteristics, Piecewise Linear Model, **Special Diodes:** Zener Diode, Varactor Diode, Tunnel Diode, Photodiode, Light Emitting Diodes, Schottky Barrier Diode, **Applications of Diodes:** Half-Wave Diode Rectifier, Full-Wave Rectifier, Clippers and Clampers (Elementary treatment only).

[T1][T2][T3][No. of Hours: 11]

#### Unit – III

**Bipolar junction transistor:** Introduction of transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-moll's model.

#### [T1][T2][T3][No. of Hours: 11]

#### Unit – IV

**Application of BJT:** CB, CE, CC configurations, hybrid model for transistor at low frequencies, Introduction to FETs and MOSFETs.

**Fundamentals of digital electronics:** Digital and analog signals, number systems, Boolean algebra, logic gates with simple applications, logic gates, karnaugh maps.

#### [T1][T2][T3][No. of Hours: 11]

#### Text Books

- [T1] S. Salivahanan, N. Suresh Kr. & A. Vallavaraj, "Electronic Devices & Circuit", Tata McGraw Hill, 2008
- [T2] Millman, Halkias and Jit, "Electronic devices and circuits" McGraw Hill
- [T3] Boylestad & Nashelsky, "Electronic Devices & Circuits", Pearson Education, 10<sup>TH</sup> Edition.

#### **Reference Books**

- [R1] Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, VI Edition
- [R2] Robert T. Paynter, "Introducing Electronic Devices & Circuits", Pearson Education, VII Edition, 2006

#### INTRODUCTION TO PROGRAMMING

Paper Code: ETCS-108	L	Т	С
Paper: Introduction to Programming	3	0	3

## INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

*Objective: The objective of the paper is to facilitate the student with the basics of programming aspects, using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the first course on programming and does not assume any prerequisite.* 

#### UNIT I

Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC), Assembler, linker and loader, Structure of a simple Hello World Program in C ,Overview of compilation and execution process in an IDE (preferably Code Block)

#### UNIT II

Programming using C: Preprocessor Directive, C primitive input output using get char and put char, simple I/O Function calls from library, data type in C including enumeration, arithmetic, relational and logical operations, conditional executing using if, else, switch and break. Concept of loops, for, while and do-while, Storage Classes: Auto, Register, Static and Extern

#### [T1], [T2], [R7][No. of hrs 8]

[T1],[T2], [R4][R5][No. of hrs 8]

#### UNIT III

Arrays (one and two dimensional), 2-d arrays used in matrix computation. Concept of Sub-programming, functions. Parameter transmission schemes i.e. call by value and call by reference, Pointers, relationship between array and pointer, Argument passing using pointers, Array of pointer, passing arrays as arguments

#### [T2], [R1], [R7][No. of hrs 8]

[T1], [T2], [R2] [R7] [No. of hrs 8]

#### UNIT IV

Structure and unions, Strings and C string library, File Handling in C Using File Pointers, fopen(), fclose(), Input and Output using file pointers, Character Input and Output with Files, String Input / Output Functions, Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files, Positioning the File Pointer

#### **Text Books:**

- [T1] Herbert Schildt, "C: The Complete Reference", OsbourneMcgraw Hill, 4th Edition, 2002.
- [T2] Forouzan Behrouz A. "Computer Science: A Structured Programming Approach Using C, Cengage Learning 2/e

#### **Reference Books:**

- [R1] Kernighan & Ritchie, "C Programming Language", The (Ansi C version), PHI, 2/e
- [R2] K.R Venugopal, "Mastering C", TMH
- [R3] R.S. Salaria "Application Programming in C " Khanna Publishers4/e
- [R4] Yashwant Kanetkar "Test your C Skills", BPB Publications
- [R5] http://www.codeblocks.org/
- [R6] <u>http://gcc.gnu.org/</u>
- [R7] Programming in ANSI C, E. Balagurusamy; Mc Graw Hill, 6<sup>th</sup> Edition.

#### ENGINEERING MECHANICS

Paper Code: ETME 110	L	Т	С
Paper: Engineering Mechanics	2	1	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

#### <u>OBJECTIVE: THE OBJECTIVE OF THE PAPER IS TO GIVE THE BASIC PRINCIPLES OF MECHANIC</u> <u>APPLIED IN DIFFERENT DISCIPLINES OF ENGINEERING.</u>

#### UNIT- I

Force system: Free body diagram, Parallel force system, concurrent force system, Equilibrium equations and applications in different force systems.

**Friction:** Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, Belt drive- derivation of equation  $T_1/T_2 = e^{\mu\theta}$  and its application, M.A, V.R and Efficiency of Screw Jack, Application of friction in pivot and collar bearing.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

UNIT- II

**Structure:** Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section, graphical method.

**Distributed Force**: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertia.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### Unit-III

Kinematics of Particles: Rectilinear motion, plane curvilinear motion-rectangular coordinates, normal and tangential component.

**Kinetics of Particles:** Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum, conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### Unit-IV

**Kinematics of Rigid Bodies**: Concept of rigid body, type of rigid body motion, absolute motion, introduction to relative velocity, instantaneous center of velocity, Velocity polygons for four bar mechanism and single slider mechanism.

**Kinetics of Rigid Bodies:** Equation of motion, translatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### **Text Books:**

- [T1] Engg Mechanics by A.K.Tayal (Umesh Publications).
- [T2] Engg Mechanics by Basudeb Bhattacharya (Oxford university Press)

#### **Reference Books:**

- [R1] Engg Mechanics by Irving H. Shames (Pearson publications).
- [R2] Engg Mechanics by U.C.Jindal (Galgotia Publications).
- [R3] Engg Mechanics by Beer & Johnston( TMH).
- [R4] Engg Mechanics by K.L.Kumar (TMH).

Shear force and bending Moment Diagram.

[R5] Engg Mechanics by Sadhu Singh (Khanna Publishers).

#### COMMUNICATION SKILLS

#### Paper Code: ETHS - 112 L Т С **Paper: Communication Skills** 2 1 3

**INSTRUCTIONS TO PAPER SETTERS:** 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enhance the language and communication competence of professional students with emphasis on English for Specific Purposes (ESP) through communication skills related activities. UNIT-I

I. Basic Remedial Grammar (Errors in Parts of Speech, Tenses, Verbs and Modal; Reported Speech; Active and Passive Voice; Conditional clauses; Question Tags and Short Responses)

#### **UNIT-II**

II. Vocabulary and usage (Synonyms and Antonyms; Suffixes and Prefixes; Homophones and Homonyms; One-word substitution; Prepositions; Phrasal verbs and Idioms, Indianism)

**UNIT-III** 

#### (A)

I. Types of writing (Expository, Descriptive, Narrative, Analytical and Argumentative)

Definition, description and explanation of scientific objects, instruments and processes etc. II.

- III. Interpretation and use of charts, graphs and tables in technical writing.[T1],[R1]
- **(B)** 
  - I. Paragraph writing
  - II. Precis writing
  - III. Comprehension [T1],[R2],[R3]

#### **UNIT-IV**

- Reading different types of texts (speed and purpose)[T1] T
- II. Reading five essays [T2]
- E.M. FORSTER, What I Believe III.

		-
IV.	JAMES BRYCE, Some Hints on Public Speaking	(D = 125)
IV	TAMEN BRILE NOMP HINK ON PUBLIC SUPARING	(Pg-135)

- V. L.A. HILL, Principles of Good Writing
- VI. A.P.J. ABDUL KALAM, Work Brings Solace
- VII. SALIM ALI, Man and Nature in India: The Ecological Balance

#### **TEXT BOOKS**

- Technical Communication: Principles and practice (OUP), (Meenakshi Raman and Sangeeta Sharma) [T1] OXFORD UNIVERSITY PRESS
- Communication Skills for Engineers, Murli Krishna, Pearson. [T2]
- Wren and Martin: High School English Grammar and Composition; S. Chand [T3]
- Exploration of Ideas; An Anthology of Prose: Orient Blackswan. [T4]

#### **REFERENCE BOOKS:**

- [R1] Professional Communication: Aruna Koneru, MCGRAW HILLS EDUCATION PVT. LTD
- Wren and Martin: High School English Grammar and Composition; S. Chand [R2]
- Advanced English Grammar and Composition: Gurudas Mukherjee & Inidbar Mukherjee; (ANE [R3] BOOKS PVT. LTD.)

#### **MAXMIUM MARKS: 75**

[No. of hrs 10]

[No. of hrs 10]

[T1],[R2],[R3][No. of hrs 06]

[T1],[R2],[R3][No. of hrs 06]

(Pg-123)

(Pg-150)

(Pg-207)

(Pg-213)

#### ENVIRONMENTAL STUDIES

Paper Code: ETEN-114	L	Т	С
Paper : Environmental Studies	2	1	3

#### **INSTRUCTIONS TO PAPER SETTER:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Each unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** The objective of this course is to make students environment conscious. They will be exposed through the fundamental concepts of environment and ecosystem so that they can appreciate the importance of individual and collective efforts to preserve and protect our environment. This course must raise various questions in student's mind that how our environment is inter dependent on various factors and how human being must care for their natural surroundings.

#### UNIT I: Environmental Studies: Ecosystems, Bio-diversity and its Conservation

(i) The Multidisciplinary Nature of Environmental Studies-

Definition, scope and importance of Environmental Studies. Biotic and a biotic component of environment, need for environmental awareness.

#### (ii) Ecosystems

Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids.

Introduction, types, characteristic features, structures and function of the following ecosystem:

- (a) Forest ecosystem
- (b) Grassland ecosystem
- (c) Desert ecosystem

(d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

#### (iii) Bio-diversity and its Conservation

Introduction to biodiversity —definition: genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity : Habitat loss, Poaching of wildlife, man-wildlife conflicts, rare endangered and threatened species(RET) endemic species of India, method of biodiversity conservation: *In-situ* and *ex-situ* conservation.

#### [T1], [R3][No. of hrs. 08]

#### UNITII: Natural Resources: problems and prospects

(i) Renewable and Non-renewable Natural Resources

Concept and definition of Natural Resources and need for their management

- *Forest resources:* Use and over-exploitation, deforestation, case studies, timber extraction, mining, dams and their effects on forests and tribal people.
- *Water resources:* Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems, Water conservation, rain water harvesting, watershed management.
- *Mineral resources:* Uses are exploitation, environmental effects of extracting and using mineral resources, case studies.
- *Food resources:* World food problems, changes causes by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- *Energy resources:* Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Urban problems related to energy, case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

[T1], [R3][No. of hrs. 08]

#### **UNIT III: Environmental Chemistry and Pollution Control**

#### (i) Chemistry of Environment

(a) Green Technology

Principles of Green technology, Zero Waste Technology, Green Chemistry & Its basic principles, Atom Economy, Green Methodologies. clean development mechanisms (CDM), concept of environmental impact assessment,

(b) Eco-Friendly polymers

Environmental degradation of polymers, Biodegradable, Photo-biodegradable polymers, Hydrolysis & Hydrobiodegradable, Biopolymers & Bioplastics: polylactic acid, polyhydroxybutyrate, polycaprolactone,. Concept of bioremediation.

#### (ii)Environmental Pollution

Definition, types, causes, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g) Nuclear hazards. Pollution case studies. Solid waste and its management: causes, effects and control measures of urban and industrial waste.

Chemical toxicology-Terms related to toxicity, impact of chemicals (Hg, As, Cd, Cr, Pb) on environment.

[T1], [R3][No. of hrs. 08]

#### UNIT IV: Disaster Management, Social Issues, Human Population and the Environment

#### Disaster Management

Disaster management: floods, earthquake, cyclone and land-slides, nuclear accidents and holocaust, case studies.

#### (ii) Social Issues, Human Population and the Environment

Sustainable development, Climate change, global warming, acid rain, ozone layer depletion, Environmental ethics: Issues and possible solutions, Consumerism and waste products, , Wasteland reclamation. Population growth, problems of urbanisation.

Environment Protection Act, 1986; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and Control of Pollution) Act, 1974; Wildlife Protection Act, 1972; Forest Conservation Act, 1980; Environmental management system standards-ISO 14000 series.

#### [T1][No. of hrs. 08]

- Text Books:
- [T1] E. Barucha, *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press (India) Pvt. Ltd., 2005.
- [T2] S. Chawla, *A Textbook of Environmental Studies*, McGraw Hill Education Private Limited, 2012

#### **References Books:**

- [R1] G. T. Miller, *Environmental Science*, Thomas Learning, 2012
- [R2] W. Cunningham and M. A. Cunningham, *Principles of Environment Science: Enquiry and Applications*, Tata McGraw Hill Publication, N. Delhi, 2003.
- [R3] R. Rajagopalan, *Environmental Studies*: From Crisis to Cure, 2<sup>nd</sup> Edition, Oxford University Press, 2011.
- [R4] A.K. De, Environmental Chemistry, New Age Int. Publ. 2012,,
- [R5] A. Kaushik and C.P. Kaushik, Perspectives in Environment Studies, 4<sup>th</sup> Edition, New Age International Publishers, 2013
- [R6] Environmental Engineering by Gerard Kiely, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2010.

#### **APPLIED PHYSICS LAB – II**

#### Paper Code: ETPH-152 Paper: Applied Physics Lab – II

Р	C
2	1

#### LIST OF EXPERIMENTS

- 1. To determine the e/m ratio of an electron by J.J. Thomson method.
- 2. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave signals from two signal generators.
- 3. To determine the frequency of A.C. mains by using Sonometer .
- 4. To determine the frequency of electrically maintained tuning fork by Melde's method.
- 5. Computer simulation (simple application of Monte Carlo): Brownian motion, charging & discharging of a capacitor.
- 6. To study the charging and discharging of a capacitor and to find out the time constant.
- 7. To study the Hall effect.
- 8. To verify Stefan's law.
- 9. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
- 10. To study the I-V characteristics of Zener diode.
- 11. To find the thermal conductivity of a poor conductor by Lee's disk method.
- 12. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.

#### Suggested Books:

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand, Latest edition.

**Note**: Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.

#### **Electronic Devices**

#### Paper Code: ETEC-156 Paper: Electronic Devices Lab

#### P C 2 1

#### LIST OF EXPERIMENTS

- 1. Introduction to C.R.O, Function Generator Bread Board Kit & to generate different types of waveform with the help of Function Generator & to calculate their frequency, amplitude AC & DC voltage.
- 2. Identification & testing of Active & passive components
- 3. To plot V-I characteristics of a semiconductor diode & Calculate Static & Dynamic Resistance
- 4. To Study the Reverse characteristics of Zener diode
- 5. To Study the Rectifier circuit.
  - a) Half Wave Rectifier
  - b) Centre Tapped Rectifier.
    - c) Bridge Rectifier.
- 6. To Study the output waveforms of different Filter Ckts of Rectifier.
- 7. To Plot Input & Output characteristics CB transistor.
- 8. To Plot Input & Output characteristics of CE transistor.
- 9. Realization of basic gates.
- 10. Implementation of Boolean functions (two or three variables).
- 11. Few experiments mentioned above to be performed on P-spice.
- 12. To develop a working model of any electronic circuit.

Note:- Any 8-10 Experiments out of the list may be chosen.

#### ENGINEERING MECHANICS LAB

#### Paper Code: ETME-158 Paper: Engineering Mechanics Lab

#### **LIST OF EXPERIMENTS:**

1. To verify the law of Force Polygon

2. To verify the law of Moments using Parallel Force apparatus. (simply supported type)

3. To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.

wood, Aluminum) on an inclined plane.

4. To find the forces in the members of Jib Crane.

5. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.

6. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the Wheel and Axle

7. To determine the MA, VR,  $\Box \Box$  of Worm Wheel (2-start)

8. Verification of force transmitted by members of given truss.

9. To verify the law of moments using Bell crank lever

10. To find CG and moment of Inertia of an irregular body using Computation method.

Note:- Any 8-10 Experiments out of the list may be chosen.

С

1

Р

2

Paper (	PROGRAMMING LAB	Р	С
Paper	: Programming Lab	2	1
For prog	<b>LIST OF EXPERIMENTS</b> gram development an IDE e.g. CodeBlock <sup>[a]</sup> , Eclipse CDT <sup>[b]</sup> , Netbeans <sup>[c]</sup> is recommended	ed	
1.	Write a program to find divisor or factorial of a given number.		
2.	Write a program to find sum of a geometric series		
3.	Write a recursive program for tower of Hanoi problem		
4.	Write a recursive program to print the first m Fibonacci number		
5.	Write a menu driven program for matrices to do the following operation		
	depending on whether the operation requires one or two matrices		
	dition of two matrices		
	ptraction of two matrices		
	ding upper and lower triangular matrices		
	nspose of a matrix		
	duct of two matrices.		
6.	Write a program to copy one file to other, use command line arguments.		
7.	An array of record contains information of managers and workers of a company.		
	Print all the data of managers and workers in separate files.		
8.	Write a program to perform the following operators an Strings without using String		
	functions		
	To find the Length of String.		
	To concatenate two string.		
	To find Reverse of a string.		
	To Copy one sting to another string.		
9.	Write a Program to store records of an student in student file. The data must be stored		
	using Binary File.Read the record stored in "Student.txt" file in Binary code.Edit the	record st	tored in
	Binary File. Append a record in the Student file.		
10.	Write a programmed to count the no of Lowercase, Uppercase numbers and special		
	Characters presents in the contents of File.		
11.	Two Mini Projects based on the skills learned in experiments 1-10 [ These mini projects	cts may l	be done
	in a group not exceeding group size of 4 ]		
	[a] http://www.codeblocks.org/		
	[b] http://www.eclipse.org/cdt/		

Note:- Any 8-10 Experiments out of the list may be chosen.

- ne

[b] http://www.eclipse.org/cdt/
[c] https://netbeans.org/features/cpp/

#### ENVIRONMENTAL STUDIES LAB

#### Paper Code – ETEN-160 **Paper : Environmental Studies Lab**

#### LIST OF EXPERIMENTS

- 1. Determination of pH, conductivity and turbidity in drinking water sample. 2.
  - Determination of pH and conductivity of soil/sludge samples.
- Determination of moisture content of soil sample. 3.
- 4. Determination of Total Dissolved Solids (TDS) of water sample.
- 5. Determination of dissolved oxygen (DO) in the water sample.
- Determination of Biological oxygen demand (BOD) in the water sample. 6.
- Determination of Chemical oxygen demand (COD) in the water sample. 7.
- Determination of Residual Chlorine in the water sample. 8.
- 9. Determination of ammonia in the water sample.
- 10. Determination of carbon dioxide in the water sample.
- Determination of nitrate ions or sulphate ions in water using spectrophotometer. 11.
- 12. Determination of the molecular weight of polystyrene sample using viscometer method.
- 13. Base catalyzed aldol condensation by Green Methodology.
- 14. Acetylation of primary amines using eco-friendly method.
- 15. To determine the concentration of particulate matter in the ambient air using High Volume Sampler.

**P.S.**: For better understanding of various aspects of environment visits to local areas, depending upon easy access and importance may be planned to any nearby river, forest, grassland, hills and students should write a report based on their observations.

**Suggested Books:** 

- <u>A. I. Vogel</u>, <u>G. H. Jeffery</u>, *Vogel's Text Book of Quantitative Chemical Analysis*, Published by Longman Scientific & Technical, 5<sup>th</sup> Edition, 1989. 1.
- dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments). 2.
- S. Chawla, *Essentials of Experimental Engineering Chemistry*, Dhanpat Rai & Co., 3<sup>rd</sup> Edition, 2008. 3.
- S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria & Sons, 2<sup>nd</sup> Edition, 2003. 4.
- W. Cunningham and M. A. Cunningham, Principles of Environment Science: Enquiry and Applications, 5. Tata McGraw Hill Publication, N. Delhi, 2003.
- A. Kaushik and C. P. Kaushik, Perspectives in Environment Studies, 4th Edition, New Age International 6. Publishers, 2013.

Note:- Any 8-10 Experiments out of the list may be chosen.

Р С 2 1

#### APPLIED MATHEMATICS-III

Paper Code: ETMA-201	L	Т	С
Paper: Applied Mathematics-III	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of this course is to teach the students the applications of fourier series, fourier transform, difference equation and numerical methods to solve various engineering problems.

#### UNIT-I

Fourier series: Definition, Euler's formula, conditions for Fourier expansion, functions having points of discontinuity, change of intervals, even and odd functions ,half range series, Harmonic analysis. Fourier Transforms: Definition, Fourier integral, Fourier transform, inverse Fourier transform, Fourier sine and cosine transforms, properties of Fourier transforms (linearity, scaling, shifting, modulation), Application to partial differential equations.

#### [T2][No. of hrs 11]

#### UNIT-II

Difference equation: Definition, formation, solution of linear difference equation with constant coefficients, simultaneous difference equations with constant coefficients, applications of difference equations .Z- transform: Definition, Z- transform of basic functions, properties of Z-transform (linearity, damping, shifting, multiplication), initial value theorem, final value theorem, convolution theorem, convergence of Z- transform, inverse of Z- transform, Application to difference equations.

#### [T2][No. of hrs 11]

#### UNIT-III

Numerical Methods: Solution of algebraic and transcendental equations using bisection method, Regula-Falsi method and Newton – Raphson method. Solution of linear simultaneous equations using Gauss-Jacobi's iteration method and Gauss-Seidal's iteration methods.Finite differences: Forward differences, backward differences and Central differences. Interpolation: Newton's interpolation for equi-spaced values. Stirling's central difference interpolation formula, Divided differences and interpolation formula in terms of divided differences, Lagrange's interpolation formula for unequi-spaced values.

#### UNIT-IV

Numerical Differentiation, maxima and minima of a tabulated function. Numerical Integration: Newton-Cote's quadrature formula, Trapezoidal rule, Simpson's one-third rule and Simpson's three-eighth rule .Numerical solution of ordinary differential equations: Picard's method, Taylor's method, Euler's method, modified Euler's method, Runge-Kutta method of fourth order.

#### [T1,T2][No. of hrs 11]

[T1,T2] [No. of hrs 11]

#### **Text Books:**

- [T1] R.K. Jain and S.R.K. Iyengar," Numerical methods for Scientific and Engineering Computation", New Age Publishing Delhi-2014.
- [T2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications, 2014 Edition.

#### **Reference Books:**

- [R1] E. kresyzig, "Advance Engineering Mathematics", Wiley publications
- [R2] P. B. Patil and U. P. Verma, "Numerical Computational Methods", Narosa
- [R3] Partial Differential Equations" Schaum's Outline Series, McGraw Hill.
- [R4] Michael Greenberg, "Advance Engineering mathematics", Pearson.
- [R5] Schaum's Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw-Hill

#### **MAXIMUM MARKS: 75**

#### ANALOG ELECTRONICS-I

Paper Code: ETEC-203	L	Т	С
Paper: Analog Electronics-I	3	1	4

#### INSTRUCTIONS TO PAPER SETTERS:

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of teaching this subject is to impart in depth understanding of the concepts of biasing in active circuits and employing simple models to represent nonlinear and active elements in circuits. It also includes the operation of the circuits at high frequencies and effects of feedback. The analysis of power amplifier & tuned amplifiers is also dealt with.

#### UNIT – I

Review of diode and BJT, Bias stabilization: Need for stabilization, fixed Bias, emitter bias, self-bias, bias stability with respect to variations in  $I_{co}$ ,  $V_{BE}$  &  $\beta$ , Stabilization factors, thermal stability. Bias compensation techniques.

**Small signal amplifiers:** CB, CE, CC configurations, hybrid model for transistor at low frequencies, RC coupled amplifiers, mid band model, gain & impedance, comparisons of different configurations, Emitter follower, Darlington pair(derive voltage gain, current gain, input and output impedance). Hybrid-model at high frequencies ( $\pi$  model).

#### [T1,T2,T3][No. of Hours: 11]

#### UNIT – II

**Multistage Amplifiers:** Cascade and cascode amplifiers, Calculations of gain, impedance and bandwidth. Design of multistage amplifiers.

**Feedback Amplifiers:** Feedback concept, Classification of Feedback amplifiers, Properties of negative Feedback amplifiers, Impedance considerations in different configurations. Analysis of feedback Amplifiers.

#### [T1,T2,T3][No. of Hours: 11]

#### UNIT – III

**Field Effect Transistor:** Introduction, Classification, FET characteristics, Operating point, Biasing, FET small signal Model, enhancement & Depletion type MOSFETS, MESFET, FET Amplifier configurations (CD,CG and CS).

Introduction to UJT, SCR, Triac and Diac (working, construction, characteristics and application), UJT relaxation oscillator.

#### [T1,T2,T3][No. of Hours: 11]

#### UNIT – IV

**Power Amplifiers:** Power dissipations in transistors, Amplifiers Classification, (Class-A, Class-B, Class-C, Class-AB) Efficiency analysis, Push-pull and complementary Push-pull amplifiers, cross over distortion and harmonic distortion in push pull amplifier. Tuned amplifiers(single,double & stagger tuned amplifier).

#### [T1,T2,T3][No. of Hours: 11]

#### **Text Books:**

- [T1] Boylestad & Nashelsky, "Electronic Devices & Circuit Theory" PEARSON PUBLICATION.
- [T2] Salivahanan, Suresh Kumar, Vallavaraj, "Electronic devices and circuits" TMH, 1999.
- [T3] J. Millman and Halkias, "Integrated Electronics, Analog & Digital Circuits & Systems" TMH 2000.

#### **Reference Books:**

- [R1] Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, 2000
- [R2] B.Kumar & Shail Bala Jain, "Electronic Devices And Circuits" PHI
- [R3] David A Bell, "Electronic Devices and Circuits", Oxford University Press, 2000.
- [R4] Albert Malvino, David J.Bates, "Problems and Solutions in Basic Electronics", TMH.

#### SWITCHING THEORY AND LOGIC DESIGN

Paper Code: ETEC-205	L	T/P	С
Paper: Switching Theory and Logic Design	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.

#### UNIT- I

**Number Systems and Codes**:- Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.

**Switching Theory: -** Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions-Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.

**Combinational Logic Circuits:**- Review of basic gates- Universal gates, Adder, Subtractor ,Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

#### [T2,T3][No. of Hrs. 14]

#### UNIT- II

**UNIT-III** 

**Integrated circuits:** - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.

Sequential Logic Circuits: - Latches and Flip Flops- SR, , D, T and MS-JK Flip Flops, Asynchronous Inputs.

**Counters and Shift Registers**:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters, Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

#### [T2,T3][No. of hrs. 10]

**Synchronous Sequential Circuits**:- State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.

**Finite state machine-**capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and merger chart methods-concept of minimal cover table.

#### UNIT- IV

#### [T1][No. of hrs. 10]

[T1][No. of hrs. 10]

Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.

**Fault Detection and Location:** Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

#### **Text Book:**

- [T1] Zyi Kohavi, "Switching & Finite Automata Theory", TMH, 2<sup>nd</sup> Edition
- [T2] Morris Mano, Digital Logic and Computer Design", Pearson
- [T3] R.P. Jain, "Modern Digital Electronics", TMH, 2<sup>nd</sup> Ed,

#### **Reference Books:**

- [R1] A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
- [R2] Taub ,Helbert and Schilling, "Digital Integrated Electronics", TMH

#### ELECTRONIC INSTRUMENTS AND MEASUREMENTS

Paper Code : ETEC-207	$\mathbf{L}$	T/P	С
Paper: Electronic Instruments and Measurements	3	1	4

#### INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: Electronic Instruments are being used in industries and in Labs. The subject provides material for a first course on electronic instruments. It details the basic working and use of different instruments.

#### UNIT – I Introduction to Metering

Performance Characteristics of Instruments: Static Characteristics, Dynamic Characteristics. Errors in Measurement: Types of Static Errors, Gross Errors, Systematic Errors, Random Errors, Sources of Errors.

Basic Meter Movement: Moving Coil and Moving Iron type of instruments.

Display Devices: Digital display system and indicators, Classification of displays, Light Emitting Diodes (LED), Liquid Crystal Display (LCD).

Printers: Classification of Printers, Drum Printer, Dot-Matrix, ink-jet & Laser-jet Printers.

Electrical Standards & Calibration.

#### UNIT – II Basic Instruments

DC Ammeter, Multi range ammeters, Extending of ammeter ranges, RF Ammeter, Effect of frequency on calibration. DC Voltmeter, Multi range voltmeter, extending Voltmeter ranges, Transistor Voltmeter, Chopper type DC amplifier Voltmeter (Micro-voltmeter), Solid-State Voltmeter, AC Voltmeter using rectifiers, True RMS Voltmeter.

Digital Metering: Dual slope integrating type DVM (Voltage to Time conversion), Integrating type DVM (Voltage to Frequency Conversion), Resolution and sensitivity of digital meters, General specifications of a DVM, Digital Multimeters, Digital frequency meter, Digital measurement of time, Universal counter, Electronic counter, Digital tachometer, Digital pH meter, Digital phase meter, Digital capacitance meter.

#### [T1 T2][No. of Hrs: 14]

#### UNIT – III Cathode Ray Oscilloscope

Basic Principle, CRT features, Block diagram of oscilloscope, single/dual beam CRO, dual trace oscilloscope, (VHF) sampling oscilloscope, storage oscilloscope (For VLF Signal). Measurement of phase and frequency by Lissajous figures method. Oscilloscope as a Bridge Null detector, standard specifications of a single beam CRO, probes for CRO, Digital Storage Oscilloscope (DSO), Fiber Optic CRT recording oscilloscope.

#### [T1 T2][No. of Hrs: 10]

#### **UNIT – IV Electronic Instruments**

Fixed / Variable Frequency AF Oscillator, Signal Generator, Function Generator, (sine, square and triangular wave generator), Frequency selective and Heterodyne Wave Analyzer.

Digital Data Recording, Potentiometric Recorder (Multipoint), Digital Memory Waveform Recorder (DWR),

Introduction to transducers, Data Acquisition System: Introduction, Objective of a DAS, Single Channel Data Acquisition System, Multi-Channel DAS.

#### **Text Books:**

- [T1] A. K. Shawney Electrical & Electronic Measurement & Instruments, Dhanpat Rai & Sons Publication
- [T2] H.S. Kalsi, "Electronic Instrumentation" Tata McGraw-Hill.

#### **Reference Books:**

- [R1] W. D. Cooper, "Modern Electronics Instrumentation & Measurement Techniques" PHI, 1998.
- [R2] E. W. Gloding and F. C. Widdis Electrical Measurements and measuring Instruments, Wheeler Publishing, fifth Edition.
- [R3] Reissland, M. U. "Electrical Measurements: Fundamentals, Concepts, Applications", New age International (P) Limited, Publishers.

#### [T1 T2][No. of Hrs: 10]

# [T1,T2][No. of Hrs.: 10]

**MAXIMUM MARKS: 75** 

## **DATA STRUCTURES**

Paper Code: ETCS-209	L	Т	С
Paper: Data Structures	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

#### Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand the programming and the various techniques for enhancing the programming skills for solving and getting efficient results.

## **UNIT – 1:**

Introduction to programm ing methodologies and design of algorithms. Abstract Data Type, array, array organization, sparse array. Stacks and Stack ADT, Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.

## UNIT – II:

Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expression trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

## UNIT – III:

Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B\* and B+ Trees. Graphs, Graph representation, Graph traversal. [T1,T2][No. of hrs. 12]

## UNIT – IV:

Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (only 2-way merge sort). Searching – List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

## [T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

## **Text Books:**

- [T1] R. F. Gilberg, and B. A. Forouzan, "Data structures: A Pseudocode approach with C", Thomson Learning.
- [T2] A.V. Aho, J. E. Hopcroft, J. D. Ulman "Data Structures and Algorithm", Pearson Education.

## **Reference Books:**

- [R1] S. Sahni and E. Horowitz, "Data Structures", Galgotia Publications.
- [R2] Tanenbaum: "Data Structures using C", Pearson/PHI.
- [R3] T.H. Cormen, C.E. Leiserson, R.L. Rivest "Introduction to Algorithms", PHI/Pearson.
- [R4] A.K.Sharma, "Data Structures", Pearson
- [R5] Ellis Horowitz and Sartaz Sahani "Fundamentals of Computer Algorithms", Computer Science Press.

## SIGNALS AND SYSTEMS

Paper Code: ETEC-211	L	T/P	С
Paper: Signals and Systems	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: This is the first course for representation of various types of electronic signals and LTI systems. Applications of Fourier series, understanding of Fourier transforms and sampling of various signals. Analysis of various systems using the Z transforms, Laplace transforms.

## UNIT- I

**Continuous And Discrete Time Signals:** Definition of signal, Classification of Signals: Periodic and Aperiodic, Even and Odd, Energy and Power signals, Deterministic and Random signals.

**Singular Functions**: Unit impulse, unit step, unit ramp, complex and exponential, parabolic, Signum, Sinc etc. Properties of unit impulse in continuous and discrete domain, properties of basic functions w.r.t. orthogonality.

**Transformation in independent variable of signals**: Time scaling, Time shifting, Amplitude scaling. Representation of signals in terms of singular function and orthogonal functions.

**Systems:** Definition of system, types of systems: Linear and nonlinear, static and dynamic, causal and non-causal, time variant and invariant, invertible and non-invertible, stable and non-stable. System described by differential equation and difference equation.

**LTI System:** Properties of LTI System, impulse response, convolution and its properties in continuous and discrete domain with proof. Linear convolution in continuous and discrete domain using graphical method, using general formula and matrix method.

## [T1, T2] [No. of Hrs. 12]

## UNIT- II

**Fourier series:** Need and application of Fourier series. Fourier series representation of continuous time and discrete time signals using exponential method and trigonometric method. Magnitude and Phase spectrum of signals.

 Fourier Transform: Properties of the Continuous time and discrete time Fourier Transform. Magnitude and Phase representations of frequency response of LTI systems Analysis and characterization of LTI systems using Differential Equations and Difference equation.

 [T1,T2][No. of Hrs.

 11]

## UNIT- III

Magnitude- Phase Representation of Frequency Response of LTI System: Linear phase, concept of phase delay and group delay. All pass system.

Laplace Transform: Properties of Laplace transform, concept of ROC and its properties. Computation of impulse response & transfer function using Laplace transform. Inverse-Laplace transforms. Computation of impulse response, total response (zero state and zero input response) & transfer function using Laplace transform.

## [T1, T2] [No. of Hrs. 11]

## UNIT- IV

**Sampling:** Sampling of low pass signals, ideal sampling, Aliasing effect, Nyquist rate, reconstruction of signal. Sampling of discrete time signals.

Z Transform: Region of convergence – properties of ROC, Properties of Z-transform.

**Inverse Z-transform** using contour integration - Residue theorem, Power series expansion and partial fraction expansion. Relationship between Z-transform, Fourier transform and Laplace transform. Computation of impulse response, total response (Zero state and Zero input response) & Transfer function using Z-Transform. Stability of discrete-time LTI System.

[T1, T2] [No. of Hrs. 10]

## **Text Books:**

- [T1] AlanV.Oppenheim, Alan S.Willsky, S.Hamid Nawab, "Signals & Systems", 2nd edition, Pearson Education, 1997.
- Simon Haykin and Barry Van Veen, "Signals and Systems", John Wiley, 1999. [T2]

## **Reference Books:**

- [R1] M.J.Roberts, "Signals and Systems Analysis using Transform Method and MATLAB", TMH 2003.
- Tarun kumar rawat "signals and systems", Oxford University Press, Incorporated, 2010 A. Anand kumar, "signals and systems" 3<sup>rd</sup> edition, PHI [R2]
- [R3]
- Ramesh Babu and R.Anandanatrajan ,"Signals and system", 4th edition Sci Tech ,2013 [R4]
- Moman .H. Hays, "Digital Signal Processing", Schaum's outlines, Tata McGraw-Hill2004. [R5]
- John G.Proakis and Dimitris G.Manolakis, "Digital Signal Processing, Principles, Algorithms and [R6] Applications", 3<sup>rd</sup> edition. PHI, 2000.

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## ANALOG ELECTRONICS-I LAB

Paper Code: ETEC-251	L	T/P	С
Paper: Analog Electronics-I Lab	0	2	1

## List of Experiments:

- Plotting input and output characteristics and calculation of parameters of a transistor in common emitter conf iguration
- 2. Transistor biasing circuit. Measurement of operating point (Ic and Vce) for a :
  - i. fixed bias circuit
  - ii. Potential divider biasing circuit.
- 3. Plot the FET characteristics & MOSFET characteristics.
- 4. Two Stage R.C. Coupled Amplifier.
  - i. To measure the overall gain of two stages at 1 KHz and compare it with gain of Ist stage, Also to observe the loading effect of second stage on the first stage.
  - ii. To plot the frequency response curve of two stage amplifier.
- 5. To study Emitter follower circuit & measurement of voltage gain and plotting of frequency response Curve.
- 6. Feedback in Amplifier. Single stage amplifier with and without bypass capacitor, measurement of voltage gain and plotting the frequency response in both cases.
- 7. To determine and plot firing characteristics of SCR by varying anode to cathode voltage, and varying gate current.
- 8. To note the wave shapes and voltages at various points of a UJT relaxation oscillator circuit.
- 9. Transistorized push pull amplifier & Measurement of optimum load, maximum undistorted power (by giving maximum allowable signal) Efficiency and percentage distortion factor.
- 10. To study the characteristics of single tuned & double tuned amplifier.

Note: It is advised to use PSPICE software and the hardware design for performing and evaluation of the above circuits.

NOTE: - At least 8 Experiments out of the list must be done in the semester

## SWITCHING THEORY AND LOGIC DESIGN LAB

Paper Code: ETEC-253	L	T/P	С
Paper: Switching Theory and Logic Design Lab	0	2	1

## **List of Experiments:**

- 1. Realize all gates using NAND & NOR gates
- 2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
- 3. Realize a BCD adder
- 4. Realize a Serial Adder
- 5. Realize a four bit ALU
- 6. Realize Master-Save J K Flip-Flop, using NAND/NOR gates
- 7. Realize Universal Shift Register
- 8. Realize Self-Starting, Self Correcting Ring Counter
- 9. Realize Multiplexer and De-Multiplexer
- 10. Realize Carry Look ahead Adder / Priority Encoder
- 11. Simulation of PAL and PLA
- 12. Simulation Mealy and Moore State machines

## NOTE: - At least 8 Experiments out of the list must be done in the semester

3

## **ELECTRONIC INSTRUMENTS AND MEASUREMENTS LAB**

Paper Code: ETEC - 257	L	T/P	С
Paper: Electronic Instruments and Measurements Lab	0	2	1

## List of Experiments

- 1. Study and demonstration of different types of display devices.
- 2. Measurement of resistance, voltage and current using digital multimeter / clamp meter.
- 3. Calibration of Ammeter and Voltmeter.
- 4. Measurement of resistance, inductance and capacitance using digital RLC meter.
- 5. Measurement of frequency and time period using digital frequency meter.
- 6. Study and demonstration of universal frequency counter.
- 7. Study and measurement of voltage, frequency and phase difference of a.c. quantities using C.R.O.
- 8. Measurement of inductance and capacitance using C.R.O.
- 9. Study and measurement of quantities using D.S.O.
- 10. Study of function generator.
- 11. Study and use of different types of transducers.
- 12. Study of different types of recorders /Printers.
- 13. To study and use different types of ADC and DAC.
- 14. To study functioning and applications of Wave Analyzer.

## NOTE: - At least 8 Experiments out of the list must be done in the semester

## DATA STRUCTURES LAB

## Paper Code: ETCS-255 Paper: Data Structures Lab

## L T/P C 0 2 1

## List of Experiments:

- 1. Perform Linear Search and Binary Search on an array.
  - Description of programs:
  - a. Read an array of type integer.
  - b. Input element from user for searching.
  - c. Search the element by passing the array to a function and then returning the position of the element from the function else return -1 if the element is not found.
  - d. Display the position where the element has been found.
- 2. Implement sparse matrix using array.

Description of program:

- a. Read a 2D array from the user.
- b. Store it in the sparse matrix form, use array of structures.
- c. Print the final array.
- 3. Create a linked list with nodes having information about a student and perform
  - I. Insert a new node at specified position.
  - II. Delete of a node with the roll number of student specified.
  - III. Reversal of that linked list.

4. Create doubly linked list with nodes having information about an employee and perform Insertion at front of doubly linked list and perform deletion at end of that doubly linked list.

5. Create circular linked list having information about an college and perform Insertion at front perform Deletion at end.

6. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linked list.

7. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display the queue elements.

8. Create a Binary Tree (Display using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.

9. Implement insertion, deletion and display (inorder, preorder and postorder) on binary search tree with the information in the tree about the details of a automobile (type, company, year of make).

10. To implement Insertion sort, Merge sort, Quick sort, Bubble sort, Bucket sort, Radix sort, Shell sort, Selection sort, Heap sort and Exchange sort using array as a data structure.

## NOTE:- At least 8 Experiments out of the list must be done in the semester.

## SIGNALS AND SYSTEMS LAB

Paper Code: ETEC-259	L	T/P	С
Paper: Signals and Systems Lab	0	2	1

## **List of Experiments**

- 1. Introduction to MATLAB and its basic commands.
- 2. Plot unit step, unit impulse, unit ramp, exponential, parabolic functions and sinusoidal signals
- 3. Plot the linear convolution of two sequences.
- 4. Plot the correlation of two sequences.
- 5. Plot the magnitude and phase spectra of a signal using Fourier transforms.
- 6. Plot the magnitude and phase spectrum of signal using Fourier series.
- 7. Find out the Z transform of a signal and check the stability using pole zero location.
- 8. Plot the spectra of ideally sampled signal w.r.t. sampling of Discrete time signals.
- 9. Verification of few properties of Fourier transform.
- 10. Evaluate the DTFS coefficients of a signal and plot them.
- 11. Plot the step response for any impulse response entered by user.

NOTE: - At least 8 Experiments out of the list must be done in the semester

## <u>APPLIED MATHEMATICS – IV</u>

Paper Code: ETMA-202	L	T/P	С
Paper: Applied Mathematics –IV	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

*Objective: To equip the students with the mathematical tools for problem solving in various engineering disciplines.* 

## UNIT – I

UNIT II:

Partial Differential Equation: linear partial differential equations with constant coefficient, homogeneous and non homogeneous linear equations. Method of separation of variables. Laplace equation, wave equation and heat flow equation in Cartesian coordinates only with initial and boundary value.

## [T1][No. of Hrs. 12]

Probability Theory: Definition, addition law of probability, multiplication law of probability, conditional probability, Baye's theorem, Random variable: discrete probability distribution, continuous probability distribution, expectation, moments, moment generating function, skewness, kurtosis, binomial distribution, Poisson distribution, normal distribution.

## [T1, T2][No. of Hrs. 11]

UNIT-III:

Curve Fitting: Principle of least square Method of least square and curve fitting for linear and parabolic curve, Correlation Coefficient, Rank correlation, line of regressions and properties of regression coefficients. Sampling distribution: Testing of hypothesis, level of significance, sampling distribution of mean and variance, Chi-square distribution, Student's T- distribution, F-distribution, Fisher's Z- distribution.

## [T1, T2][No. of Hrs. 12]

## UNIT IV

Linear Programming: Introduction, formulation of problem, Graphical method, Canonical and Standard form of LPP, Simplex method, Duality concept, Dual simplex method, Transportation and Assignment problem.

[T1][No. of Hrs. 11]

## **Text Books:**

- [T1] B. S. Grewal, "Higher Engineering Mathematics", Khanna Publications.
- [T2] N.M. Kapoor, "Fundamentals of Mathematical Statistics", Pitambar Publications

## **References Books:**

- [R1] E. Kresyzig," Advance Engineering Mathematics", Wiley publications
- [R2] Miller and Freund, "Probability and statistics for Engineers", PHI
- [R3] Gupta and Kapoor, "Fundamentals of Mathematical Statistics" Sultan Chand and Sons
- [R4] G. Hadley, "Linear Programming", Narosa.
- [R5] Schaum's Outline on "Probability and Statistics" Tata McGraw-Hill
- [R6] Gupta and Manmohan, "Problems in Operations Research", Sultan Chand and Sons.
- [R7] R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics" Narosa Publications.

## Maximum Marks: 75

## ANALOG ELECTRONICS – II

Paper Code: ETEC-204	L	T/P	С
Paper: Analog Electronics – II	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective:- The objective of teaching this subject is to give students in depth knowledge of design and analysis of analog IC (OP-AMP, OTA), The internal details of OP-AMP and measurement of its parameters is elaborated. The linear and nonlinear applications, useful for practical circuits, are detailed. Some important and widely used ICs such as 555 timer IC,PLL & VCO, Voltage Regulator IC etc., are also included.

## Unit – I

Introduction to Op-Amp : Differential amplifier using BJT, Block diagram of op-amp, pin diagram of 741 IC, characteristics of ideal Op-Amp, equivalent circuit of Op-Amp, ideal voltage transfer curve, Op-Amp ac and dc parameters. Building blocks of Analog ICs: Differential amplifier using single and two op-amp, virtual ground, circuit for improving CMRR, Wilson & Widlar Current mirrors, Active loads, Level shifters and output stages, instrumentation amplifier using Op-Amp.

## [T1,T2][No. of Hours: 11]

Maximum Marks: 75

## Unit – II

**Linear & Non Linear Wave shaping:** , Inverting and non-inverting amplifiers, voltage follower, difference amp, adders, Voltage to current with floating & grounded load, current to voltage converter, practical integrator & differentiator, Clipping & Clamping circuits, Comparators, log/antilog circuits using Op-Amps, precision rectifiers(half & full wave), peak detector, Inverting & non inverting Schmitt trigger circuit.

waveform generations: Sine wave generator (Phase shift, Wein bridge, Hartley & Colpitts), Barkhausen criteria of oscillations, conditions for oscillation, cystal oscillator.

## [T1,T2][No. of Hours: 11]

## Unit – III

Unit – IV

Waveform generators: Square and triangular waveform generators (determine period and frequency), saw tooth wave generator, Astable multi-vibrator, Monostable and Bistable Multivibrator.

Active RC Filters: Idealistic & Realistic response of filters (LPF, BPF, HPF, BRF), Butter worth & Chebyshev approximation filter functions All pass, Notch Filter.

## [T1,T2][No. of Hours: 11]

Introduction to 555 Timer IC: Functional and block diagram of 555 timer, Application of 555 timer as astable and monostable multivibrator. Operational transconductance amplifier (OTA)-C filters.OTA integrator & differentiator, Introduction to current conveyer. Applications of IC Analog Multiplier: IC phase locked loops, IC voltage regulators, IC VCO.

## [T1,T2][No. of Hours: 11]

## **Text Books:**

- [T1] S Salivahanan, V S Kanchana Bhaaskaran, "Linear Integrated Circuits" TMH.
- [T2] Op Amps And Linear Integrated Circuits, Ramakant A Gayakwad, PHI.

## **Reference Books:**

- [R1] D. Roy Choudhary, Shail B Jain, "Linear Integrated Circuits" New Age Publisher, 1999.
- [R2] M.Rashid, "Microelectronic Circuit", Cengage Learning Publication.
- [R3] Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, 2000
- [R4] David A Bell, "Operational Amplifiers and Linear IC's", PHI.

## NETWORK ANALYSIS AND SYNTHESIS

Paper Code: ETEC-206	L	T/P	С
Paper: Network Analysis and Synthesis	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Q. No.1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

**Objective:** The purpose of this course is for each student to learn and further explore the techniques of advanced circuit analysis. The concepts and analytical techniques gained in this course (e.g., signals, Laplace transformation, and frequency response) will enable students to build an essential foundation of many fields within electrical engineering, such as control theory, analog electronic circuits, signal processing.

## UNIT-I

**Review** of signals & systems and their classification, periodic waveforms and signal synthesis, properties and applications of Laplace transform of complex waveform. Concept of generalized frequency, circuit representation & their response in terms of generalized frequency.

## UNIT-II

System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuits for impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform.

[T1, T2] [No. of Hours: 12]

[T1, T2] [No. of Hours: 10]

## UNIT-III

**Two port networks** – Introduction of two port parameters and their interconversion, interconnection of two 2-port networks, open circuit and short circuit impedances and ABCD constants relation between image impedances and short circuit and open circuit impedances.

## [T1,T2] [No. of Hours: 10]

## UNIT IV

**General Network Functions:** Concepts of Network functions (driving point and transfer function), concept of minimum phase analysis of Lattice T and Bridged T networks. Concept of poles & zeros. Hurwitz polynomial, positive real function and synthesis of LC, RC, RL Networks in Foster's I and II, Cauer's I & II forms, Introduction of passive filter and their classification, frequency response, characteristic impedance of low pass and high pass prototype section.

## [T1,T2][No. of Hours: 12]

## **Text Books:**

- [T1] W. H. Hayt "Engineering Circuit Analysis" TMH Eighth Edition
- [T2] Valkenburg, "Network analysis" PHI,

## **Reference Books**

- [R1] S Salivahanan, "Circuit Theory", Vikas Publishing House 1<sup>st</sup> Edition 2014
- [R2] D. R. Choudhary, "Networks and Systems" New Age International, 1999.
- [R3] Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design" Umesh Publication, 2000.
- [R4] Kuo, "Network analysis and synthesis" John Weily and Sons, 2<sup>nd</sup> Edition.
- [R5] Allan H Robbins, W.C.Miller "Circuit Analysis theory and Practice", Cengage Learning Pub 5<sup>th</sup> Edition 2013
- [R6] Bell "Electric Circuit" Oxford Publications 7<sup>th</sup> Edition

## Maximum Marks: 75

## COMMUNICATION SYSTEMS

Paper Code: ETEC-212	L	T/P	С
Paper: Communication Systems	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

*Objective: This is the first course which introduces the concepts of communication systems, channels and various analog modulation methods. Further, an insight into the behavior of noise is dealt.* 

## UNIT I

Introduction: Overview of Communication system, Communication channels, Mathematical Models for Communication Channels

**Introduction of random Variables:** Definition of random variables, PDF, CDF and its properties, joint PDF, CDF, Marginalized PDF, CDF, WSS wide stationery, strict sense stationery, non stationery signals, UDF, GDF, RDF, Binomial distribution, White process, Poisson process, Wiener process.

## [T1, T2][No. of Hrs. 11]

UNIT II

**Amplitude Modulation:** Need for modulation, Representation of Band Pass signals and systems: Hilbert Transform, In-phase, Quad-phase representations, Power relation, modulation index, Bandwidth efficiency, AM: modulation and demodulation, DSB-SC: Modulation and demodulation, SSB: modulation and demodulation, VSB: modulation and demodulation.

## [T1, T2][No. of Hrs. 11]

## UNIT III

**Angle Modulation Systems:** Frequency Modulation, Types of Frequency Modulation, Generation of NBFM, WBFM, Transmission BW of FM Signal, Phase Modulation, Relationship between PM& FM.

**Radio Receivers:** Functions & Classification of Radio Receivers, Tuned Radio Frequency (TRF) Receiver, Superheterodyne Receiver, Basic Elements, Receiver Characteristics, Frequency Mixers, AGC Characteristics.

## [T1, T2][No. of Hrs. 11]

## UNIT IV

**Noise Theory:** Noise, Types of noise, Addition of Noise due to several sources in series and parallel, Generalized Nyquist Theorem for Thermal Noise, Calculation of Thermal Noise for a Single Noise Source, RC Circuits & Multiple Noise sources. Equivalent Noise Bandwidth, Signal to Noise Ratio, Noise-Figure, Noise Temperature, Calculation of Noise Figure

**Performance of Communication Systems:** Receiver Model, Noise in DSB-SC Receivers, Noise in SSB-SC Receivers, Noise in AM receiver (Using Envelope Detection), Noise in FM Receivers, FM Threshold Effect, Threshold Improvement through Pre-Emphasis and De-Emphasis, Noise in PM system – Comparison of Noise performance in PM and FM, Link budget analysis for radio channels.

## [T1, T2][No. of Hrs. 11]

## **Text Books**

- [T1] John G. Proakis & Masoud Salehi, "Communication System Engineering", Pearson Education.
- [T2] Haykin, S., "Communication Systems", John Wiley (2009) 4th ed.

## **Reference Books**

- [R1] Taub, H., "Principles of Communication Systems", McGraw-Hill (2008) 3rd ed.
- [R2] Kennedy, G., "Electronic Communication Systems", McGraw-Hill (2008) 4th ed.
- [R3] V. Chandra Sekar "Analog Communication", Oxford University Press, Incorporated, 2010
- [R4] John G Proakis, M.Salehi and G.Bauch "Modern Communication System Using MATLAB" Cengage Learning, 3<sup>rd</sup> edition, 2013
- [R5] J. C. Hancock, "An Introduction to the Principles of Communication Theory", TMH, 1998.
- [R6] Peebles, "Probability and Stochastic Process" Prentice Hall; 3 edition

## Maximum Marks: 75

## ELECTROMAGNETIC FIELD THEORY

Paper Code: ETEE-210	L	T/P	С
Paper: Electromagnetic Field Theory	3	0	3

## INSTRUCTIONS TO PAPER SETTERS:

## **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To list Maxwell's equations and solve them for specific regular geometries, understand general electromagnetic wave propagation and how the plane wave solution can be used to approximate real situation, describe the boundary conditions for electric and magnetic fields at dielectric interfaces, interpret the effects of lossy and low loss dielectrics upon the propagation of electromagnetic waves, and predict this process in specific applications and solve the performance of specific transmission lines.

## UNIT I

**Introduction**: Review of scalar and vector field, Dot and Cross products, Coordinate Systems-Cartesian, cylindrical and spherical. Vector representation of surface, Physical interpretation of gradient divergence and curl, Transformation of vectors in different co-ordinate systems, dirac-delta function.

**Electrostatics**: Electric field due to point-charges, line charges and surface charges, Electrostatic potential, Solution of Laplace and Poisson's equation in one dimension, M-method of image applied to plain boundaries, field mapping and conformal transformation, Electric flux density, Boundary conditions. Capacitance: calculation of capacitance for simple rectangular, cylindrical and spherical geometries, Electrostatic energy.

## [T1,T2][No. of Hrs. : 10]

## UNIT II

**Magnetostatics** : Magnetic Induction and Faraday's Law, Magnetic Flux Density, Magnetic Field Strength H, Ampere, Gauss Law in the Differential Vector Form, Permeability, Energy Stored in a Magnetic Field, Ampere's Law for a Current Element, Volume Distribution of Current , Ampere's Law Force Law, Magnetic Vector Potential, The Far Field of a Current Distribution, Maxwell's Equations: The Equation of Continuity for Time Varying Fields, Inconsistency of Ampere's Law, Maxwell's Equations, Conditions at a Boundary Surface.

## [T1,T2][No. of Hrs. : 10]

## UNIT III

**Electromagnetic Waves**: Continuity equations, Displacement current, Maxwell's equation, Boundary conditions, Plane wave equation and its solution in conducting and non-conducting media, Phasor notation, Phase velocity, Group velocity, Depth of penetration, Conductors and dielectrics, Impedance of conducting medium. Polarization, Reflection and refraction of plane waves at plane boundaries, Poynting vectors, and Poynting theorem.

## [T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 10]

## UNIT IV

**Transmission Lines:** Transmission line equations, Characteristic impendence, Distortion-less lines, Input impendence of a loss less line, computation of primary and secondary constants, Open and Short circuited lines, Standing wave and reflection losses, Impedance matching, Loading of lines, Input impedance of transmission lines, RF lines, Relation between reflection coefficient and voltage standing wave ratio (VSWR), Lines of different lengths –  $\lambda/2$ ,  $\lambda/4$ ,  $\lambda/8$  lines, Losses in transmission lines, Smith chart and applications, impedance matching Single stub, Double stub..

## Text Books:-

- [T1] Matthew N. O. Sadiku, "Elements of Electromagnetics", Oxford University Press
- [T2] E. C. Jordon, K. G. Balman, "Electromagnetic Waves & Radiation System" PHI 2nd Edition

## **Reference Books:**

- [R1] William H. Hayt, "Engineering Electromagnetics", TMH
- [R2] J.D. Kraus, "Electromagnetics", TMH
- [R3] David K. Cheng," Field and Wave Electromagnetic", 2<sup>nd</sup> Edition, Pearson Education Asia,2001
- [R4] John R. Reitz, "Foundations of Electromagnetic Theory". Pearson

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

## **COMPUTER ORGANIZATION & ARCHITECTURE**

Paper Code: ETCS-204	L	T/P	С
Paper: Computer Organization & Architecture	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand the architecture and organization of computer in depth.

## UNIT- I

## Basic Computer Organization and Register transfer language:

Over view of basic digital building blocks, Basic structure of a digital computer: Von-Neuman architecture, Introduction to types of buses, Bus and memory transfer, Bus architecture using multiplexer and tri-state buffer, register transfer language, Micro operation: arithmetic, logical, shift micro operation with hardware implementation, Arithmetic Logic Shift Unit.

Levels of programming languages: Machine language, Assembly language, High level language, programme development steps: compiling and assembling programmes.

[T1,T2][No. of hrs. 10]

## UNIT- II

## **Computer Design and Instruction set architecture**

Instruction codes, General computer registers with common bus system, addressing modes, computer instructions: Memory Reference, Register reference, Input-Output Instructions, Instruction cycle, Input-Output configuration and interrupt cycle.

Internal architecture of 8085 microprocessor: Pin diagram, 8085 instruction set.

[T1,T2][No. of hrs. 12]

## UNIT- III

## **CPU Design:**

Hardwired Control Unit, Timing and control, Micro Programmed Control Unit: Control memory and address sequencing.

Pipelining: Introduction to Flynn's classification, arithmetic pipeline, instruction pipeline, pipeline conflict and hazards.

Computer arithmetic: Unsigned, Signed 1's, 2's compliment notations, addition, subtraction, multiplication and division (Hardware implementation), introduction to floating point notation: IEEE 754 standard.

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

## UNIT- IV

**Memory & Input/output organization:** Memory Hierarchy, Main Memory (RAM and ROM Chips), Virtual memory, Cache memory and mappings.

Input/Output interface: I/O bus and interface modules, I/O bus Vs memory bus, Isolated Vs Memory mapped I/O, Bus arbitration, modes of transfer.

## **Text Books:**

- [T1] M. Morris, Mano, "Computer System Architecture", PHI 3<sup>rd</sup> Edition 2007.
- [T2] Carl Hamacher, "Computer Organization", McGraw Hill, 5<sup>th</sup> Edition 2002.

## **Reference Books:**

- [R1] W. Stallings, "Computer organization and Architecture", PHI, 7<sup>th</sup> ed, 2005.
- [R2] R. Gaonker, "MicroProcessor Architecture, Programming and Application with the 8085, 5<sup>th</sup> Edition
- [R3] J. D. Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 2006.
- [R4] J. P. Hayes, "Computer Architecture and Organization", McGraw Hill, 1988.
- [R5] J. L Hennessy and D. A. Patterson, "Computer Architecture: A quantitative approach", Morgon Kauffman, 1992.

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

## Maximum Marks: 75

## APPLIED MATHEMATICS LAB

## Paper Code: ETMA-252 Paper: Applied Mathematics Lab

## List of Experiments:-

- 1. Solution of algebraic and transcendental equation.
- 2. Algebra of matrices: Addition, multiplication, transpose etc.
- 3. Inverse of a system of linear equations using Gauss-Jordan method.
- 4. Numerical Integration.
- 5. Solution of ordinary differential equations using Runge-Kutta Method.
- 6. Solution of Initial value problem.
- 7. Calculation of eigen values and eigen vectors of a matrix.
- 8. Plotting of Unit step function and square wave function.

It is expected that atleast 12 experiments be performed, including the above specified 8 experiments which are compulsory. The remaining experiments may be developed by faculty and students based on applications of Mathematics in Real Life problem.

## **Text Books:**

- 1. B.S. Grewal., "Numerical Methods in Engg. And Science", Khanna Publications
- 2. P. Dechaumphai & N. Wansophark, "Numerical Methods in Engg.: Theories with Matlab, Fortran, C & Pascal Programs", Narosa Publications

## **Reference Books:**

- 1. P.B. Patil & U.P. Verma, "Numerical Computational Methods", Narosa Publications
- 2. John C. Polking & David Arnold, "Ordinary Differential Equations using MATLAB", Pearson Publications
- 3. Rudra Pratap, "Getting Started With MatLab" Oxford University Press
- 4. Byrom Gottfried, "Programming With C" Shaum's Outline
- 5. Santosh Kumar, "Computer based Numerical & Statistical Techniques", S. Chand Publications.

## NOTE:- At least 8 Experiments out of the list must be done in the semester.

С

1

L

0

T/P

2

## NETWORK ANALYSIS AND SYNTHESIS LAB

Paper Code: ETEC-258	L	T/P	С
Paper: Network Analysis and Synthesis Lab	0	2	1

## List of Experiments

- 1. Study the transient response of series RLC circuit for different types of waveforms on CRO and verify using MATLAB
- 2. Study the time response of a simulated linear system and verify the unit step and square wave response of first order and second order, type 0,1 system
- 3. Using MATLAB determine current in various resistors connected in network using mesh current and node voltage analysis.
- 4. To determine Z and Y parameters of the given two port network.
- 5. To determine ABCD parameters of the given two port network.
- 6. To verify Reciprocity Theorem for the given two port network.
- 7. To determine Hybrid parameters of the given two port network.
- 8. To design Cascade Connection and determine ABCD parameters of the given two port network.
- 9. To design Series-Series Connection and determine Z parameters of the given two port network.
- 10. To design Parallel-Parallel Connection and determine Y parameters of the given two port network.
- 11. To design Series-Parallel Connection and determine h parameters of the given two port network
- 12. Study the frequency response of different filter circuits.

## NOTE:- At least 8 Experiments out of the list must be done in the semester.

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## COMMUNICATION SYSTEMS LAB

Paper Code: ETEC-256	L	T/P	С
Paper: Communication Systems Lab	0	2	1

## **List of Experiments:**

- 1. Generation of DSB-SC AM signal using balanced modulator.
- 2. To study amplitude demodulation by linear diode detector
- 3. Generation of SSB AM signal.
- 4. To study envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
- 5. To generate FM signal using voltage controlled oscillator.
- 6. To generate a FM Signal using Varactor & reactance modulation.
- 7. Detection of FM Signal using PLL & foster seelay method.
- 8. To study Super heterodyne AM receiver and measurement of receiver parameters viz.sensitivity, selectivity & fidelity.
- 9. To study Pre-emphasis and De-emphasis in FM.
- 10. Generation of Phase modulated and demodulated signal.

Simulations study of some of the above experiments using P-spice or Multisim softwares

NOTE:- At least 8 Experiments out of the list must be done in the semester.

## ANALOG ELECTRONICS-II LAB

Paper Code: ETEC-254	L	T/P	С
Paper: Analog Electronics-II Lab	0	2	1

## List of Experiments:

- 1. To study the op-amp (IC 741) as inverting and non-inverting amplifier and calculate its gain.
- 2. Observe and plot the output Wave shape of Op-Amp R-C differentiating circuits, R-C integrating circuits for square wave input
- 3. To study the op-amp (IC 741) as adder, subtractor and voltage follower, calculate its output voltage..
- 4. Construct biased and unbiased series and shunt clipping circuits & combinational clipper circuit for positive and negative peak clipping of a sine wave.
- To study RC phase shift/Wien Bridge oscillator measurement of frequency and amplitude of oscillations using Op-Amp.
- 6. To study the waveform of square wave generator using 741 Op-Amp IC.
- 7. To study the waveform of Schmitt Trigger circuit & Precision Rectifier using 741 OP-AMP IC.
- 8. To make and test the operations of Monostable Multivibrator circuits using 555 timer.
- 9. To make and test the operations of Astable Multivibrator circuits using 555 timer.
- 10. To study the Sallen Key Voltage controlled voltage source active filters.

## NOTE: - At least 8 Experiments out of the list must be done in the semester

## **COMPUTER ORGANISATION AND ARCHITECTURE LAB**

Paper Code: ETCS-260	L	T/P	С
Paper: Computer Organisation and Architecture Lab	0	2	1

## List of Experiments:

Based on	8085 simulator			

- 1. To draw and explain
  - i. Block diagram and pin diagram of 8085.
  - ii. Instruction set of 8085.
- 2. Write a program to perform :
  - i. Addition of two 8 bit numbers without carry.
  - ii. Addition of two 8 bit numbers with carry
- 3. Write a program to perform:
  - i. Subtraction of two 8 bit numbers without borrows.
  - ii. Subtraction of two 8 bit numbers with borrows.
- 4. Write a program to find 1's complement of an 8 bit number.
- 5. Write a program to find 2's complement of an 8 bit number.
- 6. Write a program to perform Multiplication of two 8 bit numbers.
- 7. Write a program to find to find the smallest and largest number from the given series.
- 8. Write a program to find sum of series of n consecutive numbers.
- 9. Write a program to find factorial of a number.
- 10. Write a program to reverse an 8 bit number.
- 11. Write a program to sort array in ascending/ descending order.
- 12. Write a program to perform division of two 8 bit numbers.

The instructor is advised to develop lab programs based on the learning concepts of architecture and insight into operating systems.

## NOTE: - At least 8 Experiments from the syllabus must be done in the semester

## COMMUNICATION SKILLS FOR PROFESSIONALS

Paper Code: ETHS-301	L	T/P	С
Paper: Communication Skills for Professionals	2	0	1

## **INSTRUCTIONS TO PAPER SETTERS:**

## **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

## UNIT I

**Organizational Communication:** Meaning, importance and function of communication, Process of communication, Communication Cycle - message, sender, encoding, channel, receiver, decoding, feedback, Characteristics, Media and Types of communication, Formal and informal channels of communication, 7 C's of communication, Barriers to communication, Ethics of communication (plagiarism, language sensitivity)

**Soft Skills:** Personality Development, Self Analysis through SWOT, Johari Window, Interpersonal skills -Time management, Team building, Leadership skills. Emotional Intelligence.Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self esteem.

## [T1,T2][No. of Hrs. 08]

## UNIT II

**Introduction to Phonetics:** IPA system (as in Oxford Advanced Learner's Dictionary), Speech Mechanism, The Description of Speech Sounds, Phoneme, Diphthong, Syllable, Stress, Intonation, Prosodic Features; Pronunciation; Phonetic Transcription - Conversion of words to phonetic symbols and from phonetic symbols to words. British & American English (basic difference in vocabulary, spelling, pronunciation, structure)

**Non-Verbal Language**: Importance, characteristics, types – Paralanguage (voice, tone, volume, speed, pitch, effective pause), Body Language (posture, gesture, eye contact, facial expressions), Proxemics, Chronemics, Appearance, Symbols.

## [T1,T2][No. of Hrs. 08]

## UNIT III

**Letters at the Workplace** – letter writing (hard copy and soft copy): request, sales, enquiry, order, complaint. Job Application -- resume and cover letter

Meeting Documentation-- notice, memo, circular, agenda and minutes of meeting.

**Report Writing** - Significance, purpose, characteristics, types of reports, planning, organizing and writing a report, structure of formal report. Writing an abstract, summary, Basics of formatting and style sheet (*IEEE Editorial Style Manual*), development of thesis argument, data collection, inside citations, bibliography; Preparing a written report for presentation and submission. Writing a paper for conference presentation/journal submission.

## [T1,T2][No. of Hrs. 08]

## UNIT IV

**Listening and Speaking Skills**: Importance, purpose and types of listening, process of listening, difference between hearing and listening, Barriers to effective listening, Traits of a good listener, Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

**Presentations:** Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

Group Discussion: Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

**Interview Skills:** Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

## [T1,T2][No. of Hrs. 07]

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

## **Text Books:**

- [T1] Anna Dept. Of English. Mindscapes: English for Technologists & Engineers PB. New Delhi: Orient Blackswan.
- [T2] Farhathullah, T. M. Communication Skills for Technical Students. Orient Blackswan, 2002.

### **References Books:**

- [R1] Masters, Ann and Harold R. Wallace. Personal Development for Life and Work, 10th Edition.Cengage Learning India, 2012.
- [R2] Institute of Electrical and Electronics Engineers. IEEE Editorial Style Manual. IEEE, n.d. Web. 9 Sept. 2009.
- [R3] Sethi and Dhamija. A Course in Phonetics and Spoken English. PHI Learning, 1999.
- [R4] Khera, Shiv. You Can Win. New York: Macmillan, 2003.

## DIGITAL COMMUNICATION

Paper Code: ETEC-303	L	T/P	С
Paper: Digital Communication	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

## MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: To enable the students* 

- 1. To distinguish between analog and digital communication.
- 2. To understand the concept of digital communication system.
- 3. To understand the concept of random variables and random process.
- 4. To learn the digital modulation techniques.

## UNIT- I Introduction to Digital Communication:

Line coding: NRZ, RZ, Manchester encoding, differential Manchester encoding, AMI coding, high density bipolar code, binary with n-zero substitution codes,

Review of Sampling theorem, uniform and non-uniform quantization, companding, µ-Law and A-Law compressors, Concept and Analysis of PCM, DPCM, DM and ADM modulators and demodulators, M-ary waveforms, S/N ratio for all modulation, probability of error for PCM in AWGN Channel and other modulation techniques, Duo Binary pulse.

## UNIT- II Random Signal Theory:

Probability, Concept of Random variable (Stationary, Non stationary, WSS, SSS), Random process, CDF, PDF, Joint CDF, Joint PDF, marginal PDF, Mean, Moments, Central Moment Auto-correlation & Cross-correlation, covariance functions, ergodicity, power spectral density, Gaussian distribution, Uniform distribution, Rayleigh distribution, Binomial distribution, Poission distribution, Weiner distribution, Wiener-Khinchin theorem, Central limit theorem.

## [T1, T2, R2] [No. of Hours: 11]

[T1, T2, R1, R2] [No. of Hours: 11]

[T1, T2, R2][No. of Hours: 11]

## UNIT- III Designing of Receiver:

Analysis of digital receiver, Prediction Filter, Design and Property of Matched filter, Correlator Receiver, Orthogonal Signal, Gram-Schmidt Orthogonalization Procedure, Maximum likelihood receiver, Coherent receiver design, Inter Symbol Interference, Eye Pattern.

## **UNIT- IV Digital modulation schemes:**

Coherent Binary Schemes: ASK, FSK, PSK, QPSK, MSK, G-MSK. Coherent M-ary Schemes, Incoherent Schemes (DPSK and DEPSK), Calculation of average probability of error for different modulation schemes, Power spectra of digitally modulated signals, Performance comparison of different digital modulation schemes. Review of 2 Latest Research Paper.

## **Text Books:**

- [T1] Simon Haykin, "Communication Systems" John Wiley & Sons, Inc 4th Edition.
- [T2] Taub Schilling, "Principles of Communication Systems" TMH, 2nd Edition

## **Reference Books:**

- [R1] George Kennedy, "Communication System" TMH 4th Edition
- [R2] B. P. Lathi, "Modern Digital and Analog Communication System" Oxford University Press 3rd Edition.
- [R3] Digital Communications by John G.Proakis; McGraw Hill.

## [T1, R2][No. of Hours: 11]

## MICROPROCESSORS AND MICROCONTROLLERS

Paper Code: ETEC-305	L	T/P	С
Paper: Microprocessors and Microcontrollers	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the knowledge of microprocessor systems and microcontroller.

## UNIT-I

Introduction to Microprocessor Systems: Architecture and PIN diagram of 8085, Timing Diagram, memory organization, Addressing modes, Interrupts. Assembly Language Programming.

## UNIT-II

8086 Microprocessor: 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts.

## **UNIT-III**

Interfacing of 8086 with 8255, 8254/ 8253, 8251, 8259: Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

## [T1][No. of hrs. :12]

## **UNIT-IV**

Overview of Microcontroller 8051: Introduction to 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming.

## [T3][No. of hrs. 11]

- **Text Books:** [T1] Muhammad Ali Mazidi, "Microprocessors and Microcontrollers", Pearson, 2006
- [T2] Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" Tata McGraw Hill, 2006.
- Ramesh Gaonkar, "MicroProcessor Architecture, Programming and Applications with the 8085", PHI [T3]

## **References Books:**

- Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay "The 8051 Microcontroller and [R1] Embedded Systems", 2nd Edition, Pearson Education 2008.
- [R2] Kenneth J. Ayala, "The 8086 Microprocessor: Programming & Interfacing The PC", Delmar Publishers, 2007
- A K Ray, K M Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill, 2007. [R3]
- Vaneet Singh, Gurmeet Singh, "Microprocessor and Interfacing", Satya Prakashan, 2007. [R4]

## **MAXIMUM MARKS: 75**

[T1][No. of hrs. 10]

# [T2][No. of hrs. :12]

## CONTROL SYSTEMS

Paper Code: ETEL-307	L	T/P	С
Paper: Control Systems	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective**: To teach the fundamental concepts of Control systems and mathematical modeling of the system. To study the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system

## UNIT I : Control Systems - - Basics & Components

Introduction to basic terms, classifications & types of Control Systems, block diagrams & signal flow graphs. Transfer function, determination of transfer function using block diagram reduction techniques and Mason's Gain formula. Control system components: Electrical/ Mechanical/Electronic/A.C./D.C. Servo Motors, Stepper Motors, Tacho Generators, Synchros, Magnetic Amplifiers, Servo Amplifiers,

## **UNIT II : Time – Domain Analysis**

Time domain performance specifications, transient response of first & second order systems, steady state errors and static error constants in unity feedback control systems, response with P, PI and PID controllers, limitations of time domain analysis.

## **UNIT III : Frequency Domain Analysis**

Polar and inverse polar plots, frequency domain specifications and performance of LTI systems, Logarithmic plots (Bode plots), gain and phase margins, relative stability. Correlation with time domain performance closes loop frequency responses from open loop response. Limitations of frequency domain analysis, minimum/non-minimum phase systems.

## **UNIT IV : Stability & Compensation Techniques**

Concepts, absolute, asymptotic, conditional and marginal stability, Routh-Hurwitz and Nyquist stability criterion, Root locus technique and its application.

Concepts of compensation, series/parallel/ series-parallel/feedback compensation, Lag/Lead/Lag-Lead networks for compensation, compensation using P, PI, PID controllers.

## [T1,T2][No. of Hrs. : 11]

## **Text Books:** [T1] B. C. Kuo, "Automatic control system", Prentice Hall of India, 7<sup>th</sup> edition 2001.

[T2] Nagraath Gopal "Control Systems Engineering -Principles and Design" New Age Publishers

## **Reference Books:**

- [R1] Norman S. Nise, "Control systems engineering" John Wiley & Sons (Asia) Singapore.
- [R2] Raymond T. Stefani, Design of Feedback Control System, Oxford University Press.
- [R3] K. Ogata, "Modern control engineering", Pearson 2002.
- [R4] S. P.Eugene Xavier, "Modern control systems", S. Chand & Company.
- [R5] M. Gopal "Control Systems-Principles and Design" TMH 4<sup>th</sup> Edition 2012

# MAXIMUM MARKS: 75

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 11]

## DIGITAL SYSTEM DESIGN

Paper Code: ETEC-309	L	T/P	С
Paper: Digital System Design	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To enhance the knowledge and skill of the students in digital system design with emphasis on Hardware Description Language (VHDL HDL)

## UNIT I

Introduction to VHDL, design units, data objects, signal drivers, inertial and transport delays, delta delay, VHDL data types, concurrent and sequential statements. Subprograms – Functions, Procedures, attributes, generio, generate, package, IEEE standard logic library, file I/O, test bench, component declaration, instantiation, configuration.

## UNIT II

Combinational logic circuit design and VHDL implementation of following circuits –first adder, Subtractor, decoder, encoder, multiplexer, ALU, barrel shifter, 4X4 key board encoder, multiplier, divider, Hamming code encoder and correction circuits.

[T1][No. of Hrs.: 10]

[T1][No. of Hrs.: 12]

## UNIT III

Synchronous sequential circuits design – finite state machines, Mealy and Moore, state assignments, design and VHDL implementation of FSMs, Linear feedback shift register (Pseudorandom and CRC).

[T2][No. of Hrs.: 10]

## UNIT IV

Asynchronous sequential circuit design – primitive flow table, concept of race, critical race and hazards, design issues like metastability, synchronizers, clock skew and timing considerations

Introduction to place & route process, Introduction to ROM, PLA, PAL, Architecture of CPLD (Xilinx/Altera). [T2][No. of Hrs.: 12]

## **Text Books:**

- [T1] Douglas Perry ,"VHDL" 4th Edition, TMH
- [T2] Stephen Brown, Zvonko Vranesic, "Fundamentals of Digital Logic with VHDL design", TMH.

## **Reference Books:**

- [R1] Charles. H.Roth ,"Digital System Design using VHDL", PWS (1998)
- [R2] John F. Wakerley, "Digital Design Principles And Practices", Pearson Education
- [R3] Navabi Z, "VHDL-Analysis & Modelling of Digital Systems", McGraw Hill.
- [R4] William I. Fletcher, "An Engineering Approach To Digital Design", Prentice Hall
- [R5] Bhasker, "A VHDL Primmer", Prentice Hall 1995.

MAXIMUM MARKS: 75

## **INDUSTRIAL MANAGEMENT**

Paper Code: ETMS-311	L	T/P	С
Paper: Industrial Management	3	0	3

## **INSTRUCTIONS TO PAPER SETTERS:**

## MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The course provides a broad introduction to some aspects of business management and running of business organization.

## UNIT I

UNIT II

**Industrial relations-** Definition and main aspects. Industrial disputes and strikes. Collective bargaining. **Labour Legislation-** Labour management cooperation/worker's participation in management. Factory legislation. International Labour Organization.

**Trade Unionism-** Definition, Origin, Objectives of Trade Unions. Methods of Trade unions. Size and finance of Indian Trade unions-size, frequency distribution, factors responsible for the small size. Finance-sources of income, ways of improving finance.

## [T1,T2][No. of Hrs. 10]

[T1,T2][No. of Hrs. 10]

UNIT III

Work Study-Method study and time study. Foundations of work study. Main components of method study. Time study standards. Involvement of worker's unions. Work Sampling. Application of work study to office work.

## [T1,T2][No. of Hrs. 10]

[T1,T2][No. of Hrs. 10]

## UNIT IV

**Quality Management-** What is Quality? Control Charts. Quality is everybody's job. Taguchi Philosophy. Service Quality. What is Total Quality Management (TQM)? Roadmap for TQM. Criticism of TQM. Six Sigma.

## **Text Books:**

- [T1] Sinha, P.R.N., Sinha I.B. and Shekhar S.M.(2013), Industrial Relations, Trade Unions and Labour Legislation. Pearson Education
- [T2] Chary, S.N. (2012), Production and Operations Management. Tata McGraw Hill Education.

## **Reference Books:**

- [R1] Srivastava, S.C. (2012), Industrial Relations and Labour Laws, Vikas Publishing
- [R2] Shankar R (2012), Industrial Engineering and Management. Galgotia Publications
- [R3] Telsang, M. (2006), Industrial Engineering and Production Management. S.Chand
- [R4] Thukaram, Rao (2004), M.E. Industrial Management. Himalaya Publishing House

## **COMMUNICATION SKILLS FOR PROFESSIONALS LAB**

Paper Code: ETHS-351	L	T/P	С
Paper: Communication Skills for Professionals Lab	0	2	1

**Objective:** To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision .These activities will enhance students' communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

## Lab Activities to be conducted:

- 1. **Listening and Comprehension Activities** Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.
- 2. **Reading Activities** -- Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.
- 3. **Conversation Activities**-- Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.
- 4. **Making an Oral Presentation**–Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.
- 5. **Making a Power Point Presentation** -- Structure and format; Covering elements of an effective presentation; Body language dynamics.
- 6. Making a Speech -- Basics of public speaking; Preparing for a speech; Features of a good speech; Speaking with a microphone. Famous speeches may be played as model speeches for learning the art of public speaking. Some suggested speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawahar Lal Nehru, Atal Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.
- 7. **Participating in a Group Discussion** -- Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others' views / ideas; Arguing against others' views or ideas, etc.
- 8. **Participating in Mock Interviews** -- Job Interviews: purpose and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.

## Suggested Lab Activities:

- 1. Interview through telephone/video-conferencing
- 2. Extempore, Story Telling, Poetry Recitation
- 3. Mock Situations and Role Play; Enacting a short skit
- 4. Debate (Developing an Argument), News Reading and Anchoring.

## **Reference Books:**

- 1. Patnaik, Priyadarshi. *Group Discussion and Interview Skills*: *With VCD*. Cambridge University Press India (Foundation Books), 2012 edition.
- 2. Kaul, Asha. Business Communication. PHI Learning: 2009.
- 3. Hartman and Lemay. Presentation Success: A Step-by-Step Approach. Thomson Learning, 2000.

**Note:** The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

## DIGITAL SYSTEM DESIGN LAB

Paper Code: ETEC-351	L	T/P	С
Paper: Digital System Design Lab	0	2	1

## List of Experiments:

- 1. Design all gates using VHDL.
- Write VHDL programs for the following circuits, check the wave forms and the hardware generated

   half adder
  - ii) full adder
- Write VHDL programs for the following circuits, check the wave forms and the hardware generated i) multiplexer
  - ii) demultiplexer
- 4. Write VHDL programs for the following circuits, check the wave forms and the hardware generated i) decoder

ii) encoder

- 5. Write a VHDL program for a comparator and check the wave forms and the hardware generated
- 6. Write a VHDL program for a code converter and check the wave forms and the hardware generated
- 7. Write a VHDL program for a FLIP-FLOP and check the wave forms and the hardware generated
- 8. Write a VHDL program for a counter and check the wave forms and the hardware generated
- 9. Write VHDL programs for the following circuits, check the wave forms and the hardware generated
  - i) ALU
  - ii) shift register

NOTE: - At least 8 Experiments out of the list must be done in the semester

## CONTROL SYSTEMS LAB

Paper Code: ETEL-355	L	T/P	С
Paper: Control Systems Lab	0	2	1

## **List of Experiments:**

- 1. Comparison of open loop & closed loop control in speed control of D.C. motor & to find the transfer function.
- 2. To study the characteristics of positional error detector by angular displacement of two servo potentiometers
  - a. excited with dc
  - b. excited with ac
- 3. To study synchro transmitter in terms of position v/s phase and voltage magnitude with respect to rotor voltage magnitude /phase.
- 4. To study remote position indicator systems using synchro transmitter/receiver.
- 5. To plot speed- torque curves for ac servomotor for different voltages.
- 6. To study ac motor position control system & to plot the dynamic response & calculate peak time, settling time, peak overshoot, damping frequency, steady state error etc.
- 7. To study the time response of simulated linear systems.
- 8. To study the performance of PID Controller.
- 9. Plot impulse response, unit step response, unit ramp response of any 2<sup>nd</sup> order transfer function on same graph using MATLAB.
- 10. To draw the magnetization (Volt Amps) characteristics of the saturable core reactor used in the magnetic amplifier circuits.
- 11. Plot root locus for any 2<sup>nd</sup> order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
- 12. To design lead-lag compensator for the given process using Bode plots in MATLAB.

## NOTE:- At least 8 Experiments out of the list must be done in the semester.

## MICROPROCESSORS AND MICROCONTROLLERS LAB

Paper Code: ETEC-355	L	T/P	С
Paper: Microprocessors and Microcontrollers Lab	0	2	1

## List of Experiments:

1. Write a program to add and subtract two 16-bit numbers with/ without carry using 8086.

2. Write a program to multiply two 8 bit numbers by repetitive addition method using 8086.

- 3. Write a Program to generate Fibonacci series.
- 4. Write a Program to generate Factorial of a number.
- 5. Write a Program to read 16 bit Data from a port and display the same in another port.
- 6. Write a Program to generate a square wave using 8254.
- 7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1(using 8051).
- 8. Write a Program to transfer data from external ROM to internal (using 8051).
- 9. Design a Minor project using 8086 Micro processor (Ex: Traffic light controller/temperature controller etc)
- 10. Design a Minor project using 8051 Micro controller

NOTE: - At least 8 Experiments out of the list must be done in the semester.

## **DIGITAL COMMUNICATION LAB**

Paper Code: ETEC-357	L	T/P	С
Paper: Digital Communication Lab	0	2	1

List of Experiments: MATLAB/ LABVIEW based practical on:

- 1. To Study Sampling Theorem.
- 2. To Study of Pulse Code Modulation and Probability of error.
- 3. To calculate S/N ratio and Probability of error of Differential Pulse Code Modulation.
- 4. To calculate S/N ratio and Probability of error of Delta Modulation.
- 5. To calculate S/N ratio and Probability of error of Adaptive Delta Modulation.
- 6. To calculate S/N ratio and Probability of error of Amplitude Shift Keying (ASK).
- 7. To calculate S/N ratio and Probability of error of Phase Shift Keying (PSK).
- 8. To calculate S/N ratio and Probability of error of frequency Shift Keying (FSK).
- 9. To calculate S/N ratio and Probability of error Differential Phase Shift Keying Modulation (DPSK).
- 10. To calculate S/N ratio and Probability of error of Quadrature Phase Shift Keying Modulation (QPSK).
- 11. To calculate S/N ratio and Probability of error of QAM
- 12. Faculty can opt for practical of Digital Communication to be performed on Kit.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

## **MICROWAVE ENGINEERING**

Paper Code: ETEC-302	L	T/P	С
Paper: Microwave Engineering	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objectives: To study different components which support the microwaves to carry from one point to other, generation of microwaves, measurements of microwave signal power, reflection coefficients etc., and application of microwaves.

## UNIT-1

**Introduction of microwaves**: Maxwell's equation, wave equation and their solution (in rectangular and circular coordinates), boundary conditions, Poynting theorem, application of microwaves.

**Waveguide: Rectangular waveguide:** TE and TM modes, field configurations, dominant and degenerative modes, propagation characteristics. Power transmission and power loss in waveguide, Excitation of waveguide. **Circular waveguide:** TE and TM modes, field configuration.

Introduction of planar transmission lines, micro strip line, strip line and coplanar line, comparison of coaxial, waveguide and planar transmission line.

## **UNIT-II**

**UNIT-III** 

**Microwave Network Analysis**: limitation of Z, Y and H parameters for microwave circuits, scattering matrix representation for microwave network, properties of S- matrix.

**Microwave resonators**: rectangular and circular cavity resonator (resonant frequency and wavelength), Introduction of Re-entrant cavity resonator and toroidal resonator.

**Waveguide components:** E -plane Tee, H-plane - Tee, Magic-Tee, RAT-RACE circuit, application of Tee junctions, directional coupler and its application.

Construction, working, S-matrix and application of attenuators, phase shifters, iris, corners, bends, twists.

Introduction of ferrite devices and its application in isolator, circulator, gyrator.

## [T1][T2][R1][R2] [No. of Hrs. 11]

[T1][T2][R1][R2][No. of Hrs. 11]

**Linear Beam tubes:** Two cavity klystron (working, principle, velocity modulation, bunching process) Reflex klystron (working principle, bunching process, condition of oscillation), application of klystrons. Travelling Wave tube, slow wave structure, helix TWT (construction and working).

**Cross field tubes:** Cylindrical magnetron (construction, working principle, Hull cut-off Equations), application of magnetron.

**Microwave solid state devices:** Transferred Electron Devices, Gunn diode (introduction, Gunn Effect, RWH theory, two-valley model, Gunn oscillation modes), condition of oscillation in negative resistance devices, Tunnel diode, PIN diode.

## [T1][T2][R3][No. of Hrs. 12]

[T1][T2][R3][No. of Hrs. 10]

Avalanche transit time devices: Introduction of READ diode, IMPATT, TRAPATT.
Parametric Devices: Varactor diode, Manley-Rowe relation, Parametric up and down convertors.
Microwave Measurements: VSWR meter, detectors and frequency meters.

Measurement of Impedance, Frequency, VSWR and Microwave power.

## **Text Books:**

- [T1] S.Y Liao, "Microwave devices and Circuits" Pearson publications
- [T2] R.E Collin, "Foundation for Microwave Engineering", Wiley Publications.

## **Reference Books:**

[R1] D.M Pozar, "Microwave Engineering", Wiley Publications.

- [R2] M.L. Sisodia, "Microwave Active Devices", New Age International Publications.
- [R3] G.S Raghuvanshi, "Microwave Engineering" Cengage publications.

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

## UNIT-IV

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## **INFORMATION THEORY AND CODING**

Paper Code: ETEC-304	L	T/P	С
Paper: Information Theory and Coding	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

## **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

*Objective: In this course the students will study a number of efficient encoding/decoding strategies which have proven important in practice with a categorization on the notion of decoding.* 

## UNIT-I

**UNIT-II** 

Review of Probability Theory, Random Variables and Random Process. Information Theory Introduction, Uncertainty, Information, and Entropy, Information Rate, Conditional and Joint Entropies. Source Coding Theorem, Data Compaction, Prefix Coding, Kraft McMillan Inequality, Huffman Coding, Lempel Ziv Coding, Discrete Memoryless Channels, Mutual Information, Markov Sources, Channel Capacity.

## [T1] [T2][No. of Hrs. 12]

Channel Coding Theorem, Differential Entropy and Mutual Information for Continuous Ensembles, Information Capacity Theorem and its implications, Information Capacity of a colored noise channel. Discrete Memoryless Channels and Channel Coding Theorem revisited.

## [T1][T2][R1][R5][No. of Hrs.10]

## UNIT-III

Linear Block codes, Repetition Codes, Syndrome Decoding, Hamming Codes, Dual Code, Cyclic Codes, Maximal Length Codes, CRC Codes, BCH Codes, Reed-Solomon Codes, Golay Codes, Convolutional Codes: Code Tree, Trellis and State Diagram.

## [T1] [R2][R4][No. of hrs.11]

## UNIT-IV

Decoding of Convolutional Codes: Maximum Likelihood decoding, Viterbi's algorithm, free distance of a convolutional code. Turbo Codes: Turbo Encoder and Decoder, Puncturing, Performance of Turbo Codes. Introduction to Cryptography.

## [T1] [R2] [R3][R5] [No. of Hrs.11]

- **Text Books:** [T1] Simon Haykins, "Communication Systems", 4<sup>th</sup> edition Wiley, 2001.
- [T2] J G Proakis, "Digital Communications", Mc Graw Hill, 2001.

## **Reference Books:**

- [R1] T M Gover, J M Thomos, "Elements of Information Theory", Wiley, 1999.
- [R2] Arijit Saha, Nilotpal Manna, Surajit Mandal, "Information Theory, Coding and Cryptography", Pearson Education, 2013.
- [R3] Schaum's Outlines, Analog and Digital Communications, Second Edition.
- [R4] Amitabha Bhattacharya, "Digital Communication", TMH 2006.
- [R5] J. H. Van Lint.. "Introduction to Coding Theory", Springer -Verlag.

## DIGITAL SIGNAL PROCESSING

Paper Code: ETEC-306	L	T/P	С
Paper: Digital Signal Processing	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objectives:** The aim of this course is to provide in depth knowledge of various digital signal processing techniques and design of digital filters, learn the concept of DFT FFT algorithms, and design of digital filters using different approximations, DSP processor and architecture. The prerequisites of this subject are basic knowledge of signal and systems.

## UNIT-I:

**Frequency Domain Sampling:** The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based of the DFT.

**Efficient computation of the DFT:** Principal Of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT.

Application of DFT, Design of Notch filter

## [T2,T1][No. of Hours: 11]

## UNIT-II:

**Design & Structure of IIR filters from analog filters:** Impulse Invariance; Bilinear transformation and its use in design of Butterworth and Chebyshev IIR Filters; Frequency transformation in Digital Domain, Direct, Cascade, Parallel & transposed structure

**Design & structure of FIR filters:** Symmetric and anti-symmetric FIR filters; Design of Linear Phase FIR filters using windows, Frequency Sampling Method of FIR design, Direct, Cascade, Frequency Sampling, transposed structure

## [T1,T2] [No. of Hours: 11]

## UNIT-III:

## **Implementation of Discrete Time Systems:**

Lattice structures, Lattice and Lattice-Ladder Structures, Schur - Cohn stability Test for IIR filters; Discrete Hilbert Transform.

Linear predictive Coding:

Lattice filter design, Levension Darwin Technique, Schur Algorithm

## UNIT-IV:

**Quantization Errors in Digital Signal Processing**: Representation of numbers, Quantization of filter coefficients, Round-off Effects in digital filters.

**Multirate Digital Signal Processing**: Decimation, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Polyphase decomposition.

## [T1, T2][No. of Hours: 10]

[T1,T2] [No. of Hours: 10]

## **Text Books:**

- [T1] Oppenheim & Schafer, Digital Signal Processing, PHI-latest edition.
- [T2] Proakis and Manolakis, Digital Signal Processing, PHI Publication

## **Reference Books:**

- [R1] S. K. Mitra, Digital Signal Processing, TMH edition 2006
- [R2] Johny. R. Johnson, Introduction to Digital Signal Processing, PHI-latest edition
- [R3] R.Babu , Digital Signal Processing , Scitech Publication.

## VLSI DESIGN

Paper Code: ETEC-308	L	T/P	С
Paper: VLSI Design	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The prerequisite are analog devices, STLD, Digital system design and micro-electronics. The students are introducing to MOS technology, design rules and some applications.

## UNIT I

Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage, MOS device design equations, MOSFET scaling and small geometry effects, MOSFET capacitances.

NMOS inverter, CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, static & dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, body effect, latch up in CMOS.

## [T1,T2][No. of Hours: 11]

UNIT II

Stick diagram and design rules, lambda based design rules, switching characteristics & inter connection effects: rise time, fall time delays, noise margin.

CMOS logic gate design: NAND, NOR, XOR and XNOR gates, Transistor sizing, combinational MOS logic circuits: pass transistor and transmission gate designs, Pseudo NMOS logic.

## [T1,T2][No. of Hours: 11]

**UNIT III** Sequential MOS logic circuits: SR latch, clocked latch and flip flop circuits, CMOS D latch and edge triggered flip flop, dynamic logic circuits; basic principle, non ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution.

## [T1,T2][No. of Hours: 11]

## UNIT IV

VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

## [T1,T2][No. of Hours: 11]

## Text Books:

- [T1] Basic VLSI Design Pucknell Douglas A., Eshraghian Kamran, PHI Learning Pvt Limited, 2013.
- [T2] N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective 4th Edition", Pearson Education, India.

## **Reference Book:**

- [R1] S. M. Kang, Y. Lebiebici, "CMOS digital integrated circuits analysis & design" Tata McGraw Hill, 3<sup>rd</sup> Edition.
- [R2] Digital Integrated Circuit Design- Ken Martin, Oxford University Press
- [R3] The MOS Transistor- Yaniiis Tsividis and Colin Mcandrew, Oxford University Press, 2013
- [R4] J. M. Rabaey, "Digital Integrated Circuits" PHI Learning Pvt Limited, India
- [R5] J. P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Inc., New York, NY
- [R6] Neelam Sharma, "Digital Logic Design", Ashirwad Publication 2013-14

## **DATA COMMUNICATION & NETWORKS**

Paper Code: ETEC-310	L	T/P	С
Paper: Data Communication & Networks	3	1	4

## **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of the paper is to provide an introduction to the fundamental concepts on data communication and the design, deployment, and management of computer networks.

## UNIT- I

**Data Communications :** Components, protocols and standards, Network and Protocol Architecture, Reference Model ISO-OSI, TCP/IP-Overview ,topology, transmission mode, digital signals, digital to digital encoding, digital data transmission, DTE-DCE interface, interface standards, modems, cable modem, transmission media-guided and unguided, transmission impairment, Performance, wavelength and Shannon capacity. Review of Error Detection and Correction codes.

**Switching:** Circuit switching (space-division, time division and space-time division), packet switching (virtual circuit and Datagram approach), message switching.

## [T1, T2, R1, R4] [No. of Hours: 11]

## UNIT- II

**Data Link Layer:** Design issues, Data Link Control and Protocols: Flow and Error Control, Stop-and-wait ARQ. Sliding window protocol, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to –Point Access: PPP Point –to- Point Protocol, PPP Stack,

**Medium Access Sub layer:** Channel allocation problem, Controlled Access, Channelization, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Token ring, Token Bus, FDDI based LAN, Network Devices-repeaters, hubs, switches bridges.

## [T1, T2,R1][No. of Hours: 11]

## UNIT- III

**Network Layer:** Design issues, Routing algorithms, Congestion control algorithms, Host to Host Delivery: Internetworking, addressing and routing, IP addressing (class full & Classless), Subnet, Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6.

## [T1, T2,R1][No. of Hours: 11]

## UNIT- IV

**Transport Layer**: Process to Process Delivery: UDP; TCP, congestion control and Quality of service.

**Application Layer:** Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP), file transfer (FTP), HTTP and WWW.

## [T2, T1, R1, R4][No. of Hours: 11]

## **Text Books:**

- [T1] A. S. Tannenbum, D. Wetherall, "Computer Networks", Prentice Hall, Pearson, 5<sup>th</sup> Ed
- [T2] Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, 4th Ed

## **Reference Books:**

- [R1] Fred Halsall, "Computer Networks", Addison Wesley Pub. Co. 1996.
- [R2] Larry L, Peterson and Bruce S. Davie, "Computer Networks: A system Approach", Elsevier, 4 Ed
- [R3] Tomasi, "Introduction To Data Communications & Networking", Pearson 7<sup>th</sup> impression 2011
- [R4] William Stallings, "Data and Computer Communications", Prentice Hall, Imprint of Pearson, 9<sup>th</sup> Ed.
- [R5] Zheng, "Network for Computer Scientists & Engineers", Oxford University Press
- [R6] Data Communications and Networking: White, Cengage Learning

#### ANTENNA AND WAVE PROPAGATION

Paper Code: ETEC-314	L	T/P	С
Paper: Antenna and Wave Propagation	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objectives: To study the antenna fundamentals, various types of antennas and wave propagation.

#### UNIT –I

**Introduction of antenna**: radiation mechanism, single wire, two wire, dipole, current distribution of thin wire antenna.

**Fundamental parameters of antenna:** radiation pattern, isotropic, directional and omni directional pattern, principal patterns, radiation patterns lobes, field regions, radian and steradian, Radiation power density, radiation intensity, directivity, gain, antenna efficiency, half power beam width, beam efficiency, bandwidth efficiency, input impedance, antenna radiation efficiency, antenna aperture, effective height.

#### [T1][T2][No. of Hrs. 11]

UNIT-II

Vector potential for an electric and magnetic current source, electric and magnetic fields for electric and magnetic current source, far field radiation, Duality theorem, reciprocity theorem.

**Linear wire antenna:** infinitesimal dipole, radiation field (with derivation), directivity, near field, intermediate field, far field ,power density, small/short dipole, half wavelength dipole. folded dipole.

Antenna Array: Two element arrays, N-element linear array, broadside array, ordinary endfire array, phased array.

#### [T1][T2][R1][R2]No. of Hrs. 11]

#### UNIT-III

Types of antenna:

Travelling wave antenna: long wire, V antenna, rhombic antenna.

Broadband antenna: helical antenna, Yagi-Uda antenna.

Frequency independent antenna: log periodic antenna.

Introduction of Microstrip patch antenna (MPA), basic characteristics, feeding method, microstrip rectangular patch antenna and its design using transmission line model, smart antennas.

#### [T1][T2][R1][R2] [No. of Hrs. 11]

#### UNIT-IV

**Wave propagation:** Ground wave, sky wave, space wave, ionosphere, reflection and refraction by ionosphere, critical frequency, virtual height, MUF (max. usable frequency), skip distance, troposphere and duct propagation. **Antenna measurements**: Measurement of reflection coefficient and radiation pattern, Introduction of Anechoic chamber and Vector Network Analyzer.

#### [T1][R2][No. of Hrs. 11]

#### **Text Books**

- [T1] Edward Conrad Jordan, Keith George Balmain, Electromagentic waves and raditing systems, Prentice Hall,1968
- [T2] J.D. Kraus, RJ. Marhefka and Ahmad S. Khan, "Antennas and Wave Propagation" Tata Mcgraw Hill publications, New Delhi, 4th ed., (Special Indian Edition), 2010.
- [T2] Constantine A. Balanis, "Antenna Theory Analysis and Design", 3<sup>rd</sup> Edition, Wiley Publications.

#### **Reference Books**

- [R1] S. Das and A. Das, "Antennas and Wave Propagation", Tata Mcgraw Hill publications.
- [R2] A.R. Harish and M. Sachidananda, "Antenna and wave Propagation", Oxford Publications.
- [R3] G.S.N.Raju, Antenna Wave Propagation, Pearson Education, 2004

#### MICROWAVE ENGINEERING LAB

Paper Code: ETEC-352	L	T/P	С
Paper: Microwave Engineering Lab	0	2	1

#### List of Experiments:

1. To measure the frequency and wavelength using slotted line section and frequency meter.

- 2. To measure the Isolation and Insertion loss of Isolator and Circulator.
- 3. To study E-plane, H-plane and Magic Tee.
- 4. To measure Coupling Factor, Directivity and Isolation of directional coupler.
- 5. To measure VSWR and Reflection coefficient of different loads.
- 6. To study the characteristics of Klystron and Gunn diode.
- 7. Simulation of Transmission line: Waveguide and Coaxial line.\*
- 8. Simulation of directional coupler.\*
- 9. Simulation of E-plane and H-plane Tee.\*
- 10. Study of micro strip line and LPF using MIC kit/Software.\*
- 11. Study of BPF using MIC kit/ Software.\*

\* These experiments may be performed using simulation software like HFSS, CST or IE3D (for planar circuits) etc.

#### VLSI DESIGN LAB

Paper Code: ETEC-354	L	T/P	С
Paper: VLSI Design Lab	0	2	1

#### List of Experiments:

- 1) To study the MOS characteristics and introduction to tanner EDA software tools.
- 2) To design and study the DC characteristics of PMOS and NMOS.
- 3) To design and study the DC characteristics of resistive inveter.
- 4) To design and study the transient and DC characteristics of CMOS inverter.
- 5) To design and study the characteristics of CMOS NAND and NOR gate.
- 6) To design and study the characteristics of CMOS multiplexer.
- 7) To design any Boolean function using transmission gates.
- 8) To design and study the characteristics of CMOS Full adder.
- 9) To design and study the characteristics of CMOS D Flip Flop.
- 10) To design and study the transient characteristics of CMOS XOR/XNOR.
- 11) To design and study the characteristics of Schmitt trigger circuit.

#### **DIGITAL SIGNAL PROCESSING LAB**

Paper Code: ETEC-356	L	T/P	С
Paper: Digital Signal Processing Lab	0	2	1

#### List of Experiments:

#### Software Experiments:

- 1. Generation of basic signals sine, cosine, ramp, step, impulse and exponential in continuous and discrete domains using user defined functions.
- 2. Write a MATLAB program to find convolution (linear/circular) and correlation of two discrete signals.
- 3. Perform linear convolution using circular convolution and vice versa.
- 4. Write a MATLAB program to
  - a. Find 8 point DFT, its magnitude and phase plot and inverse DFT.
  - b. Find 16 point DFT, its magnitude and phase plot and inverse DFT.
- 5. Perform the following properties of DFT
  - a. Circular shift of a sequence.
  - b. Circular fold of a sequence.
- 6. Write a MATLAB Program to design FIR Low pass filter using
  - a. Rectangular window
  - b. Hanning window
  - c. Hamming window
  - d. Bartlett window
- 7. Write a MATLAB program to
  - a. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Butterworth approximation.
  - b. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Chebyshev approximation.

#### Hardware Experiments using Texas Instruments Kits-DSK 6713:

8. Introduction to Code composer Studio.

- 9. Write a program to generate a sine wave and see the output on CRO
- 10. Write a Program to Generate ECHO to give audio file.
- 11. Write a program to demonstrate Band Stop filter by FIR.

#### **Additional Experiments:**

- 12. Write a program to generate a cos wave and see the output on CRO
- 13. Write a program to blink the LED
- 14. Write a program to display a string on LCD.

#### **DATA COMMUNICATION & NETWORKS LAB**

Paper Code: ETEC-358	L	T/P
Paper: Data Communication & Networks Lab	0	2

#### List of Experiments:

- Introduction to Computer Network laboratory Introduction to Discrete Event Simulation Discrete Event Simulation Tools - ns2/ns3, Omnet++
- 2. Using Free Open Source Software tools for network simulation I Preliminary usage of the tool ns3 Simulate telnet and ftp between N sources N sinks (N = 1, 2, 3). Evaluate the effect of increasing data rate on congestion.
- Using Free Open Source Software tools for network simulation II Advanced usage of the tool ns3
   Simulating the effect of queueing disciplines on network performance - Random Early Detection/Weighted RED / Adaptive RED (This can be used as a lead up to DiffServ / IntServ later).
- 4. Using Free Open Source Software tools for network simulation III Advanced usage of the tool ns3 Simulate http, ftp and DBMS access in networks
- Using Free Open Source Software tools for network simulation IV Advanced usage of the tool ns3 Effect of VLAN on network performance - multiple VLANs and single router.
- Using Free Open Source Software tools for network simulation IV Advanced usage of the tool ns3 Effect of VLAN on network performance - multiple VLANs with separate multiple routers.
- Using Free Open Source Software tools for network simulation V Advanced usage of the tool ns3 Simulating the effect of DiffServ / IntServ in routers on throughput enhancement.
- Using Free Open Source Software tools for network simulation VI Advanced usage of the tool ns3 Simulating the performance of wireless networks
- Case Study I : Evaluating the effect of Network Components on Network Performance To Design and Implement LAN With Various Topologies and To Evaluate Network Performance Parameters for DBMS etc)
- Case Study II : Evaluating the effect of Network Components on Network Performance To Design and Implement LAN Using Switch/Hub/Router As Interconnecting Devices For Two Different LANs and To Evaluate Network Performance Parameters.
- 11. Mini project one experiment to be styled as a project of duration 1 month (the last month)

#### NOTE:- At least 8 Experiments out of the list must be done in the semester.

C 1

#### EMBEDDED SYSTEMS

Paper Code: ETEC-401	L	T/P	С
Paper: Embedded Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to enable a student to design an embedded system for specific tasks.

#### UNIT- I

**Overview of Embedded Systems:** Characteristics of Embedded Systems. Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 micro controllers.

**PIC Microcontrollers:** Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals.

#### [T1][No. of hrs. 12]

UNIT- II

**ARM Processors:** Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture.

Bus structure: Time multiplexing, serial, parallel communication bus structure. Bus arbitration, DMA, PCI, AMBA, I2C and SPI Buses.

#### [T2][No. of hrs. 12]

UNIT- III

Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System.

#### [T3][No. of hrs. 10]

[T3][No. of hrs. 10]

#### UNIT-IV

**RTOS:** Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RT-Linux introduction, RTOS kernel, Real-Time Scheduling.

#### **Text Book:**

- [T1] Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002
- [T2] ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss, Dominic Symes, Chris Wright, Morgan Kaufman Publication, 2004.
- [T3] Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

#### **References Books:**

- [R1] The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
- [R2] Embedded System Design, Marwedel, Peter, Kluwer Publishers, 2004.

#### **OPTOELECTRONICS AND OPTICAL COMMUNICATION**

Paper Code: ETEC-403	L	T/P	С
Paper: Optoelectronics and Optical Communication	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: The objective of this paper is to introduce the student about Optical Fiber, Wave propagation, Detectors and its structures and functions.

#### UNIT - I

**Introduction: Optical Fiber:** Structures, Wave guiding and Fabrication – Nature of light, Basic optical laws and Definition, Optical fiber modes and Configuration, Mode theory for circular waveguides, Single mode fibers, Graded index fiber, Fiber materials, Fabrication and mechanical properties, Fiber optic cables, Basic Optical Communication System, Advantage of Optical Communication System.

#### [T1, T2][No. of Hrs.10]

**UNIT – II Attenuation in Optical Fibers:** Introduction, Absorption, Scattering, Very Low Loss Materials, All Plastic & Polymer-Clad-Silica Fibers.

**Wave Propagation:** Wave propagation in Step-Index & Graded Index Fiber, Overall Fiber Dispersion-Single Mode Fibers, Multimode Fibers, Dispersion-Shifted Fiber, Dispersion, Flattened Fiber, Polarization.

#### [T1, T2][No. of Hrs.11]

[T1, T2][No. of Hrs.11]

#### UNIT – III

**Source & Detectors:** Design & LED's for Optical Communication, Semiconductor Lasers for Optical Fiber Communication System and their types, Semiconductor Photodiode Detectors, Avalanche Photodiode Detector & Photo multiplier Tubes. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling. Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers .

#### $\mathbf{UNIT} - \mathbf{IV}$

**Optical Fiber Communication Systems:** Data Communication Networks – Network Topologies, Mac Protocols, Analog System. Advanced Multiplexing Strategies – Optical TDM, Sub carrier Multiplexing, WDM Network. Architectures: SONET/SDH. Optical Transport Network, Optical Access Network, Optical Premise Network. **Applications**-Military Applications, Civil, Consumer & Industrial Applications.

### [T1, T2][No. of Hrs.12]

#### **Text Books:**

- [T1] J. Gowar, "Optical Communication System", IEEE Press 2<sup>nd</sup> Edition.
- [T2] R.P.Khare, "Fiber Optics and Opto Electronics" Oxford Publication

#### **Reference Books:**

- [R1] Optical Information Processing F. T. S. Yu Wiley, New York, 1983
- [R2] G. P. Agrawal, Fiber optic Communication Systems, John Wiley & sons, New York, 1992
- [R3] A. Ghatak, K. Thyagarajan, "An Introduction to Fiber Optics", Cambridge University Press
- [R4] J. H. Franz & V. K. Jain, "Optical Communication Components & Systems", Narosa Publish, 2013
- [R5] John M. Senior, "Optical Fiber Communications", Pearson, 3rd Edition, 2010.

#### WIRELESS COMMUNICATION

Paper Code: ETEC-405	L	T/P	С
Paper: Wireless Communication	3	1	4

#### **INSTRUCTIONS TO PAPER SETTER:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each auestion should be of 12.5 marks.

*Objective: The objective of the course is to introduce various wireless networks, mobile networks and their basic architecture starting from 2G through to 3G and 4G.* 

#### UNIT – I

**Introduction To Wireless Communication Systems:** Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

**Introduction to Personal Communication Services (PCS):** PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

**Introduction to Wireless Channels and Diversity:** Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications

#### UNIT - II

# **2G Networks:** Second generation, digital, wireless systems: GSM, IS\_136 (D-AMPS), IS-95 CDMA. Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling, mobile management, voice signal processing and coding. **Spread Spectrum Systems**-Cellular code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

#### [T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

#### UNIT - III

**2.5G Mobile Data Networks:** Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes, EDGE, Wireless LANs, (IEEE 802.11), Mobile IP.

**Third Generation (3G) Mobile Services:** Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

#### [T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

#### $\mathbf{UNIT} - \mathbf{IV}$

**Wireless Local Loop (WLL):** Introduction to WLL architecture, WLL technologies. Wireless personal area networks (WPAN): Blue tooth, IEEE 802.15, architecture, protocol stack. Wi-Max, introduction to Mobile Adhoc Networks.

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

#### **Text Books:**

- [T1] Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001.
- [T2] Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2<sup>nd</sup> Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.

#### **Reference Books:**

- [R1] T.L.Singhal "Wireless Communication", Tata McGraw Hill Publication.
- [R2] Jochen Schiller, "Mobile communications," Pearson Education Pvt. Ltd., 2002.
- [R3] Yi –Bing Lin & Imrich Chlamatac, "Wireless and Mobile Networks Architecture," John Wiley & Sons, 2001.
- [R4] Lee, W.C.Y., "Mobile Cellular Telecommunication", 2nd Edition, McGraw Hill, 1998.
- [R5] Smith & Collins, "3G Wireless Networks," TMH, 2007
- [R6] Schiller, Jochen, "Mobile Communications", 2<sup>nd</sup> Edition, Addison Wesley

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

#### ADVANCED DIGITAL SIGNAL PROCESSING

Paper Code: ETEC-407	L	T/P	С
Paper: Advanced DSP	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objectives: The prerequisites are signals and systems, analog and digital communication, digital signal processing. The objective of the paper is to learn the advanced techniques used in DSP.

#### UNIT-I

**Multirate DSP:** Overview of Mathematical description of change of sampling rate, Filter design & implementation for sampling rate conversion, Multistage implementation of sampling rate conversion ,Sampling rate conversion of band pass signal, sampling rate conversion by an arbitrary factor, Application of multi rate signal processing, poly phase structures, multirate identities, quadrature mirror filter& perfect reconstruction, calculation of amplitude & Phase distortion.

#### Adaptive System

Definition and Characteristics, Areas of Application, Example of an Adaptive System, Adaptive Linear Combiner and The Performance Function; Gradient and Minimum Mean-Square Error, Alternative Expression of the Gradient, De-correlation of Error and Input Components.

#### [T1, T2, R2] [No. of Hours 12]

#### UNIT II

Spectrum Estimation: Estimation of spectra from finite duration signals,

**Non-Parametric Methods**-Correlation Method - Periodogram Estimator, Performance Analysis of Estimators, Unbiased consistent Estimators, Modified periodogram, Bartlett and Welch methods, Blackman - Tukey method **Parametric Methods** - AR - MA - ARMA model based spectral estimation, Parameter Estimation, Yule-Walker equations, Solutions using Durbin's algorithm

#### [T1, T2, R2] [No. of Hours 11]

#### UNIT III

Wiener Filter: Linear Optimum Filtering, Principle of Orthogonally, Minimum Mean Square Error, Wiener-Hopf Equation, Error Performance Surface.

Linear Prediction: Forward Linear Prediction, Backward Linear Predict ion, Properties of Prediction Error Filters

**Method of Steepest Descent:** Basic Idea of Steepest-Descent Algorithm, Steepest-Descent Algorithm Applied to Wiener Filter, Stability of Steepest-Descent Algorithm, and Limitations of Steepest-Descent Algorithm.

#### [T1] [No. of Hours 11]

[T1, R1] [No. of Hours 10]

#### UNIT IV

Least-Mean Square Adaptive Filter: Overview, LMS Adaptation Algorithm, Application, Comparison of LMS with Steepest-Descent Algorithm.

**Normalized Least-Mean Square Adaptive Filter:** Normalized LMS Filter as the Solution to Constrained Optimization Problem, Stability of the NLMS.

#### Textbooks:

- [T1] Simon Haykin, Adaptive Filter Theory, 4th Edn. Pearson Education
- [T2] John G. Proakis, Dimitris G. Manolakis, Digital Signal Processing Principal Algorithm & Application,3<sup>rd</sup> Edition, Pearson Education, 2002

#### **Reference Book:**

- [R1] Bernard Widrow and Samuel D. Stearns, Adaptive Signal Processing, Pearson Education
- [R2] Monson H. Hayes, Statistical Digital Signal processing and Modeling, John Wiley and Sons, Inc., Singapore, 2002.

#### INTRODUCTION TO MEMS

Paper Code: ETEC-409	L	T/P	С
Paper: Introduction to MEMS	3	0	3

#### **INSTRUCTIONS TO PAPER SETTER:**

- Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to introduce the introductory ideas of micro electro mechanical switches, filters, phase shifters, antennas and their applications.

#### UNIT-I:

1.

Introduction: Introduction and origin of MEMS, Micro fabrications for MEMS, Electromechanical transducers, Electrothermal actuators, Microsensing for MEMS, Materials for MEMS, fabrication techniques, Semiconductors, Electrical and chemical properties, Growth and deposition, Thin films for MEMS and their deposition techniques, Oxide film formation by thermal oxidation, Deposition of silicon dioxide and silicon nitride, Bulk micromachining for silicon-based MEMS, Isotropic and orientation-dependent wet etching, Dry etching, Silicon surface micromachining, scanning method.

#### [T1,T2][No. of Hrs. 12]

UNIT-II:

RF MEMS elements: Switches, Mechanical switches, Electronic switches, Switches for RF and microwave applications, Micro relays; Bistable micro relays and micro actuators, MEMS inductors and capacitors, Modeling and design issues.

#### [T1,T2][No. of Hrs. 10]

#### UNIT-III:

**UNIT-IV:** 

Micromachined RF filters: General considerations and modeling, Micromechanical filters, Electrostatic comb drive, Micromechanical filters using comb drives, Micromechanical filters using electrostatic coupled beam structures, Surface acoustic wave filters, Design of interdigital transducers, Single-phase unidirectional transducers, Bulk acoustic wave filters, Micromachined filters for millimeter wave frequencies.

#### [T1,T2][No. of Hrs. 10]

# MEMS phase shifters transmission lines, components and Antenna: phase shifters and their limitations, Micromachined transmission lines, Losses in transmission lines, Overview of microstrip antenna, Integration and packaging for RF MEMS devices, Role of MEMS packages.

#### [T1,T2][No. of Hrs. 10]

- Text books:
- [T1] Vijay K. Varadan K.J. Vinoy and K.A. Jose, "RF MEMS and Their Applications", John Wiley USA
- [T2] Mohamed Gad-el-Hak, "MEMS Design and Fabrication Edited", Taylor and Francis.

#### **Reference Books:**

- [R1] Mohamed Gad-el-Hak, "MEMS Introduction and Fundamentals Edited", Taylor and Francis
- [R2] Christian C. Enz and Andreas Kaiser, "MEMS-based Circuits and Systems for Wireless Communication", Springer
- [R3] P Rai Choudhury, "MEMS and MOEMS Technology and applications" –PHI Learning Pvt Ltd, India
- [R4] Sergey Y.Yurish and Maria Teresa S.R. Gomes, "Smart Sensors and MEMS", Kluwer Academic Publisher
- [R5] Mohamed Gad-el-Hak, Taylor and Francis MEMS Applications, The MEMS handbook .

С

3

#### ADVANCE VLSI DESIGN

#### Paper Code: ETEC-411 Paper: Advance VLSI Design

**INSTRUCTIONS TO PAPER SETTER:** 

#### **MAXIMUM MARKS: 75**

L

3

T/P

0

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to study the advance VLSI design. The students are introducing to MOS technology, design rules and some applications.

#### UNIT I

Small signal & large signal models of MOS & BJT transistor, MOS & BJT transistor Amplifiers: single transistor Amplifiers stages: Common Emitter, Common base, Common Collector, Common Drain, Common Gate & Common Source Amplifiers, Frequency response of amplifiers.

Multiple transistor amplifier stages: CC-CE, CC-CC, & Darlington configuration, Cascode configuration, Active Cascode, Differential amplifiers: Differential pair & DC transfer characteristics.

#### [T1,T2][No. of Hours: 11]

Current Mirrors, Active Loads & References, current mirrors, simple current mirror, Cascode current mirrors Widlar current mirror, Wilson Current mirror, Active loads, Analysis of differential amplifier with active load, supply and temperature independent biasing techniques.

#### [T1,T2][No. of Hours: 11]

#### UNIT III

**UNIT II** 

Operational Amplifier: applications of operational Amplifier, theory and Design; Definition of Performance Characteristics; Design of two stage MOS Operational amplifier, two stage MOS operational amplifier with cascodes, MOS telescopic-cascode operational amplifiers, MOS folded-cascode operational amplifiers, Bipolar operational amplifiers, Frequency response & compensation.

#### [T1,T2][No. of Hours: 11]

[T1,T2][No. of Hours: 11]

#### UNIT IV

Voltage controlled oscillator, Comparators, Source follower, Phase locked techniques; Phase Locked Loops (PLL), closed loop analysis of PLL. Digital-to-Analog (D/A) and Analog-to-Digital (A/D) Converters, OTA Amplifiers, Switched Capacitor Filters.

#### Text books:

- [T1] P. R. Gray, P. J. Hurrt, S. H. Lweic, RoG. Meyer, "Analysis and Design of Analog Integrated Circuits" John Wiley and Sons Inc. 2001.
- [T2] P. E. Allen, D. R. Holberg, "CMOS Analog Circuit Design" Oxford University Press 2002.

#### **Reference Books:**

- [R1] B. Razavi, "Design of Analog CMOS Integrated Circuits", TMH 2002.
- [R2] R. J. Baker, H. W. Li and D. E. Boyce, "CMOS Circuit Design, Layout and Simulation", PHI
- [R3] Ken Martin, "Digital Integrated Circuit Design", Oxford University Press.
- [R4] Yaniiis Tsividis and Colin Mcandrew, "The MOS Transistor", Oxford University Press, 2013
- [R5] Geiger, Allen, Strader "VLSI Design Techniques for Analog and Digital Circuits" McGraw Hill, 1990

#### **BIOMEDICAL INSTRUMENTATION**

Paper Code: ETIC-403	L	T/P	С
Paper: Biomedical Instrumentation	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1.. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective:-The objective of teaching this subject is to make students understand the applications of electronics in diagnostic and therapeutic area. Further the methods of recording various bio potentials; measurement of biochemical and physiological information are explained. The topics such as Patient Monitoring systems, Audiometers, imaging systems, Patients safety are also included. The emerging Computer Applications in Biomedical field are also dealt with.

#### UNIT I

UNIT II

Biomedical signals & Physiological transducers: Source of biomedical signal, Origin of bioelectric signals, recording electrodes, Electrodes for ECG, EMG & EEG .Physiological transducers: Pressure, Temperature, photoelectric & ultrasound Transducers. Measurement in Respiratory system: Physiology of respiratory system, Measurement of breathing mechanics Spiro meter, Respiratory therapy equipments Inhalators ventilators & Respirators, Humidifiers, Nebulizers Aspirators, Biomedical recorders: ECG, EEG & EMG. [T1, T2][No of Hours:-11]

Patient Monitoring systems & Audiometers: Cardiac monitor, Bedside patient monitor, measurement of heart rate, blood pressure, temperature, respiration rate, Arrhythmia monitor, Methods of monitoring fatal heart rate, Monitoring labor activity . Audiometers: Audiometers, Blood cell counters, Oximeter, Blood flow meter, cardiac output measurement, Blood gas analyzers.

#### [T1, T2][No of Hours:-11]

[T1, T2][No of Hours:-11]

Modern Imaging systems: Introduction, Basic principle & Block diagram of x-ray machine, x- ray Computed Tomography (CT), Magnetic resonance imaging system (NMR), ultrasonic imaging system. Eco-Cardiograph, Eco Encephalography, Ophthalmic scans, MRI. Therapeutic Equipments: Cardiac pacemakers, cardiac defibrillators, Hemodialysis machine, Surgical diathermy machine.

#### UNIT III

**Text Books:** 

**UNIT III** 

Patients safety & Computer Applications in Biomedical field: Precaution, safety codes for electro medical equipment, Electric safety analyzer, Testing of biomedical equipment, Use of microprocessors in medical instruments, Microcontrollers, PC based medical instruments, Computerized Critical care units, Planning & designing a computerized critical care unit. Physiotherapy: Software Diathermy, microwave diathermy, Ultrasound therapy unit. Electrotherapy Equipments, Ventilators.

#### [T1, T2][No of Hours:-11]

Joseph J. Carr & John M. Brown, "Introduction to Biomedical Equipment Technology", Pearson. [T1]

Shakti Chatterjee, "Textbook of Biomedical Instrumentation System", Cengage Learning [T2]

#### **Reference Books:**

- [R1] R.S.Khandpur, "Hand book of Biomedical Instrumentation", TMH
- Walter Welko- Witiz and Sid Doutsch, "Biomedical Instruments: Theory and Design" Wiley [R2]
- Lesile Cromwell, Fred J. Weibell & Erich A. Pfeiffer, "Biomedical Instrumentation & Measurements", [R3] PHI

#### PLC & SCADA SYSTEMS

Paper Code: ETEE-413	L	T/P	С
Paper: PLC & SCADA Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this paper is to introduce the students about the knowledge of programmable logic controller, principles of PLC and functions and SCADA and its elements and functions.

#### UNIT-I

**UNIT-II** 

**Programmable Logic Controller (PLC) Basics**: Introduction, Parts of PLC, Principles of operation, PLC size and applications, PLC Advantages and Disadvantages, PLC Manufacturers, PLC hardware components, I/O section, Analog I/O modules, Digital I/O modules, CPU- Processor memory module, Programming devices, Devices which can be connected to I/O modules, Relay, Contactor, SPST, Push Buttons, NO/NC Concept

#### [T1,T2] [No of Hrs 10]

**Programming of Programmable Logic Controller**: General PLC Programming Procedures, Contacts and Coils, Program SCAN, Programming Languages, Ladder Programming, Relay Instructions, Instruction Addressing, Concept of Latching, Branch Instructions, Contact and Coil I/O Programming Examples, Relation of Digital Gate Logic to Contact/Coil Logic.

#### [T1,T2] [No of Hrs 12]

#### UNIT-III

**Programmable Logic controller Functions:** Timer Instructions: ON DEAY Timer and OFF DELAY timer, Counter Instructions: UP/DOWN Counters, Timer and Counter Applications, Program Control Instructions: Master Control Reset, Jump and Subroutine,

Math Instructions- ADD, SUB. Data Handling: Data Move, Data Compare, Data Selection, Electro-pneumatic Sequential Circuits and Applications.

#### [T1,T2] [No of Hrs 12]

#### UNIT-IV

**SCADA:** Definition of SCADA, Applicable Processes, Elements of SCADA System, A Limited Two-Way System. Real Time Systems: Communication Access and Master-Slave determining scan interval. Introduction to Remote Control, Communications-A/D Conversion, Long Distance Communication, Communication System components in brief- Protocol, Modems, Synchronous/Asynchronous telephone cable/radio, Half Duplex, Full Duplex System, Brief introduction to RTU and MTU, Applications-Automatic Control, Advisory Applications.

#### [R1] [No of Hrs 10]

#### Text Books:

- [T1] Frank D. Petruzella "Programmable Logic Controllers", McGraw-Hill Book Company.
- [T2] John w. Webb and Ronald A. Reis, "Programmable Logic Controllers", PHI

#### **Reference Books:**

- [R1] Stuart A.Boyer "Supervisors Control and Data Acquisition", ISA
- [R2] William I. Fletcher "An Engineering Approach to Digital Design", PHI.
- [R3] Simpson, Colin "Programmable Logic Controllers", Englewood Cliffs NJ PHI.
- [R4] Gray Dunning, "Introduction to Programmable Logic Controllers", Delmar Thompson Learning
- [R5] Stenerson, John "Fundamentals Logic Controllers Sensors, & Communications", Englewood Cliffs, NJ, 1993. Prentice Hall.
- [R6] Programmable Logic Controllers, W.Bolton, Elsevier

#### **POWER ELECTRONICS**

Paper Code: ETEE-415	L	T/P	С
Paper: Power Electronics	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Power Electronics that are required for an engineering student.

#### UNIT- I

#### Introduction 🥒

Characteristics and switching behaviour of Power Diode, SCR, UJT, TRIAC, DIAC, GTO, MOSFET, IGBT, MCT and power BJT, two-transistor analogy of SCR, firing circuits of SCR and TRIAC, SCR gate characteristics, SCR ratings. Protection of SCR against over current, over voltage, high dV/dt, high dI/dt, thermal protection, Snubber circuits, Methods of commutation, series and parallel operation of SCR, Driver circuits for BJT/MOSFET.

#### [T1,T2][No. of hrs. 11]

#### UNIT- II

**A.C. to D.C. Converter:** Classification of rectifiers, phase controlled rectifiers, fully controlled and half controlled rectifiers and their performance parameters, three phase half wave, full wave and half controlled rectifiers and their performance parameters, effect of source impedance on the performance of single phase and three phase controlled rectifiers, single-phase and three phase dual converter.

#### [T1, T2, T3][No. of hrs. 11]

#### UNIT- III

**D.C. to D.C. Converter:** Classification of choppers as type A, B, C, D and E, principle of operation, switching mode regulators: Buck, Boost, Buck-Boost, Cuk regulators.

**A.C. to A.C. Converter:** AC voltage Controllers, Cyclo-converters : single phase to single phase, three phase to single phase, three phase to three phase Cyclo-converter circuit and their operation, Matrix converter.

#### [T1, T2, T3][No. of hrs. 11]

#### UNIT-IV

**D.C. to A.C. Converter:** single phase single pulse inverter: Square wave, quasi square. Three phase single pulse inverters (120° and 180° conduction) Modulation Techniques and reduction of harmonics, PWM techniques, SPWM techniques, SVM, Carrier less modulation. , PWM Inverter, Bidirectional PWM converters, voltage source inverters and current source inverter, Multi level Inverter: cascaded and NPC Inverters.

#### [T1, T2, T3][No. of hrs. 11]

#### **Text Books:**

- [T1] M.H. Rashid, "Power Electronics: Circuits, Devices and Applications" Pearson Publications.
- [T2] Daniel W. Hart, "Power Electronics "Tata McGraw-Hill
- [T3] H.C. Rai, "Power Electronics Devices, Circuits, Systems and Application", Galgotia Publications, 3<sup>rd</sup> Edition

#### **References Books:**

- [R1] Singh, Kanchandani, "Power Electronics", Tata McGraw-Hill.
- [R2] Ned Mohan, Tore M. Undeland and Robbins, "Power Electronics: Converters, Applications and Design" Wiley India Publication
- [R3] V R Moorthi, "Power Electronics: Devices, Circuits and Industrial Applications", Oxford Publication.
- [R4] Kassakian, Schlecht, Verghese, "Principles of Power Electronics", Pearson Publications
- [R5] M.S. Jamil Asghar, "Power Electronics" PHI Publication
- [R6] P. S. Bimbhra "Power Electronics", Khanna Publishing.

#### **RF DEVICES AND CIRCUITS**

Paper Code: ETEC-417	L	Т	С
Paper: RF Devices and Circuits	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To study the various devices and circuits for microwave and RF circuit applications.

#### UNIT-I

Introduction of RF and Microwaves, RF behavior of Passive components (resistor, capacitor and inductor), **Transmission line**: lumped element circuit model, wave propagation on transmission line, lossless line two wire

line, coaxial line, micro strip line, terminated lossless transmission line, short circuit and open circuit terminated transmission line.

Quarter wave transformer (impedance, frequency response and multiple reflections).

#### **UNIT-II**

Smith chart: basic smith chart operation, combined impedance – admittance Smith chart, computation of Impedance of Passive circuits using smith chart (from reflection coefficient to load impedance)

RF network analysis : Scattering matrix, Generalized Scattering Parameters.

Impedance matching and tuning: matching with lumped element(analytic and smith chart solution), single stub tuning, shunt stub and series stub tuning.

#### [T1, T2, R1][No. of Hrs. 11]

[T1, T2, R1][No. of Hrs. 10]

[T1, T2, R1][No. of Hrs. 11]

#### **UNIT-III**

Power dividers: basic properties of dividers and couplers, TEE junction lossless power divider, waveguide directional coupler.

**RF Filter Design** : Periodic structures, analysis of infinite periodic structure, terminated periodic structure,  $k-\beta$ diagram and wave velocities, filter design using insertion loss method, characterization of power loss ratio, low pass prototype filter for Butterworth and Chebyshev filters, impedance and frequency transformation(only for LPF).

#### **UNIT-IV**

Microwave Bipolar Transistors: Physical structures, figure of merit of various geometry and power frequency

limitation. RF Field effect Transistors: Construction and functionality of MISFET, MOSFET, MESFET and High electron mobility Transistors (MODFET).

#### [T1, T3][No. of Hrs. 10]

#### **Text Books:**

- [T1] S Y Liao, Microwave Devices and Circuits, Pearson Publications.
- R.E. Collin, "Foundation for Microwave Engineering", Wiley Publications [T2]
- Davis, "Radio frequency circuit design", Wiley publication [T3]

#### **Reference Books**

- Reinhold Ludwig and Gene Bogdanvo, "RF Circuit design Theory and applications", Pearson [R1] Publications.
- [R2] D.M Pozar, "Microwave Engineering", Wiley Publications.

#### DATABASE MANAGEMENT SYSTEMS

Paper Code: ETCS-425	
Paper: Database Management Systems	

#### **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks: 75

T/P

0

L

3

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The concepts related to database, database techniques, SQL and database operations are introduced in this subject. This creates strong foundation for application data design.

**UNIT-I : Introductory Concepts of DBMS:** Introduction and application of DBMS, Data Independence, Database System Architecture – levels, Mapping, Database users and DBA, Entity – Relationship model, constraints, keys, Design issues, E-R Diagram, Extended E-R features- Generalization, Specialization, Aggregation, Translating E-R model into Relational model.

#### [T1, T2][No. of Hrs. 10]

**UNIT-II : Relational Model:** The relational Model, The catalog, Types, Keys, Relational Algebra, Fundamental operations, Additional Operations-, SQL fundamentals, DDL,DML,DCL PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Integrity – Triggers.

#### [T2, R3][No. of Hrs. 10]

**UNIT-III:** Functional Dependencies, Non-loss Decomposition, First, Second, Third Normal Forms, Dependency Preservation, Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

#### [T2, R1][No. of Hrs. 10]

**UNIT-IV: Transaction Management:** ACID properties, serializability of Transaction, Testing for Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Database recovery management.

**Implementation Techniques:** Overview of Physical Storage Media, File Organization, Indexing and Hashing, B+ tree Index Files, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Materialized views, Database Tuning.

#### [T1, T2, R2][No. of Hrs. 12]

#### **Text Books:**

- [T1] Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 5<sup>th</sup> Edition, Tata McGraw Hill, 2006
- [T2] Elmsari and Navathe, "Fundamentals of Database Systems", 4th Ed., A. Wesley, 2004

#### **References Books:**

- [R1] C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8<sup>th</sup> Edition, Pearson Education, 2006.
- [R2] J. D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.

С

3

#### RENEWABLE ENERGY RESOURCES

Paper Code: ETEE-419	L	T/P	С
Paper: Renewable Energy Resources	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to introduce the knowledge of upcoming and future promising area of renewable energy resources to the students, which is developing rapidly.

#### UNIT- I

Solar Energy: radiation – extra terrestrial, spectral distribution, solar constant, solar radiation on earth, measurements; solar thermal system – solar thermal power and its conversion, solar collectors, flat plate, solar concentrating collectors, - types and applications; photovoltaic (PV) technology - photovoltaic effect, efficiency of solar cells, semi-conductor materials, solar PV system, standards and applications, tracking.

#### [T1][No. of hrs. 10]

#### UNIT- II

Wind and Small Hydropower Energy: wind data, properties, speed and power relation, power extracted, wind distribution and speed prediction, wind map of India; wind turbines and electric generators. fundamentals – types of machines and their characteristics, horizontal and vertical wind mills, elementary design principle, wind energy farms, off-shore plants; small, mini and micro hydro power plants and their resource assessment, plant layout with major components shown.

#### [T2][No. of hrs. 10]

#### UNIT- III

Other Non-conventional Energy Sources: biomass – photosynthesis and origin of biomass energy, resources, cultivated resources, waste to biomass, terms and definitions – incineration, wood and wood waste, harvesting super tree, energy forest, phyrolysis, thermo-chemical biomass conversion to energy, gasification, anaerobic digester, fermentation, gaseous fuel; geothermal – resources, hot spring, steam system, principle of working, site selection, associated problems in development; ocean and tidal energy – principle of ocean thermal energy conversion machines, problems and limitations, fundamentals of tidal power, conversion systems and limitations; hydrogen energy – properties of hydrogen, sources, production and storage, transportation, problems for use as fuel; fuel cells – introduction with types, principle of operation and advantages.

#### [T1,R2][No. of hrs. 12]

[T2,R3][No. of hrs. 10]

#### UNIT-IV

Grid Connectivity: wind power interconnection requirement - low-voltage ride through (LVRT), ramp-rate limitations, supply of ancillary services for frequency and voltage control, load following, reserve requirement, impact of connection on stead-state and dynamic performance of power system; interfacing dispersed generation of solar energy with the grid, protective relaying, islanding, voltage flicker and other power quality issues; role of non-conventional energy system in smart grid.

#### **Text Books:**

[T1] Tiwari and Ghosal, "Renewable Energy Resources: Basic Principle & Application", Narosa Pub.

[T2] S N Bhadra ,D, Kastha,'Wind Electrical Systems" Oxford Publication 2014

#### **References Books:**

- [R2] John Twidell, "Renewable Energy Sources", Taylor and Francis
- [R3] Godfrey Boyle, "Renewable Energy: Power for a Sustainable Future", Oxford University Press
- [R4] Ewald F. Fuchs, "Power Conversion of Renewable Energy Systems", Springer
- [R5] B. H. Khan, "Non Conventional Energy", Tata McGraw Hill
- [R6] D P kothari, "Wind energy System and applications" Narosa Pub 2014

#### RADAR AND NAVIGATION

Paper Code: ETEC-419	L	T/P	С
Paper: Radar and Navigation	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To study the basic of radar systems and their use in different navigation systems.

#### UNIT I

UNIT II:

**Introduction to Radar:** Basic Radar – The Origins of Radar, radar system (block diagrams), Radar range Equation, Applications of Radar. Radar types: MTI, Doppler and Pulse, PRF, Delay, Line Cancellers, Staggered Pulse Repetition Frequencies, Doppler Filter Banks, Digital MTI Processing, Moving Target Detector, Limitations to MTI Performance, Pulse Doppler Radar. Tracking with Radar-Monopulse Tracking, Conical Scan and Sequential Lobing, Limitations to Tracking Accuracy, Low-Angle Tracking - Tracking in Range, Comparison of Trackers, Automatic Tracking with Surveillance Radars.

#### [T1][R1][No. of Hrs. 11]

**Radar Receiver:** Introduction, Superheterodyne Receiver, Receiver noise Figure, Duplexers and Receiver Protectors, Radar Displays. Matched Filter Receiver, Detection Criteria, Detectors, Automatic Detector, Integrators, Constant-False-Alarm Rate Receivers, The Radar operator, Signal Management, Propagation Radar Waves, Atmospheric Refraction, Standard propagation, Nonstandard Propagation, The Radar Antenna, Reflector Antennas, Electronically Steered Phased Array Antennas, Phase Shifters, Frequency-Scan Arrays

#### [T1][R1][R2][No. of Hrs. 11]

[T2][R3][No. of Hrs. 11]

[T1][R1][No. of Hrs. 11]

#### UNIT III

**Radar Transmitters-** Introduction –Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources – Other aspects of Radar Transmitter.

**Detection of Signals in Noise** –Detection of Signals in Noise, Receiver Noise and the Signal-to-Noise Ratio, Probability Density Functions, Probabilities of Detection and False Alarm, Integration of Radar Pulses, Radar Cross Section of Targets, Radar cross Section fluctuations, Transmitter Power.

#### UNIT IV

**Navigation** – Introduction, Four methods of Navigation, Radio Direction Finding, The Loop Antenna, Loop Input Circuits, An Aural Null Direction Finder, The Goniometer, Errors in Direction Finding, Adcock Direction Finders, Direction Finding at Very High Frequencies, Automatic Direction Finders, The Commutated Aerial Direction Finder, Range and Accuracy of Direction Finders, Radio Ranges, Doppler Navigation, component, Beam Configurations, Track Stabilization, introduction to Satellite Navigation System, Global Positioning System(GPS).

#### **Textbooks:**

[T1] Merrill I. Skolnik, "Introduction to Radar Systems", Tata McGraw-Hill (3rd Edition) 2003.

[T2] N.S.Nagaraja, "Elements of Electronic Navigation Systems", 2nd Edition, TMH, 2000.

#### **Reference books:**

- [R1] Gottapu Sasi Bhushana Rao, "Microwave and RADAR Engineering". Pearson publication.
- [R2] Peyton Z. Peebles, "Radar Principles", Johnwiley, 2004
- [R3] J.C Toomay, "Principles of Radar", 2nd Edition PHI, 2004

#### **PROJECT MANAGEMENT**

Paper Code: ETMS-421	L	T/P	С
Paper: Project Management	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The student is introduced to the concepts of project management which becomes back bone knowledge for an engineer to have a holistic view of executing a project.

#### UNIT – I

Introduction to Project management: Characteristics of projects, Definition and objectives of Project Management, Stages of Project Management, Project Planning Process, Establishing Project organization.

#### UNIT –II

Work definition: Defining work content, Time Estimation Method, Project Cost Estimation and budgeting, Project Risk Management, Project scheduling and Planning Tools: Work Breakdown structure, LRC, Gantt charts, CPM/PERT Networks.

#### UNIT – III

#### [T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

Developing Project Plan (Baseline), Project cash flow analysis, Project scheduling with resource constraints: Resource Leveling and Resource Allocation. Time Cost Trade off: Crashing Heuristic.

#### [T1,T2][No. of Hrs. 10]

#### $\mathbf{UNIT} - \mathbf{IV}$

Project Implementation: Project Monitoring and Control with PERT/Cost, Computers applications in Project Management, Contract Management, Project Procurement Management. Post-Project Analysis.

#### [T1,T2][No. of Hrs. 10]

#### **Text Books:**

- [T1] Shtub, Bard and Globerson, Project Management: Engineering, Technology, and Implementation, Prentice Hall, India
- [T2] P. K. Joy, Total Project Management: The Indian Context, Macmillan India Ltd.

#### **Reference Books**:

- [R1] Cleland and King, VNR Project Management Handbook.
- [R2] Lock, Gower, Project Management Handbook.
- [R3] Wiest and Levy, Management guide to PERT/CPM, Prentice Hall. India
- [R4] Horald Kerzner, Project Management: A Systemic Approach to Planning, Scheduling and Controlling, CBS Publishers.
- [R5] S. Choudhury, Project Scheduling and Monitoring in Practice.
- [R6] John M Nicholas, Project Management for Business and Technology: Principles and Practice, Prentice Hall, India.
- [R7] N. J. Smith (Ed), Project Management, Blackwell Publishing.
- [R8] Robert K. Wysocki, Robert Back Jr. and David B. Crane, Effective Project Management, John Wiley.
- [R9] Jack R Meredith and Samuel J Mantel, Project Management: A Managerial Approach, John Wiley.

#### **ECONOMICS FOR ENGINEERS**

Paper Code: ETMS-423	L	T/P	С
Paper: Economics for Engineers	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to give the working engineer an overview of the economics principles often employed in effective engineering decisions as related to the designing, planning and implementation of successful civil engineering projects.

#### UNIT – I

Engineering economics and its definition, Nature and scope, Overview of Indian Financial Scenario.

Utility, Theory of demand, law of demand and its exceptions, Elasticity of demand, Law of supply and elasticity of supply, Determination of equilibrium price under perfect competition.

Time value of money-Simple and Compound Interest, Cash Flow Diagram, Principle of Economic Equivalence Evaluation of Engineering projects, Concept of Internal rate of return (IRR).

#### [T1,T2][No. of Hrs: 10]

UNIT – II

Cost Concepts, Elements of costs, Preparation of cost sheet, Segregation of costs into Fixed and variable costs, Break-even Analysis-Linear Approach.

Engineering Accounting, Manufacturing Cost, Manufacturing Cost Estimation, Preparing Financial Business Cases, Profit and loss A/c Balance sheet.

Asset Depreciation and its Impact on Economic Analyses, Depreciation Policy, Straight line method and declining balance method, Economic Justification of Asset Replacements.

#### [T1,T2][No. of Hrs: 12]

#### UNIT – III

Types of business ownership: Private ownership- individual, Partnership, Joint stock companies, Co-operative societies, State ownership-government departmental organization, Public corporations, Government companies, Public Private Partnership (PPP) and its management. Store keeping, Elements of Materials management and control polices. Banking: Meaning and functions of commercial banks, Function of Reserve Bank of India.

#### [T1,T2][No. of Hrs: 10]

#### UNIT - IV

Asset Depreciation and its Impact on Economic Analyses, Depreciation Policy, Straight line method and declining balance method, Economic Justification of Asset Replacements. Development of business case analyses for new product development projects and the impact of taxes on engineering economic decisions. Inflation and its impact on economy.

#### [T1,T2][No. of Hrs: 12]

#### Text Books:

[T1] Sullivan, Wicks, Koelling, "Engineering Economy", Pearson Education

[T2] S.C. Sharma and T.R. Banga, "Industrial organization and engineering economics"

#### **References Books:**

- [R1] Riggs, Bedworth and Randhwa, "Engineering Economics", McGraw Hill Education India.
- [R2] C. T. Horngreen, "Cost Accounting", Pearson Education India.
- [R3] R. R. Paul, "Money banking and International Trade", Kalyani Publuisher, New-Delhi.
- [R4] Engineering Economics by Tahir Hussain, University Science Press, 2010
- [R5] Engineering Economics by Dr. Rajan Mishra University Science Press, 2009
- [R6] H.L. Ahuja, "Principle of Economics", S. Chand
- [R7] Khan, Siddiquee, Kumar, "Engineering Economy" Pearson Education

#### **GRID COMPUTING**

Paper Code: ETIT-425	L	T/P	С
Paper: Grid Computing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enable students to understand the basic concepts of GRID computing with performance issues, Web services, monitoring, optimization, security and resource management.

#### UNIT I

Fundamentals: Overview of Distributed Systems and it's variants like grid computing, cloud computing, Cluster Computing etc. Introduction to Grid Computing, it's components(Functional View, A Physical View, Service View), key issues and benefits, Characterization and Architecture of Grid, Grid - Types, Topologies, Components, Layers. Grid Computing Standards and Applications.

#### UNIT II

Web Services and Grid Monitoring : OGSA and WSRF : Overview, Services, Schema and architecture. Grid Monitoring Systems: Overview, architecture, GridICE, JAMM, MDS and Other monitoring Systems (Ganglia and GridMon), Grid portals.

#### [T1,T2][No. of Hours: 11]

#### UNIT III

Grid Security and Resource Management -

Grid Security: A Brief Security Primer, PKI, X509 Certificates, Grid Security-Grid Scheduling and Resource Management: Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

[T1,T2][No. of Hours: 11]

[T1,T2][No. of Hours: 11]

#### UNIT IV

Data Management and Grid Middleware-

Data Management: Categories and Origins of Structured Data, Data Management, Challenges, Database integration with grid, Architectural Approaches-Collective Data Management Services, Federation Services . Grid Middleware: List of globally available Middlewares, Globus Toolkit.

#### **Text Books:**

- [T1] Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons.
- [T2] Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson 2004.
- [T3] C.S. R. Prabhu,"Grid and Cluster Computing', PHI 2014

#### **Reference Books:**

- [R1] Ian Foster & Carl Kesselman, The Grid 2 Blueprint for a New Computing Infrastructure, Morgan Kaufman – 2004.
- [R2] Barry Wilkinson, "Grid Computing", CRC Press.
- [R3] Joel M. Crichlow, "Distributed Systems Computing over Networks", PHI, 2014.
- [R4] RajKumar Buyya, "High Performance Cluster Computing Volume I Architectures and Systems", Pearson, 2013.

#### **MAXIMUM MARKS: 75**

# [T1,T2][No. of Hours: 11]

#### PARALLEL COMPUTING

Paper Code: ETCS-427	L	T/P	С
Paper: Parallel Computing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The perquisites are Computer Architecture, OS. The student is introduced to the concepts of parallelism which enhances the speed of operations of an OS. Further, various architectures of multiprocessor is taught.

#### UNIT I

Theory of Parallelism: Parallelism, Reason of parallel processing, Concepts and challenges, applications of parallel processing.

Parallel computer models: The state of computing, Classification of parallel computers, Flynn and Feng's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors, multiprocessors and multicomputers, Multivector and SIMD computers, PRAM and VLSI Models.

Program and Network Properties: Conditions of parallelism, program partitioning and scheduling, program flow mechanism, system interconnection architecture.

#### [T1,T2][No. of Hrs. 10]

#### UNIT II

Memory Hierarchy Design: Memory technologies and optimization, inclusion, coherence and locality, cache memory organization and cache performance optimization, shared memory organization, memory protection, virtual memory technology and introduction to buses, crossbar and multi-stage switches.

Pipelining and ILP: Instruction level parallelism and its exploitation- concepts and challenges, overcoming data hazards with dynamic scheduling. Pipelining, instruction and arithmetic pipelining designs, branch handling techniques, linear and non-linear pipeline processors, superscalar and super pipeline design.

#### [T1,T2][No. of Hrs. 10]

#### UNIT III

Parallel architectures: multi-processor system interconnects, cache coherence and synchronization mechanism, message passing mechanism, vector processing principles, multivector multiprocessors, compound vector processing, principles of multithreading, latency hiding techniques- shared virtual memory, prefetching techniques, distributed coherent cache, scalable and multithread architectures, dataflow and hybrid architecture.

#### [T1,T2][No. of Hrs. 10]

#### UNIT IV

Parallel Programming Platforms: Implicit Parallelism: Trends in Microprocessor Architectures, limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines, Routing Mechanisms for Interconnection Networks. Parallel Programming Models: Shared variable models, message passing models, parallel languages and complier, code optimization and scheduling, Introduction of shared-memory MIMD machines and message-passing MIMD machines.

#### **Text Books:**

#### [T1,T2][No. of Hrs. 10]

- [T1] Introduction to Parallel Computing by Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson Publication.
- [T2] Advance computer Architecture by Kai Hwang under Tata McGraw Hill publications.
- [T3] Introduction to Parallel Processing: Algorithms and Architectures By Behrooz Parhami in Springer Shop.

#### **Reference Books:**

- [R1] Introduction to Parallel Processing by P. Ravi Prakash, M. Sasikumar, Dinesh Shikhare By PHI
- [R2] Fundamentals of Parallel Processing by Jordan Harry, Alaghband Gita, PHI Publication
- [R3] Introduction to Parallel Programming by Steven Brawer.
- [R4] Parallel Computers Architecture and Programming by V. Rajaraman And C. Siva Ram Murthy.

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

#### SOCIOLOGY AND ELEMENTS OF INDIAN HISTORY FOR ENGINEERS

Paper Code: ETHS-419	L	T/P	С
Paper: Sociology and Elements of Indian History for Engineers	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

#### UNIT I

*Module 1A:* Introduction to Elements of Indian History: What is History? History Sources-Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.

[3 Lectures]

[3 Lectures]

*Module 1B:* Introduction to sociological concepts-structure, system, organization, social institution, Culture social stratification (caste, class, gender, power). State & civil society.

[7 Lectures] [**T1**][**No. of Hrs. 10**]

#### UNIT II

*Module 2A:* Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.

Module 2B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[7 Lectures] [**T1**][**No. of Hrs. 10**]

#### UNIT III

Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence.

[3 Lectures] Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

> [9 Lectures] [**T1**][**No. of Hrs. 12**]

#### UNIT IV

*Module 4A:* Issues & concerns in post-colonial India (upto 1991); Issues & concerns in post-colonial India 2<sup>nd</sup> phase (LPG decade post 1991).

[3 Lectures]

*Module 4B:* Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.

[10 Lectures] [T1][No. of Hrs. 13]

#### **Text Books:**

- [T1] Desai, A.R. (2005), Social Background of Indian Nationalism, Popular Prakashan.
- [T2] Giddens, A (2009), Sociology, Polity, 6<sup>th</sup> Edition

#### **Reference Books:**

- [R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan
- [R2] Haralambos M, RM Heald, M Holborn, (2000), Sociology, Collins

#### SELECTED TOPICS IN ECE

Paper Code: ETEC-429	L	T/P	С
Paper: Selected Topics in ECE	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of this course is to familiarize the selected vital topics of the electronics and communication engineering.

#### UNIT I

Introduction to the Verilog Hardware Description Language (HDL), Verilog system design, Module testing, Behaviour Modelling, Tasks and functions, Verilog structure, syntax and semantics, Identifier names, logic values and numbers, data types. Gate level modeling, Generating arrays of instances • Generating arrays of instances Dataflow modelling, Reset function design. Design of digital sequential modules. Examples - Bus design.

#### UNIT II

Introduction to System Verilog, System Verilog extensions to Verilog data types, System Verilog enhanced procedural blocks, System Verilog coding styles for top-down design with synthesis and simulation. Blocking and non-blocking assignments affect, simulation and synthesis. Overview of RTL/gate/switch models. Writing verification test benches in Verilog. System verilog interfaces. Using interfaces to simplify inter-module connections, Specifying interface views (modports), using tasks and functions in interfaces

#### [T1,R2][No. of Hrs. 10]

[T1,R2][No. of Hrs. 10]

## UNIT III

Introduction to Smart Antenna Systems, Concept and benefits of smart antennas, Fixed weight beam forming basics, Detection and estimation of arrival angle, Adaptive beam forming. Tx-Rx Array processing. Spatial processing for wireless systems. Adaptive antennas. Beam forming networks. Digital radio receiver techniques and software radios. Coherent and non-coherent CDMA spatial processors. Dynamic re-sectoring. Range and capacity extension – multi-cell systems. Spatio – temporal channel models. Environment and signal parameters. Geometrically based single bounce elliptical model.

#### UNIT IV

Optimal Spatial filtering – adaptive algorithms for CDMA. Multitarget decision – directed algorithm. DOA estimation – conventional and subspace methods. ML estimation techniques. Estimation of the number of sources using eigen decomposition. Direction finding and true ranging PL systems. Elliptic and hyperbolic PL systems. TDOA estimation techniques. Applications of Smart Antennas in Wireless/Mobile Communications Applications, Smart Antenna Techniques for CDMA (including current applications).

#### [T2,R1][No. of Hrs. 10]

[T2,R1][No. of Hrs. 10]

#### **Textbook:** [T1] SystemVerilog for Verification by Ben Cohen, Srinivasan Venkataramanan, Ajeetha Kumari

[T1] System vernog for vernearion by Den Concil, Shinvasar venkatarananan, Ajeenia Ruman
 [T2] T.S.Rappaport & J.C.Liberti, Smart Antennas for Wireless Communication, Prentice Hall (PTR), 1999.

#### **Reference Books:**

- [R1] R.Janaswamy, Radio Wave Propagation and Smart Antennas for Wireless Communication, Kluwer, 2001.
- [R2] Verilog HDL: A Guide to Digital Design and Synthesis, by Samir Palnitkar Prentice Hall Professional, 2003

#### **OPTICAL AND WIRELESS COMMUNICATION LAB**

Paper Code: ETEC-451	L	T/P	С
Paper: Optical and Wireless Communication Lab	0	2	1

#### List of Experiments:

- 1. Setting up Fiber Optic Analog and Digital Link.
- 2. Study of Intensity Modulation Technique using Analog Input Signal.
- 3. Study of Intensity Modulation Technique using Digital Input Signal.
- 4. Frequency Modulation System.
- 5. Pulse width Modulation System.
- 6. Study of Propagation Loss in Optical Fiber.
- 7. Study of Bending Loss.
- 8. Measurement of Optical Power using Optical Power Meter.
- 9. D. C. Characteristics of PIN and APD photo diode.
- 10. Measurement of Numerical aperture and Propagation loss in optical fiber.

#### **PSPICE SIMULATION**

Operating characteristics of optical devices (LED and photodiode). DC Characteristics of LED,PIN and APD Photo Diode

#### NOTE:- At least 8 Experiments out of the list must be done in the semester.

12,

#### EMBEDDED SYSTEMS LAB

Paper Code: ETEC-453 Paper: Embedded Systems Lab	L 0	T/P 2	C 1
List of Experiments:			
1. Introduction to microcontroller and interfacing modules.			
2. To interface the seven segment display with microcontroller 8051			
3. To create a series of moving lights using PIC on LEDs.			
4. To interface the stepper motor with microcontroller.			
5. To display character 'A' on 8*8 LED Matrix.			
6. Write an ALP to add 16 bits using ARM 7 Processor	$\sim$		
7. Write an ALP for multiplying two 32 bit numbers using ARM Processor	1		
8. Write an ALP to multiply two matrices using ARM processor	<b>6</b> /		

#### **BIOMEDICAL INSTRUMENTATION**

Paper Code: ETEC-455	L	T/P	С
Paper: Biomedical Instrumentation	0	2	1

#### **List of Experiments:**

- 1. To study various transducers for biomedical applications
- 2. To study various functions of Bedside & Central Patient Monitoring Unit.
- 3. To measure blood pressure using Patient Monitoring Unit.
- 4. To study working principle & measure blood pressure using Sphygmomanometer.
- 5. To measure percentage amount of oxygenated arterial blood using Patient Monitoring Unit.
- 6. To measure ECG using Patient Monitoring Unit.
- 7. To measure body temperature using Patient Monitoring Unit.
- 8. To study working principle & measure body temperature using Digital Thermometer.

#### DATABASE MANAGEMENT SYSTEMS LAB

Paper Code: ETEC-455	L	T/P	С
Paper: Database Management Systems Lab	0	2	1

#### LAB BASED ON DBMS

Lab includes implementation of DDL, DCL, DML i.e SQL in Oracle.

#### List of Experiments:

- 1. Design a Database and create required tables. For e.g. Bank, College Database
- 2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- 3. Write a SQL statement for implementing ALTER, UPDATE and DELETE
- 4. Write the queries to implement the joins
- 5. Write the queries for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()
- 6. Write the queries to implement the concept of Integrity constrains
- 7. Write the queries to create the views
- 8. Perform the queries for triggers
- 9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints

#### **TEXT BOOK:**

1. SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications

#### HUMAN VALUES & PROFESSIONAL ETHICS – II

Paper Code: ETHS-402	L	Т	С
Paper : Human Values & Professional Ethics-II	1	0	1

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

3. Two internal sessional test of 10 marks each and one project report\* carrying 5 marks.

#### Objectives:

- 1. The main object of this paper is to inculcate the skills of ethical decision making and then to apply these skills to the real and current challenges of the engineering profession.
- 2. To enable student to understand the need and importance of value-education and education for Human Rights.
- 3. To acquaint students to the National and International values for Global development

#### **UNIT I - Appraisal of Human Values and Professional Ethics:**

Review of Universal Human Values: Truth, Love, Peace, Right conduct, Non violence, Justice and Responsibility. Living in harmony with 'SELF', Family, Society and Nature. Indian pluralism - the way of life of Islam, Buddhism, Christianity, Jainism, Sikhism and Hinduism, Greek - Roman and Chinese cultural values. Sensitization of Impact of Modern Education and Media on Values:

a) Impact of Science and Technology

b) Effects of Printed Media and Television on Values

c) Effects of computer aided media on Values (Internet, e-mail, Chat etc.)

d) Role of teacher in the preservation of tradition and culture.

e) Role of family, tradition & community prayers in value development.

Review of Professional Ethics: Accountability, Collegiality, Royalty, Responsibility and Ethics Living. Engineer as a role model for civil society, Living in harmony with 'NATURE', Four orders of living, their intercorrectness, Holistic technology (eco-friendly and sustainable technology).

#### UNIT II - Engineers responsibility for safety:

Safety and Risks, Risk and Cost, Risk benefit analysis, testing methods for safety. Engineer's Responsibility for Safety Social and Value dimensions of Technology - Technology Pessimism - The Perils of Technological Optimism - The

Promise of Technology – Computer Technology Privacy

Some Case Studies: Case Studies, BHOPAL Gas Tragedy, Nuclear Power Plant Disasters, Space Shuttle Challenger, Three Mile Island Accident, etc.

#### [T1] [T2] [R4] [R2][No. of Hrs. 03]

[T1] [T2] [R1] [R5] [R4][No. of Hrs. 03]

**UNIT III – Global Issues:** 

Globalization and MNCs: International Trade, Issues,

Case Studies: Kelleg's, Satyam, Infosys Foundation, TATA Group of Companies

Business Ethics: Corporate Governance, Finance and Accounting, IPR.

Corporate Social Responsibility (CSR): Definition, Concept, ISO, CSR.

Environmental Ethics: Sustainable Development, Eco-System, Ozone depletion, Pollution.

**Computer Ethics**: Cyber Crimes, Data Stealing, Hacking, Embezzlement.

#### [T1] [T2] [R4][No. of Hrs. 05]

#### **UNIT IV - Engineers Responsibilities and Rights and Ethical Codes:**

Collegiality and loyalty, Conflict of interests, confidentiality, occupational crimes, professional rights, responsibilities. To boost industrial production with excellent quality and efficiency, To enhance national economy, To boost team spirit, Work Culture and feeling of job satisfaction, National integration, Examples of some illustrious professionals.

Need for Ethical Codes, Study of some sample codes such as institution of Electrical and Electronics Engineers, Computer Society of India etc., Ethical Audit.

**Development and implementation of Codes:** Oath to be taken by Engineering graduates and its importance\*\*.

Modified Scheme and Syllabus of B. Tech-ECE (1st Semester to 8th Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

#### [T1] [T2] [R4][R2][No. of Hrs. 05]

#### **Text Books:**

- [T1] Professional Ethics, R. Subramanian, Oxford University Press.
- [T2] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

#### **References Books:**

- [R1] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers" Manual by the same author
- [R2] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press
- [R3] Values Education: The paradigm shift, by Sri Satya Sai International Center for Human Values, New Delhi.
- [R4] Professional Ethics and Human Values M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi
- [R5] A Textbook on Professional Ethics and Human Values R.S. Naagarazan New Age International (P) Limited, Publishers New Delhi.
- [R6] Human Values & Professional Ethics- S B Gogate- Vikas publishing house PVT LTD New Delhi.
- [R7] Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill
- [R8] Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning
- [R9] PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications
- [R10] Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press
- [R11] Charles D Fleddermann, "Engineering Ethics", Prentice Hall.
- [R12] George Reynolds, "Ethics in Information Technology", Cengage Learning
- [R13] C, Sheshadri; The Source book of Value Education, NCERT
- [R14] M. Shery; Bhartiya Sanskriti, Agra (Dayalbagh)

\*Any topic related to the experience of the B.Tech student in the assimilation and implementation of human values and professional ethics during the past three years of his/her studies in the institute OR A rigorous ethical analysis of a recent case of violation of professional ethics particularly related to engineering profession.

\*\*All students are required to take OATH in writing prior to submission of major project and the record of the same is to be maintained at the college level and/or, this oath may be administered by the head of the institutions during the graduation ceremonies. The draft for the same is available alongwith the scheme and syllabus.

#### **OATH TO BE TAKEN BY ENGINEERING GRADUATES**

In a manner similar to the Hippocratic Oath taken by the medical graduates, Oath to be taken by the engineering graduates is as given below.

- I solemnly pledge myself to consecrate my life to the service of humanity. 1.
- 2. I will give my teacher the respect and gratitude, which is their due.
- 3. I will be loyal to the profession of engineering and be just and generous to its members.
- 4. Whatever project I undertake, it will be for the good of mankind.
- 5. I will exercise my profession solely for the benefit of humanity and perform no act for criminal purpose and not contrary to the laws of humanity.
- I will keep away from wrong, corruption and avoid tempting others to vicious practices. 6.
- I will endeavor to avoid waste and consumption of non-renewable resources. 7.
- I will speak out against evil and unjust practices whenever and wherever I encounter them. 8.
- I will not permit considerations of religion, nationality, race, party politics or social standing to 9. intervene between my duty and my work, even under threat.
- 10. I will practice my profession with conscience, dignity and uprightness.
- 11.
- I will respect the secrets, which are confided to me.

I make these promises solemnly, freely and upon my honor.

(Name of the Student)

Correspondence Address: \_\_\_\_\_

Email: \_\_\_\_\_

#### SATELLITE COMMUNICATION

Paper Code: ETEC-404	L	T/P	С
Paper: Satellite Communication	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To study the most relevant aspects of satellite communication with emphasis on the most recent application & developments. It covers orbital mechanics, launching techniques, satellite link design, earth & space segment, error control coding and different multiple access techniques.

#### UNIT- I

**Principles of Satellite Communication:** Evolution & growth of communication satellite, Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite, Applications of satellite communication. Synchronous satellite, Satellite Launch.

**Satellite Orbits:** Introduction, Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits, LEO, MEO, Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage.

[T1, T2, R1][No. of Hrs. 11]

#### UNIT- II

#### Satellite Link Design

Basic transmission, System noise temperature, G/T ratio, design of down links, uplink design, design of specified C/N, Atmospheric Absorption, Rain induced attenuation.

**Space Segment:** Power Supply, Altitude Control, Station Keeping, Thermal Control, TT&C sub system, Transponders, Antenna Sub system.

Earth Segment: Subsystem of earth station, Transmit-Receive Earth Station, different types of earth stations, frequency coordination.

#### [T1, T2, R1][No. of Hrs. 11]

#### UNIT- III

**Multiple Access Techniques:** FDMA, FDMA down link analysis. TDMA, Satellite-switched TDMA, code division multiple access, DAMA, On board signal processing for FDMA/TDM Operation.

**Error Control for Digital Satellite Links:** Error detection and correction for digital satellite links, error control coding, Convolutional codes, satellite links concatenated coding and interleaving, Automatic Repeat Request (ARQ).

#### [T1, T2, R2][No. of Hrs. 10]

#### UNIT- IV

Interconnection of Satellite Networks: Interconnection with ISDN, Interconnection of television networks.

**Satellite Applications:** Satellite mobile services, VSAT, GPS, Radarsat, INMARSAT, Satellite navigational system. Direct broadcast satellites (DBS)- Direct to home Broadcast (DTH), Worldspace services, Business TV(BTV)

#### [T1, R2, R3][No. of Hrs. 10]

#### **Text Books:**

[T1] Dennis Roddy, "Satellite Communication", McGraw Hill International.

[T2] T. Pratt, "Satellite Communication", John Willy and Sons (Asia) Pvt. Ltd.

#### **Reference Books:**

- [R1] T. Ha, "Digital Satellite Communication", McGraw Hill.
- [R2] Bruce R. Elbert, "The Satellite Communication Applications Handbook", Artech House Boston.
- [R3] Mark R. Chartrend, "Satellite Communication" Cengage Learning
- [R4] Handbook of Satellite Communication, Wiley.

Paper C	Code: ETEC-406	
Paper:	Ad Hoc and Sensor Networks	

#### **INSTRUCTIONS TO PAPER SETTER:**

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: The prerequisites are data communication networks, wireless communication and networks. The objective of the paper is to introduce infrastructure less wireless networking.* 

#### UNIT I

#### Ad Hoc Wireless Networks:

Introduction. Issues in Ad Hoc Wireless Networks. Ad Hoc Wireless Internet.

#### MAC Protocols for Ad Hoc Wireless Networks:

Introduction, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols. Contention-Based Protocols with Reservation Mechanisms. Contention-Based MAC Protocols with Scheduling Mechanisms. MAC Protocols in Directional Antennas. Other MAC Protocols

[T1, T2][No. of Hrs. 11]

#### UNIT II

#### **Routing Protocols for Ad Hoc Wireless Networks:**

Introduction to Routing algorithm, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks. Classifications of Routing Protocols. Table-Driven Routing Protocols. On-Demand Routing Protocols. Hybrid Routing Protocols. Routing Protocols with Efficient Flooding Mechanisms. Hierarchical Routing Protocols. Power-Aware Routing Protocols.

#### **Transport Layer and Security Protocols for Ad Hoc Wireless Networks:**

Introduction. Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks. Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks. Classification of Transport Layer Solutions. TCP Over Ad Hoc Wireless Networks. Other Transport Layer Protocols for Ad Hoc Wireless Networks. Security in Ad Hoc Wireless Networks. Network Security Requirements. Issues and Challenges in Security Provisioning. Network Security Attacks. Key Management. Secure Routing in Ad Hoc Wireless Networks.

#### [T1, T2][No. of Hrs. 12]

[T1, T2][No. of Hrs. 11]

#### UNIT III

#### Wireless Sensor Networks:

Introduction. Sensor Network Architecture. Data Dissemination. Data Gathering. MAC Protocols for Sensor Networks. Location Discovery. Quality of a Sensor Network. Evolving Standards. Other Issues.

#### Hybrid wireless Networks:

Introduction. Next-Generation Hybrid Wireless Architectures. Routing in Hybrid Wireless Networks. Pricing in Multi-Hop Wireless Networks. Power Control Schemes in Hybrid Wireless Networks. Load Balancing in Hybrid Wireless Networks.

#### UNIT IV

#### Wireless Geolocation Systems:

Introduction. What is wireless Geolocation? Wireless Geolocation System Architecture. Technologies for Wireless Geolocation. Geolocation Standards for E-911 Services. Performance Measures for Geolocation Systems. Questions. Problems.

#### **Recent Advances in Wireless Networks:**

Introduction. Ultra-Wide-Band Radio Communication. Wireless Fidelity Systems. Optical Wireless Networks. The Multimode 802.11 -IEEE 802.11a/b/g. The Meghadoot Architecture, introduction to vehicular sensor networks.

[T1, T2] [No. of Hrs. 11]

С

3

#### **MAXIMUM MARKS: 75**

T/P

0

L

3

#### **Text Books:**

- [T1] Siva Ram Murthy, C. and Manoj,B. S., Adhoc Wireless Networks Architectures and Protocols, Prentice Hall, PTR, (2004) 2nd ed.
- [T2] Perkins, Charles E., Ad hoc Networking, Addison Wesley, (2000) 3rd ed.

#### **Reference Books**

- [R1] Toh, C. K., Ad hoc Mobile Wireless Networks Protocols and Systems, Prentice Hall, PTR, (2001) 3rd Edition.
- [R2] Pahlavan, Kaveh., Krishnamoorthy, Prashant., Principles of Wireless Networks, A united approach -Pearson Education, (2002) 2nd ed.
- [R3] Wang X. and Poor H.V., Wireless Communication Systems, Pearson education, (2004) 3rd ed.
- [R4] Schiller Jochen., Mobile Communications, Person Education 2003, 2nd ed.
- [R5] Carlos De Morais Cordeiro and Dharam P Agrawal, "Adhoc and Sensor Networks- Theory & Applications", 2<sup>nd</sup> Ed, Cambridge Univ Press India Ltd

#### CONSUMER ELECTRONICS

Paper Code: ETEC-408	L	T/P	С
Paper: Consumer Electronics	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of teaching this subject is to give students in depth knowledge of various electronic audio and video devices and systems. Further this subject will introduce the students with working principles, block diagram, main features of consumer electronics gadgets/goods/devices like audio-systems, CD systems, TV, VCR and other items like fax machine washing machine, microwave ovens, digital camera & iPODS etc., which in-turn will develop in them capabilities of assembling, fault diagnosis and rectification in a systematic way.

#### UNIT I

#### Audio System: Microphones, Construction, Working principles and applications of microphone:

Carbon, Moving coil, velocity, crystal, condenser type, Cordless microphone, Dynamic & wireless microphone. Loud Speakers: Direct radiating, horn loaded, woofer, tweeter and squeaker, baffles and enclosures.

Sound recording on magnetic tape its principles, block diagram and tape transport mechanism, Wow, Flutter & Rumble distortion. Relationship between gap width, tape speed and frequency. Optical recording and reproduction system, Blue ray technology,

VCD & DVD system, HI- Fi system, condition for good acoustic features, stereo amplifiers

#### UNIT II

[T1, T2][No. of Hours: 11]

**Television:** Monochrome TV Communication: Elements of TV communication system; Scanning – its need for picture transmission; Need synchronizing and blanking pulses; Progressive scanning, interlaced scanning, ell effect, resolution and band width requirement, Composite Video signal (CVS) at the end of even and odd fields, advantage & disadvantage of negative modulation, need of pre & post Equalizing pulses; Monochrome picture tube– construction and working, comparison of magnetic and electric of Construction and working of camera tube: vidicon and plumbicon, night vision camera.

**Block diagram of a TV receiver:** function of each block and wave form at the input and output of each block; Frequency range of various VHF bands and channels used in India, Major specification of the CCIR B standard. Typical circuits of scanning and EHT stages of TV receiver, keyed AGC,SAW filter; trap circuit, Identification

of faulty stage by analyzing the symptoms and basic idea of a few important faults and there remedies.

#### [T1, T2][No. of Hours: 12]

#### UNIT III

**Color TV:** Primary colors, trisimulus values, trichromitc coefficients, concepts of additive and subtracting mixing of colours, concepts of luminance, Hue and saturation, Compatibility of colour TV system with monochrome system. Block diagram of colour TV camera, Construction and working principles of Trinitron, delta gun and PIL types of colour picture tubes. Concepts of degaussing, purity, beam shifting; burst signal and its need, chrominance signal; analysis of G-Y signal is not transmitted, Block diagram of PAL TV receiver.

#### [T1,T2] [No. of Hours: 11]

#### UNIT IV

Comparison of digital TV LCD, LED, HDTV, Plasma TV & Three dimension TV.

Cable Television: Block diagram and principle of working of STB and DTH, Study of FAX machine, group-3 fax machine, Fuzzy logic washing machine, study of digital camera, RFID & Bluetooth technology, study of iPods, MP4 players & accessories, block diagram of microwave oven and its function of each block.

[T1,T2] [No. of Hours: 11]

#### Text Books:

- [T1] R. R. Gulati, "Modern Television Practice" New Age International, 2<sup>nd</sup> Edition.
- [T2] S. P. Bali, "Consumer Electronics" Pearson Education, 1<sup>st</sup> Edition.

#### **Reference Books:**

- [R1]
- A. Dhake, "Television & Video Engineering" TMH 2<sup>nd</sup> Edition. R.R. Gulati, "Monochrome & Colour Television" New age International Publisher, 2<sup>nd</sup> Edition. R.G. Gupta, "Audio & Video Systems" TMH 2<sup>nd</sup> Edition. [R2]
- [R3]

12

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

#### DIGITAL IMAGE PROCESSING

Paper Code: ETIT-418	L	T/P	С
Paper: Digital Image Processing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The aim of this course is to provide digital image processing fundamentals, hardware and software, digitization, encoding, segmentation, feature extraction etc. It will enhance the ability of students to apply tools in image restoration, enhancement and compression and to apply the techniques in both the spatial and frequency domains. It will enhance the ability of students to identify the quality characteristics of medical images, differences between computer vision and image processing and help in studying the remote sensing images of the environmental studies.

#### UNIT-I:

**Introduction and Digital Image Fundamentals:** The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

**Image Enhancement in the Spatial Domain:** Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

#### [T1, T2][No. of Hrs: 10]

#### UNIT-II:

**Filtering in the Frequency Domain:** Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters.

**Image Restoration:** A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

#### UNIT-III:

**Image Compression**: fundamentals of compression, coding redundancy, Lossy and lossless compression, Spatial and temporal redundancy, Image compression models. Some basic compression methods **Image Segmentation**: Detection of Discontinuities. Edge linking and boundary detection. Region Oriented

**Image Segmentation:** Detection of Discontinuities, Edge linking and boundary detection, Region Oriented Segmentation, Motion based segmentation.

#### [T1, T2][No. of Hrs. 12]

#### UNIT- IV:

**Representation and Description:** Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms.

**Object Recognition:** Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

### [T1, T2][No. of Hrs: 10]

#### Text Books:

- [T1] Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3<sup>Rd</sup> edition, Pearson, 2002.
- [T2] A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

#### **Reference Books:**

- [R1] Bernd Jahne, "Digital Image Processing", 5<sup>th</sup> Ed., Springer, 2002.
- [R2] William K Pratt, "Digital Image Processing: Piks Inside", John Wiley & Sons, 2001.

# [T1, T2][No. of Hrs. 12]

#### ASIC DESIGN

Paper Code: ETEC-412	L	T/P	С
Paper: ASIC Design	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To proved basic knowledge of logic synthesis, simulation and testing of integrated circuits.

## **UNIT- I: Overview of ASIC**

Types of ASICs, Design flow, CMOS transistors, and CMOS Design rules, Combinational Logic Cell, Sequential logic Cell, Data path logic Cell, Transistors as Resistors, Transistor Parasitic Capacitance, Logic effort, Library Cell design, Library Architecture. Anti fuse, static RAM, EPROM and EEPROM technology, Xilinx LCA, Altera FLEX, Altera MAX.

#### **UNIT- II: Logic Synthesis**

Xilinx LCA, Xilinx EPLD, Altera MAX 5000 and 7000, Altera MAX 9000, Design system, Logic Synthesis, Half gate ASIC, Schematic entry, Low level design language, PLA tools, EDIF, CFI design representation. Verilog and logic synthesis, VHDL and logic synthesis, Performance-Driven Synthesis. [T1, T2][No. of Hrs: 11]

#### **UNIT- III: ASIC Physical Design**

System Partition: FPGA partitioning, partitioning method, floor planning, placement, physical design flow global routing, detailed routing, special routing, circuit extraction, DRC.

[T1, T2][No. of Hrs: 10]

#### **UNIT- IV: Simulation and Testing**

Simulation, Types of Simulation, Cell Models, Delay Models, Switch-Level Simulation, Transistor-Level Simulation, The Importance of Test, Boundary-Scan Test, Faults, Fault Simulation, Automatic Test-Pattern Generation, Scan Test, Built-in Self-test, Physical Design Automation of FPGAs, VHDL, Verilog, Implementation of Simple circuits using VHDL and Verilog.

#### [T1, T2][No. of Hrs: 10]

#### Text Books:

- [T1] Smith, M.J.S., Application Specific Integrated Circuits, Pearson Education (2006).
- [T2] N.A. Sherwani, "Algorithms for VLSI Physical Design Automation", Kluwer Academic publications

#### **Reference Books**:

- [R1] S. Brown, R. Francis, J. Rose, Z. Vransic, Field Programmable Gate Array, Kluwer Pub, 1992.
- [R2] Wayne Wolf, FPGA-Based System Design, Prentice Hall PTR, 2004.

#### MAXIMUM MARKS: 75

[T1, T2][No. of Hrs: 10]

#### **MOBILE COMPUTING**

Paper Code: ETIT-402	L	T/P	С
Paper: Mobile Computing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: Should have studied papers such as Communication systems, Data communications and networking and wireless networks. To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture. To have an exposure about wireless protocols –Wireless LAN, Bluetooth, WAP, Zig Bee issues. To Know the Network, Transport Functionalities of Mobile communication. To understand the concepts of Adhoc and wireless sensor networks. Introduce Mobile Application Development environment.

#### UNIT – I

Mobile Physical layer: Review of generation of mobile services, overview of wireless telephony, cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

Mobile computing Architecture: issues in mobile computing, three tier architecture for mobile computing, design considerations, Mobile file systems, Mobile databases. WAP: Architecture, protocol stack, Data gram protocol, Wireless transport layer security, Wireless transaction protocol, wireless session protocol, application environment, and applications.

#### [T1][T2][T3][No. of Hrs. 12]

#### UNIT - II

**UNIT-III** 

Mobile Data link layer: Wireless LAN over view, IEEE 802.11, Motivation for a specialized MAC, Near & far terminals, Multiple access techniques for wireless LANs such as collision avoidance, polling, Inhibit sense, spread spectrum, CDMA, LAN system architecture, protocol architecture, physical layer MAC layer and management, Hiper LAN.

Blue Tooth: IEEE 802.15 Blue tooth User scenarios, physical, MAC layer and link management.

Local Area Wireless systems: WPABX, IrDA, ZigBee, RFID, WiMax

#### [T1][T2][T3][No. of Hrs. 10]

MOBILE IP Network Layer: IP and Mobile IP Network Layer- Packet delivery and Handover Management-Location Management- Registration- Tunnelling and Encapsulation-Route Optimization- Dynamic Host Configuration Protocol, Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), VoIP –IPSec,

Mobile Transport Layer: Traditional TCP/IP, Transport Layer Protocols-Indirect, Snooping, Mobile TCP

[T1][T2][T3][No. of Hrs. 12]

#### UNIT – IV

Support for Mobility: Data bases, data hoarding, Data dissemination, UA Prof and Caching, Service discovery, Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, Mobile devices and File systems, Data Synchronization, Sync ML.

Introduction to Wireless Devices and Operating systems: Palm OS, Windows CE, Symbion OS, Android, Mobile Agents. Introduction to Mobile application languages and tool kits.

#### [T1][T2][T3][No. of Hrs. 10]

#### **Text Books:**

- [T1] J. Schiller, "Mobile Communications", 2<sup>nd</sup> edition, Pearson, 2011.
- [T2] Raj Kamal "Mobile Computing" Oxford Higher Education, Second Edition, 2012.
- [T3] Dharam Prakash Agrawal and Qing-An Zeng, "Introduction to Wireless and Mobile Systems" 3<sup>rd</sup> Edition, Cengage learning 2013.

#### **References Books:**

- [R1] Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal "Mobile Computing", Tata McGraw Hill, Pub, Aug – 2010
- [R2] Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farrell "Wireless Networking Complete" Morgan Kaufmann Series in Networking , 2009 (introduction, WLAN MAC)
- [R3] Vijay K Garg "Wireless Communications & Networking" Morgan Kaufmann Series, 2010
- [R4]. M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
- [R5]. Charles Perkins, Mobile IP, Addison Wesley.
- [R6]. Charles Perkins, Ad hoc Networks, Addison Wesley.
- [R7]. Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, "Principles of Mobile Computing", Springer.
- [R8] Evaggelia Pitoura and George Samarus, "Data Management for Mobile Computing", Kluwer Academic Press, 1998
- [R9] V. Jeyasri Arokiamary, "Mobile Computing", Technical Publications

Laboratory session: The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc., Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

TooL Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

- [R1]. Donn Felker, "Android Application Development for Dummies", Wiley, 2010
- [R2]. Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. to Programmer Series.
- [R3]. Ed Burnette, 'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers, 2012
- [R4]. Jerome (J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University press, 2005.
- [R6]. R.Riggs, A. Taivalsaari, M.VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74627-1, Addison Wesley, 2001.

#### INTRODUCTION TO NANO TECHNOLOGY

Paper Code: ETEC-416	L	T/P	С
Paper: Introduction to Nano Technology	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The prerequisites are basic electronics, analog and digital electronics, VLSI. The objective of the paper to introduce the relevance and importance of Nano electronics, fabrication techniques and Nano structures.

#### UNIT – I

Introduction to Modern Electronics, Nanoelectronics, International Technology roadmap, New Concepts in Electronics, Microelectronics and Nanoelectronics.

Basic Concepts of Electromagnetic waves and Quantum Mechanics, Electromagnetic Waves and Maxwell's Equations, Duality of Electron, Schrodinger Equation, Eigenvalue Problem and Electron in Quantum Well, Electrons in Multiple Quantum Wells, Superlattices, Artificial Atoms, Quantum Dots, Molecules, Energy Level Splitting, Chemical Bonds, Optical Transitions and Lasers.

#### $\mathbf{UNIT} - \mathbf{II}$

Pattern Formation in Nanoelectronics, High Resolution Lithography, Dip-Pin Lithography, NEMS, Nano-Electro-Mechanical Systems, Self-Assembly Structures: Chemically – Directed Self-Assembly, Surface-Layer Proteins in Nanolithography.

#### [T1,T2][No. of Hrs: 11]

[T1,T2][No. of Hrs: 11]

[T1,T2][No. of Hrs: 11]

#### UNIT – III

Traditional Low-Dimensional Systems: Quantum Wells, Cascade Lasers and Other Quantum-Well Devices, Quantum Wires, Quantum Dots and Quantum Dot Molecules, Quantum – Dot – Based Cellular Automata, Coulomb Effects: Single Electron Devices, Nanoscale Sensors and Actuators.

#### $\mathbf{UNIT} - \mathbf{IV}$

Newly Emerging Nanostructures and Applications: Applications of Inorganic-Organic Heterostructures, Quantum Dots Embedded in Organic Matrix: Organic Light Emitting Diodes, Quantum Wire Interconnects: DNA Computing, Carbons Nanotubes for Data Processing, Molecular Electronics Materials and Biomolecules, Future Integrated Circuits: Quantum Computing using super conductors.

#### [T1,T2][No. of Hrs: 11]

#### Text Books:

- [T1] C. P. Poole and F. J. Owens, "Introduction to NanoTechnology", John Wiley & Sons, 2003.
- [T2] M. A. Ratner and D. Ratner, "Nanotechnology: A gentle introduction to the next big Idea", PHI, 2003.

#### **Reference Books:**

- [R1] Rainer Waser, "Nanoelectronics and INformation Technology: Advanced Electronic Materials and Novel Devices", John Wiley & sons, 2005.
- [R2] Jurgen Schulte, "Nanotechnology: Global Strategies, Industry Trends and Applications", John Wiley, 2004.
- [R3] M.A Shah, Tokeer Ahmad, "Principle of Nanoscience and nanotechnology, Narosa Publishing House, India.
- [R4] S.E. Lyshevski, "Nano and Micro Electromechanical Systems Fundamentals of Nano and Micro-ENgineering", 2<sup>nd</sup> Edition, CRC Press, 2004.
- [R5] K.K Chattopadhay A.N. Banerjee, "Nanoscience and Nanotechnology" PHI learning Pvt limited, Delhi, 2012.

#### GPS AND GIS

Paper Code: ETIT-422	$\mathbf{L}$	T/P	С
Paper: GPS and GIS	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To study the fundamentals and scope of Global Information System and Global Positioning System.

#### UNIT- I

UNIT-II

**Global Information System (GIS):** Introduction, scope and benefits of GIS; application areas of GIS; functional components and elements of GIS; geographic objects: scale, accuracy and resolution.

**GIS Cartography and Maps:** Digital cartography: selection, classification and simplification; exaggeration and symbolization for cartographic abstraction; Types of Maps; map elements: projection, direction, scale and co-ordinates; Geodatabases; GIS map outputs; Topographic mapping.

#### [T1,T2][No. of Hrs: 11]

**Geographic Data:** Spatial and attribute data; vector and raster models; points, lines, polygon features; computed and associated attributes; grids, cells and image data; linking spatial and attributed data.

**Geoprocessing:** Geographic co-ordinate system: latitudes and longitudes; Geoids Spheroids ellipsoids and datum's; projections and transformations.

#### [T1,T2][No. of Hrs: 10]

#### UNIT- III

**Global Positioning System (GPS):** Introduction; GPS components: systems, scales and codes; error and accuracy of GPS observation; Differential GPS.

Fundamentals of Satellite Orbits: Orbital Mechanics, Constellation Design

**Remote Sensing (RS):** Introduction; application of RS; electromagnetic radiation; spectral signatures; aerial/satellite image characteristics: spatial, spectral, radiometric and temporal.

#### UNIT- IV

**Statistics:** Spatial statistics; independent and dependent variables; continuous data: sampling, correlation, regression, frequency and descriptive analysis; discrete data.

Interpolation: Characteristic interpolators; deterministic interpolators; evaluating interpolators.

#### [T1,T2][No. of Hrs: 10]

[T1,T2][No. of Hrs: 11]

#### **Text Books**:

#### Note: There is no single textbook for this course. Suggested Readings:

- [T1] Burrough, P.A. and R.A. McDonnell, Principles of Geographic Information System, Oxford University Press, Oxford.
- [T2] Chang, K.T., Introduction to Geographic Information System, Tata Mc Graw-Hill, New Delhi.
- [T3] Heywood, I. et. al., An Introduction to Geographic Infomation Systems, Pearson Education, Delhi.
- [T4] Clarke, K., Analytical and Computer Cartography. 2<sup>nd</sup> Ed., Upper Saddle River.
- [T5] Garmin Corporation., GPS Guide for Beginners available at: http://www.garmin.com/manuals/gps4beg.pdf.
- [T6] LLiffe, J.C., Datum and Map Projections for remote Sensing, GIS and Surveying. New York : CRC Press.
- [T7] Curran, Paul J., Principles of Remote Sensing, Longman, London & New York.
- [T8] Lillesand, T. and R. Kiefer, Remote Sensing and Image Interpretation, Wiley, New York.

#### ADAPTIVE SIGNAL PROCESSING

Paper Code: ETEC-424	L	T/P	С
Paper: Adaptive Signal Processing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The aim of the Adaptive Signal Processing course is to present its algorithms and architectures and explain their use in real world applications. As prerequisites it is assumed that students have studied Signals and Systems, DSP and introductory linear algebra. Familiarity with random process theory is also helpful.

#### UNIT- I

Introduction to Adaptive Systems:- Definitions, Characteristics, Applications, Example of an Adaptive System..

**Introduction to Adaptive Filters:** - Adaptive filter structures:- issues and examples, Applications of adaptive filters: Channel equalization, active noise control, Echo cancellation, beam forming

**Discrete time Stochastic Processes:-** Review of Probability and random variables, discrete time random processes, Autocorrelation and covariance structures of discrete time random processes, Yule Walker Equation Power spectral density - properties. Eigen-analysis of autocorrelation matrices.

#### [T1, R1] [No. of Hours: 10]

**MAXIMUM MARKS: 75** 

#### UNIT- II

**Development of Adaptive Filter Theory & Searching the Performance surface:** Introduction to Filtering - Smoothing and Prediction, Linear Optimum Filtering:- Problem statement, Principle of Orthogonality - Minimum Mean Square Error, Wiener- Hopf equations, Error Performance - Minimum Mean Square Error.

Searching the Performance Surface – Methods & Ideas of Gradient Search methods - Gradient Searching Algorithm & its Solution - Stability & Rate of convergence - Learning Curves.

**Steepest Descent Algorithms:** Gradient Search by Newton's Method, Method of Steepest Descent, Comparison of Learning Curve.

#### [T1, T2, R1][No. of Hours: 12]

#### UNIT- III

**LMS Algorithm & Applications:** Overview - LMS Adaptation algorithms, Stability & Performance analysis of LMS Algorithms - LMS Gradient & Stochastic Algorithms - Convergence of LMS algorithm.

**Applications:** Noise cancellation – Cancellation of Echoes in long distance telephone circuits, Adaptive Beam forming, Adaptive Channel Equalization

Variants of the LMS Algorithm: - The sign-LMS and the normalized LMS algorithm Block LMS Algorithm. [T1, T2][No. of Hours: 12]

#### UNIT- IV

**General Least Squares Solution:** Least squares solution of general adaptive system; QR algorithm solution. **Recursive Least Squares (RLS) algorithm:** RLS formulation; forgetting factors; practical implementations; QR based RLS; numerical stability and integrity issues, Kalman filter & Standard Kalman Filter , Filtering Examples using Kalman filtering,

Adaptive Lattice Filters: Gradient lattice, RLS lattice.

#### **Text Books:**

- [T1] Adaptive Filter Theory Simon Haykin, 4<sup>th</sup> Ed., 2002, Pearson Asia.
- [T2] Adaptive Filter Ali H. Sayeed, Wiley-Blackwell, 2008

#### **Reference Books:**

- [R1] Adaptive Signal Processing Bernard Widrow, Samuel D.Strearns, 2005, PE.
- [R2] Optimum signal processing: An introduction Sophocles. J. Orfamadis, 2nd Ed., 1988, McGraw-Hill,
- [R3] Adaptive signal processing-Theory and Applications S.Thomas Alexander, 1986, Springer –Verlag.
- [R4] Adaptive Filters Theory and Applications B. Farhang-Boroujeny, John Wiley and Sons, 1999.

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

#### [T1, T2][No. of Hours: 10]

#### **ROBOTICS**

Paper Code: ETMT-402	L	T/P	С
Paper: Robotics	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the foundations of robotics. Also, a course on Robotics must use one or more software to not only visualize the motion and characteristics of robots but also to analyzer/synthesize/design robots for a given application.

#### UNIT - I

#### Fundamentals of Robot Technology:

Robot definition, automation and robotics, Robot anatomy, Work volume, Drive systems. Control systems and dynamic performance. Accuracy and repeatability. Sensors and actuators used in robotics. Machine Vision, Robot configurations, Path control. Introduction to robot languages. Applications; Types (Mobile, Parallel); Serial: Cartesian, Cylindrical, etc.; Social Issues

#### [T1,T2,T3][No. of Hrs: 11]

UNIT - II

**Robot Kinematics**: Mapping, Homogeneous transformations, Rotation matrix, Forward Kinematics (DH Notation) and inverse kinematics: Closed form solution.

**Robot Differential Motion:** Linear and Angular velocity of rigid link, Velocity along link, Maipulator jacobian, Statics: Use of jacobian.

#### [T1,T2,T3][No. of Hrs: 11]

#### UNIT – III

**Robot Dynamics:** Lagrangian Mechanics, Lagrangian Formulation and numericals. Dynamics, Newton-Euler Recursive Algorithm, Simulation. Euler-Lagrange Equations of motion/Any one other formulation like using Decoupled Natural Orthogonal Complements (DeNOC)

**End effectors**: Mechanical and other types of grippers. Tools as end effectors. Robot and effector interface. Gripper selection and design.

#### [T1,T2,T3][No. of Hrs: 12]

#### UNIT - IV

**Applications for Manufacturing**. Flexible automation. Robot cell layouts. Machine interference. Other considerations in work cell design. Work cell control, interlocks. Robot cycle time analysis. Mechanical design of robot links.

Typical applications of robots in material transfer, machine loading/unloading; processing operations; assembly and inspection.

#### [T1,T2,T3][No. of Hrs: 10]

#### **Text Books:**

- [T1] R.K. Mittal, I.J. Nagrath, "Robotics & Control", Tata McGraw & Hills, 2005.
- [T2] Mikell P Groover, Mitchell Weiss "Industrial Robotics :Technology, Programming and Application" Tata McGraw & Hills, 2009.
- [T3] Saha, S.K., Introduction to Robotics, 2<sup>nd</sup> Edition, McGraw-Hill Education, New Delhi, 2014

#### **Reference Books:**

- [R1] John J.Craig; "Introduction to Robotics Mechanics & Control", Pearson Education, 2004.
- [R2] Robert J. Schilling, "Fundamentals of Robotics, analysis & Control", Prentice Hall (I) P. Ltd., 2002
- [R3] Mark W. Spong, Seth Hutchinson, M. Vidyasagar "Robot Modeling and Control" John Wiley 2<sup>nd</sup> Ed
- [R4] J Srinivasan, R.V.Dukkipati, K. Ramji, "Robotics control & programming", Narosa.
- [R5] Ghosal, Ashitava, "Robotics: Fundamental Concepts and Analysis," Oxford University Press, 2006
- [R6] M. Murray, M., Li, Zexiang, Sastry, S.S., "A Mathematical Introduction to Robotic Manipulation," CRC Press, 1994
- [R7] Tsai, L.W., "Robot Analysis: The Mechanics of Serial & Parallel Manipulators," Wiley 1999

Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

#### [R8] Niku, S. B., "Introduction to Robotics: Analysis, Systems, Applications", Prentice Hall, 2001 <u>COMPUTER GRAPHICS & MULTIMEDIA</u>

Paper Code: ETIC-428	L	T/P	С
Paper: Computer Graphics & Multimedia	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The objective of this paper is to learn about the computer graphic and multimedia

#### UNIT- I

**UNIT-II** 

Introduction, Applications areas, Components of Interactive Computer Graphics System. Overview of Input devices, Output devices, raster scan CRT displays, random scan CRT displays. DDA and Bresenham's Line Drawing Algorithms, Bresenham's and Mid Point Circle Drawing Algorithms. Homogeneous Coordinate System for 2D and 3D, Various 2D, 3D Transformations (Translation, Scaling, Rotation, Shear).

#### [T1,T2][No. of Hrs. 12]

Clipping Algorithms, Sutherland-Cohen line Clipping Algorithm Bezier Curves, B-Spline Curves. Parallel Projection, Perspective Projection, Illumination Model for diffused Reflection, Ambient light, Specular Reflection Model, Reflection Vector.

#### [T1,T2][No. of Hrs. 10]

[T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

**UNIT- III** Shading Models, Flat shading, Gourard Shading, Phong Model. Visible surface detection, Back Face Detection, Depth Buffer (Z-Buffer, A-Buffer) Method. Overview of multimedia: Classification, basic concepts of sound/audio MIDI: devices, messages, software. , Authoring tools, Video and Animation: controlling animation,

## UNIT- IV

display and transmission of animation

Data Compression: storage space, coding requirements, Basic compression techniques: run length code, Huffman code, Lempel-Ziv JPEG: Image preparation, Lossy sequential DCT, expanded lossy DCT, Lossless mode, Hierarchical mode. MPEG, Media synchronization, Media Integration, Production Standards.

#### **Text Books:**

- [T1] Donald Hearn and M.Pauline Baker, "Computer Graphics C version", Second Edition, Pearson
- [T2] Ralf Steinmetz & Klara Nahrstedt, "Multimedia Computing Communication & Applications", Pearson

#### **Reference Books:**

- [R1] C, Foley, VanDam, Feiner and Hughes, "Computer Graphics Principles & Practice", Second Edition
- [R2] R. Plastock and G. Kalley, "Theory and Problems of Computer Graphics", Schaum's Series, McGraw Hill, 2<sup>nd</sup> edition.
- [R3] Fred Halsall, "Multimedia Communications Applications, Networks, Protocols & Standards", Pearson
- [R4] David F. Rogers, "Procedural elements for computer graphics", McGraw-Hill.

#### NEXT GENERATION NETWORKS

Paper Code: ETEC-428	L	T/P	С
Paper: Next Generation Networks	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to provide exposure to the new technologies and services that telecommunication operators have as they create new 3G networks and beyond where multimedia coverage is based on packet switched rather than circuit switched Telephony.

#### UNIT-I

Introduction to next generation networks. Communicating in the new Era, New Era of Networking, Technologies influencing change, IP Everywhere, Optical fiber anywhere, wireless access, building blocks for NGN, IP Networks, VOIP, Multi service Flexible Networks architecture. VPNs, Optical Networks, Wire line & Wireless Networks, NGN Services, Network Infrastructure convergence, services convergence, from technology push to service pull.

#### [T1,T2] [No. of Hrs. 11]

UNIT-II

IP Networks ,IP past, present and future, IP influence and confluence, IP version 4, I. P. Version 6, IP Network convergence, LAN Technologies, IP Routing, LAN Switching, WAN's, WAN Technologies and Topologies. Wireless IP LANS, Mobility Networks, Global IP Networks, Global capacity, Globally Resilient IP, Internet – A Network of Networks. Beyond IP, Technology Brief – IP Networks, Business Drivers, Success factors, Applications and Service Value.

#### [T1,T2] [No. of Hrs. 11]

## UNIT-III

Muti service Networks Origin of multi service ATM, Next Generation Multi service Networks, Next Generation Multi service ATM switching, Multi protocol Label switching, Networks, Frame Based MPLS, Cell based MPLS, MPLS services and their benefits, multi service provisioning platforms (MSPP) & Multi service switching platform (MSSP).

#### UNIT-IV

NGN Applications Internet connectivity, e-commerce, call center, third party application service provision, UMTS, WAP, WiMAX, integrated billing, security and directory enabled networks.

#### [T1,T2] [No. of Hrs. 11]

[T1,T2] [No. of Hrs. 11]

#### **Text Books:**

- [T1] Neill Wilkinson, "Next Generation Networks Services, Technologies and Strategies", Wiley.
- [T2] Robet Wood, "Next Generation Network Services", Pearson

#### **Reference Books**

- [R1] Next Generation Telecommunications Network, Parliament office of Science and Technology (Postnote). Dec 2007, No. 296, Ref. http://www.parliament.uk/briefing-papers/POST-PN-296.pdf
- [R2] Huber, J.F.' "Mobile Next Generation Networks", IEEE Multimedia Vol. 11, Issue I Jan- March 2004.
- [R3] J.C. Crimi, "Next Generation Network (NGN) Service", A Telecoolia Technologies white paper; refer www.telecodia.com
- [R4] International Conference on Next Generation Networks & Basestations Tackles LTE, WiMAX, Femtocells, Backhaul, Spectum Re-farming and Also Goes. 'Green'.http://www.thefreelibrary.com/International+Conference+on+Next+Generation+Networks+%26 +Basestations...-a0176872977
- [R5] Carugi, M.; Hirschman, B.; Narita, A., "Introduction to the ITU-T NGN focus group release 1: target environment, services, and capabilities,"Communications Magazine, IEEE, vol.43, no.10, pp. 42-48, Oct. 2005 doi: 10.1109/MCOM.2005.1522123 URL:http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1522123&isnumber=32552<u>http://encyc lopedia2.thefreedictionary.com/LTE</u>

- [R6] Iti Saha Misra, "Wireless Communication and Networks 3G and beyond", McGraw Hill Edu. (India)
- [R7] International Journal of Next Generation Network (IJNGN), ISSN: 0975-7023 (Online); 0975-7252 (Print); http://www.airccse.org/journal/ijngn/



Modified Scheme and Syllabus of B. Tech-ECE (1<sup>st</sup> Semester to 8<sup>th</sup> Semester) implemented from Academic Session w.e.f. 2015-16, approved in the 23<sup>rd</sup> BOS and 40<sup>th</sup> AC meeting of USET.

13

#### SATELLITE AND ANTENNA LAB

Paper Code: ETEC-452	L	T/P	С
Paper: Satellite and Antenna Lab	0	2	1

#### **List of Experiments:**

1. To setup an active and passive satellite link and demonstrate Link fails operation.

- 2. Study base-band Analogue signal parameters in Satellite link.
- 3. To measure S/N ratio, FM improvement and G/T.
- 4. To measure propagation delay of signal in a Satcom link.
- 5. To verify power distance relation.
- 6. To measure reflection coefficient/return loss of the given antenna.
- 7. To plot radiation pattern of the antenna.
- 8. To study Reciprocity Theorem.
- 9. To study current distribution along the element of an antenna.
- 10. To study polarization of an antenna.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

#### **COMPUTER GRAPHICS & MULTIMEDIA LAB**

Paper Code: ETEC-454(ELECTIVE)	L	T/P	С
Paper: Computer Graphics & Multimedia Lab	0	2	1

#### **List of Experiments**

- 1. Study of Fundamental Graphics Functions.
- 2. Implementation of Line drawing algorithms: DDA Algorithm, Bresenham's Algorithm
- 3. Implementation of Circle drawing algorithms: Bresenham's Algorithm, Mid Point Algorithm.
- 4. Programs on 2D and 3D transformations
- 5. Write a program to implement cohen Sutherland line clipping algorithm
- 6. Write a program to draw Bezier curve.
- 7. Using Flash/Maya perform different operations (rotation, scaling move etc..) on objects
- 8. Create a Bouncing Ball using Key frame animation and Path animation.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

## SCHEME OF EXAMINATION

and



Scheme and Syllabi for B. Tech,  $1^{st}$  year (Common to all branches) **w.e.f batch 2014-15** and  $(2^{nd}, 3^{rd} \& 4^{th} \text{ years})$  **w.e.f batch 2013-14** approved in the  $22^{nd}$  BOS of USET on  $30^{th}$  June, 2014 and approved in the  $37^{th}$  AC Sub Committee Meeting held on  $10^{th}$  July, 2014.

#### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) FIRST SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
ETMA-101		Applied Mathematics-I	3	1	4	М
ETPH-103		Applied Physics-I	2	1	3	М
ETME-105		Manufacturing Processes	3	0	3	М
ETEE-107		Electrical Technology	3	0	3	М
ETHS-109		Human Values & Professional Ethics-I#	1	1	1	
ETCS-111		Fundamentals of Computing	2	0	2	
ETCH-113		Applied Chemistry	2	1	3	М
	51	PRACTICAL/VIVA VOCE	0 j	X		
ETPH-151	10	Applied Physics Lab-I		2	1	
ETEE-153	720	Electrical Technology Lab		2	1	М
ETME-155	51	Workshop Practice		3	2	М
ETME-157	21	Engineering Graphics Lab		3	2	
ETCS-157	1	Fundamentals of Computing Lab		2	4	
ETCH-161		Applied Chemistry Lab		2	1	
15		NCC/NSS*#				
TOTAL			16	18	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

Scheme and Syllabi for B. Tech,  $1^{st}$  year (Common to all branches) w.e.f batch 2014-15 and ( $2^{nd}$ ,  $3^{rd}$  &  $4^{th}$  years) w.e.f batch 2013-14 approved in the  $22^{nd}$  BOS of USET on  $30^{th}$  June, 2014 and approved in the  $37^{th}$  AC Sub Committee Meeting held on  $10^{th}$  July, 2014.

#### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) SECOND SEMESTER EXAMINATION

Code No. P	aper ID	Paper	L	T/P	Credits	Status
ETMA-102		Applied Mathematics-II	3	1	4	М
ETPH-104		Applied Physics-II	2	1	3	
ETEC-106		Electronic Devices	3	0	3	М
ETCS-108		Introduction to Programming	3	0	3	М
ETME-110	55	Engineering Mechanics	2	A	3	
ETHS-112	0	Communication Skills	2		3	
ETEN-114	2.0	Environmental Studies	2	17	3	
PRACTICAL/VIV	A VOCE	-		1	12	
ETPH-152	1000	Applied Physics Lab-II		2	1	
1111-132	1	Applied I hysics Edo-II		2	A \	
ETCS-154	/	Programming Lab		2		М
6						M M
ETCS-154		Programming Lab		2		
ETCS-154 ETEC-156		Programming Lab Electronic Devices Lab		2 2 2	11-	
ETCS-154 ETEC-156 ETME-158	8	Programming Lab Electronic Devices Lab Engineering Mechanics Lab		2 2 2 2	1	

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

> GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### **APPLIED MATHEMATICS-I**

Paper Code : ETMA-101	- L	Т	С
Paper : Applied Mathematics-I	3	1	4

INSTRUCTIONS TO PAPER SETTERS:	MAXIMUM MARKS: 75
1. Question No. 1 should be compulsory and cover the entire syllabus. This	question should have objective
or short answer type questions. It should be of 25 marks.	
2. Apart from Question No. 1, rest of the paper shall consist of four units	as per the syllabus. Every unit
should have two questions. However, student may be asked to attempt on	nly 1 question from each unit.
Each question should be of 12.5 marks.	
Objective: The objective of the paper is to facilitate the student with the basi	cs of Applied Mathematics that are
required for an engineering student.	5
UNIT-I	2.5
Successive differentiation: Leibnitz theorem for n <sup>th</sup> derivative (without proof	
divergence of infinite series, positive terms infinite series, necessary cond	
D'Alembert ratio test, Integral Test, Cauchy's root test, Raabe's test and	
Alternating series, Leibnitz test, conditional and absolutely converg	
expansion(without proof) of function ( $e^x$ , $log(1+x)$ , $cos x$ , $sin x$ ) with	th remainder terms ,Taylor's and
Maclaurin's series, Error and approximation.	
	[T1], [T2][No. of hrs. 12]

#### UNIT-II

Asymptotes to Cartesian curves. Radius of curvature and curve tracing for Cartesian, parametric and polar using curves. Integration: integration reduction formula for

sinn de . Cosnede " sin<sup>n</sup> lcos<sup>m</sup> ld

Application of integration : Area under the curve, length of the curve, volumes and surface area of solids of revolution about axis only .Gamma and Beta functions.

#### UNIT- III

Matrices: Orthogonal matrix, Hermitian matrix, Skew-Hermitian matrix and Unitary matrix. Inverse of matrix by Gauss-Jordan Method (without proof). Rank of matrix by echelon and Normal (canonical) form. Linear dependence and linear independence of vectors. Consistency and inconsistency of linear system of homogeneous and non homogeneous equations. Eigen values and Eigen vectors. Properties of Eigen values (without proof). Cayley-Hamilton theorem (without proof). Diagonlization of matrix. Quadratic form, reduction of quadratic form to canonical form.

#### UNIT-IV

Ordinary differential equations: First order linear differential equations, Leibnitz and Bernaulli's equation. Exact differential equations, Equations reducible to exact differential equations. Linear differential equation of higher order with constant coefficients, Homogeneous and non homogeneous differential equations reducible to linear differential equations with constant coefficients. Method of variation of parameters. Bessel's and Legendre's equations (without series solutions), Bessel's and Legendre's functions and their properties.

#### Text:

- B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications. [T1]
- [T2]. R. K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications.

#### **References:**

- E. kresyzig," Advance Engineering Mathematics", Wiley publications [R1]
- G.Hadley, "Linear Algebra" Narosa Publication [R2]
- [R3] N.M. Kapoor, "A Text Book of Differential Equations", Pitambar publication.
- [R4] Wylie R, "Advance Engineering mathematics", McGraw-Hill
- [R5] Schaum's Outline on Linear Algebra, Tata McGraw-Hill
- Polking and Arnold, "Ordinary Differential Equation using MatLab" Pearson. [R6]

[T1],[T2][No. of hrs. 12]

[T1], [T2][No. of hrs. 12]

[T1],[T2][No. of hrs. 12]

Paper Code: ETPH – 103	L	Т	С
Paper : Applied Physics – I	2	1	3

INSTRUCTIONS TO PAPER SETTERS:	<b>MAXIMUM MARKS: 75</b>
1. Question No. 1 should be compulsory and cover the entire syllabus.	This question should have objective or
short answer type questions. It should be of 25 marks.	
2. Apart from Question No. 1, rest of the paper shall consist of four unit	ts as per the syllabus. Every unit should
have the most in a Harmonia stadaut were he ashed to attempt only 1.	

have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

#### UNIT I

**Interference:** Introduction, Interference due to division of wave front: Fresnel's Biprism, Interference due to division of amplitude: wedge shaped film, Newton's rings.

**Diffraction:** Introduction, Difference between Fresnel and Fraunhofer diffraction, Single slit diffraction, Transmission diffraction grating, Absent spectra.

[T1], [T2](No. of Hrs. 8)

#### UNIT II

**Polarization:** Introduction, Uniaxial crystals, Double refraction, Nicol prism, Quarter and half wave plates, Theory of production of plane, circularly and elliptically polarized lights, Specific rotation, Laurents half shade polarimeter.

Laser: Spontaneous and stimulated emissions, Einstein's coefficients, Laser and its principle, He-Ne laser.

Fibre optics: Introduction, Single mode fibre, Step index and graded index multimode fibres, Acceptance angle and numerical aperture.

[T1], [T2](No. of Hrs. 8)

[T1], [T2](No. of Hrs. 8)

#### UNIT III

**Theory of Relativity:** Introduction, Frame of reference, Galilean transformation, Michelson-Morley experiment, Postulates of special theory of relativity, Lorentz transformations, Length contraction, Time dilation, Mass energy relation

Ultrasonics: Introduction, Production of ultrasonics by magnetostriction and Piezoelectric methods, Applications.

#### UNIT IV

**Nuclear Physics:** Introduction, Radioactivity, Alpha decay, Beta decay, Gamma decay, Q value, Threshold energy, Nuclear reactions, Nuclear fission: Liquid drop model, Nuclear fusion, Particle accelerators: Linear accelerator, Cyclotron, Radiation detectors: Ionization chamber, Geiger Mueller Counter.

[T1](No. of Hrs. 8)

#### Text Books:

- [T1]. Arthur Beiser, 'Concepts of Modern Physics', [McGraw-Hill], 6th Edition 2009
- [T2]. A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6<sup>th</sup> Edition, 2013.

#### **Reference Books**

- [R1]. A. Ghatak 'Optics', TMH, 5<sup>th</sup> Edition, 2013
- [R2]. G. Aruldhas 'Engineering Physics' PHI 1<sup>st</sup> Edition, 2010.
- [R3]. Fundamentals of Optics : Jenkins and White, Latest Edition
- [R4]. C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I.
- [R5]. Feynman "The Feynman lectures on Physics Pearson Volume 3 Millennium Edition, 2013
- [R6]. Uma Mukhrji 'Engineering Physics' Narosa, 3<sup>rd</sup> Edition, 2010.
- [R7]. H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], 1<sup>st</sup> Edition, 2009.

#### MANUFACTURING PROCESSES

Paper Code: ETME-105	L	Т	С
Paper: Manufacturing Processes	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

- Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or 1. short answer type questions. It should be of 25 marks.
- 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The Objective of the paper is to facilitate the student with the basic Manufacturing processes. UNIT-I

Introduction: Introduction of Manufacturing processes and their classification, Basic Metals & Alloys Properties and Applications. Properties of Materials: Strength, elasticity, stiffness, malleability, ductility, brittleness, toughness and hardness. Ferrous Materials: Carbon steels, its classification based on % carbon as low, mild, medium & high carbon steel, its properties & applications. Wrought iron. Cast iron. Alloy steels: stainless steel, tool steel. Elementary introduction to Heat- treatment of carbon steels: annealing, normalizing, quenching & tempering and case- hardening.

Non-Ferrous metals & alloys: Properties and uses of various non-ferrous metals & alloys and its composition such as Cu-alloys: Brass, Bronze, Al-alloys such as Duralumin.

#### Casting Processes:

Principles of metal casting, Pattern materials, types and allowance, composition and properties of moulding sand, foundry tools, concept of cores and core print, elements of gating system, description and operation of cupola, special casting processes e.g. die-casting; permanent mould casting; centrifugal casting; investment casting; casting defects.

#### UNIT-II

#### **Smithy and Forging:**

Hot working and cold working, Forging tools and equipments, Forging operations, Forging types: Smith forging, Drop forging, Press forging, Machine forging; Forging defects; Extrusion, wire drawing, swaging. **Bench Work and Fitting:** 

Fitting shop tools, operation: Fitting; sawing; chipping; thread cutting (with taps and dies); Marking and marking tools.

(T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>) [No. of Hrs. 12]

(T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>) [No. of Hrs.12]

#### UNIT-III

Metal joining: Welding principles, classification of welding techniques, Oxyacetylene Gas welding, equipment and field of application, Arc-welding, metal arc, Carbon arc welding, submerged arc welding and atomic hydrogen welding, TIG and MIG welding, Electric resistance welding; spot; seam; flash; butt and percussion welding, Flux: composition; properties and function, Electrodes, Types of joints and edge preparation, Brazing and soldering, welding defects. (T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>)[No. of Hrs. 12]

#### UNIT-IV

#### Sheet Metal Work:

Tools and equipments used in sheet metal work, metals used for sheets, standard specification for sheets, Types of sheet metal operations: shearing, drawing, bending. Other operations like spinning, stretch forming, embossing and coining.

Powder Metallurgy: Introduction of powder metallurgy process: powder production, blending, compaction, sintering.

(T<sub>1</sub>, T<sub>2</sub>, R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>)[No. of Hrs. 12]

#### **Text Books:**

- Manufacturing Process by Raghuvanshi.(Dhanpat Rai and Co.) [T1].
- [T2]. Manufacturing Technology by P.N.Rao (TMH publications)

#### **Reference Books:**

- Workshop Technology by Hazra-Chowdhary (Media Promoters and Publishers Pvt. Ltd.) [R1].
- [R2]. Production Engineering by R.K.Jain (Khanna Publishers)
- [R3]. Workshop Technology by Chapman (Elsevier Butterworth-Heinemann)
- [R4] Fundamentals of Modern Manufacturing by Mikell P. Groover (Wiley India Edition)
- Manufacturing Processes for Engineering Materials by Kalpakjian and Schmid (Pearson) [R5]

Scheme and Syllabi for B. Tech, 1<sup>st</sup> year (Common to all branches) w.e.f batch 2014-15 and (2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> years) w.e.f batch 2013-14 approved in the 22nd BOS of USET on 30th June, 2014 and approved in the 37th AC Sub Committee Meeting held on 10th July, 2014.

#### ELECTRICAL TECHNOLOGY

Paper Code: ETEE-107	
<b>Paper : Electrical Technology</b>	

#### **INSTRUCTIONS TO PAPER SETTERS:**

This is first introductory course in electrical technology to the students of all the branches of engineering in first year.

Ouestion No. 1 should be compulsory and cover the entire syllabus. This question should have objective 2. or short answer type questions. It should be of 25 marks.

3. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To provide exposure to the students in respects of the basics of different aspects of electrical engineering with emphasis on constructional, measurement and applications of various types of instruments and equipments.

#### **UNIT – I: DC Circuits**

Introduction of Circuit parameters and energy sources (Dependent and Independent), Mesh and Nodal Analysis, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer and Millman's Theorems, Star-Delta Transformation and their Applications to the Analysis of DC circuits.

#### UNIT – II: A.C.Circuits

A.C. Fundamentals, Phasor representation, Steady State Response of Series and Parallel R-L, R-C and R-L-C circuits using j-notation, Series and Parallel resonance of RLC Circuits, Quality factor, Bandwidth, Complex Power, Introduction to balanced 3-phase circuits with Star- Delta Connections.

#### **UNIT – III: Measuring Instruments**

Basics of measuring instruments and their types, Working principles and applications of moving coil, moving iron (ammeter & voltmeter) and Extension of their ranges, dynamometer- type Wattmeter, induction-type Energy Meter, Two-wattmeter method for the measurement of power in three phase circuits, Introduction to digital voltmeter, digital Multimeter and Electronic Energy Meter.

#### UNIT - IV: Transformer and Rotating Machines

Fundamentals of Magnetic Circuits, Hysteresis and Eddy current losses, working principle, equivalent circuit, efficiency and voltage regulation of single phase transformer and its applications. Introduction to DC and Induction motors (both three phase and single phase), Stepper Motor and Permanent Magnet Brushless DC Motor.

#### **Text Books:**

S.N Singh, "Basic Electrical Engineering" PHI India Ed 2012 [T1]

[T2] Chakrabarti, Chanda, Nath "Basic Electrical Engineering" TMH India", Ed 2012.

#### **Reference Books:**

William Hayt "Engineering Circuit Analysis" TMH India Ed 2012 [R1] Giorgio Rizzoni "Principles and Application of Electrical Engineering" Fifth Edition TMH India. [R2]

# UNIVERSIT

#### [T1],[T2][No. of Hrs. 11]

[T1],[T2][No. of Hrs. 14]

[T1],[T2],[R2][No. of Hrs. 11]

[T1],[T2],[R2][No. of Hrs. 12]

Т

Maximum Marks: 75

0

L

3

С

3

#### HUMAN VALUES & PROFESSIONAL ETHICS

Paper Code: ETHS-109 Paper : Human Values & Professional Ethics	L 1	Т 1	C 1
Non-University Examination Scheme (NUES) Note: There will be no End-Term External University Examination. Marks are to be internal sessional test of 30 marks each and one final Viva-voce project report Exam			
<ul> <li>Objectives:</li> <li>This introductory course input is intended <ul> <li>a. To help the students appreciate the essential complementarity between 'V' ensure sustained happiness and prosperity which are the core aspirations of a</li> <li>b. To facilitate the development of a holistic perspective among students to happiness, based on the correct understanding of the Human reality and the a Holistic perspective forms the basis of value-based living in a natural way.</li> <li>c. To highlight plausible implications of such a Holistic understanding in terms trustful and mutually satisfying human behaviour and mutually enriching interview.</li> </ul> </li> </ul>	ll human wards lif rest of th s of ethica	beings. e, profess e Existen l human	sion and ce. Such conduct,
<ul> <li>UNIT-1: Introduction to Value Education lectures: 03+1</li> <li>1. Understanding the need, basic guidelines, content and process for value education.</li> <li>2. Basic Human Aspirations: Prosperity and happiness</li> <li>3. Methods to fulfil the human aspirations – understanding and living in harmony at v</li> <li>4. Practice Session – 1.</li> </ul>	arious lev	No. rels. [T1], [R	of R1], [R4]
<ul> <li>UNIT-2: Harmony in the Human Being</li> <li>1. Co-existence of the sentient "I" and the material body – understanding their needs - Conveniences.</li> <li>2. Understanding the Harmony of "I" with the body – Correct appraisal of physical prosperity.</li> <li>3. Programme to ensure harmony of "I" and Body-Mental and Physical health and hap</li> </ul>	- Happine needs ar opiness.	d the me	aning of
<ul> <li>4. Harmony in family and society: Understanding Human-human relationship in respect.</li> <li>5. Understanding society and nation as extensions of family and society respectively.</li> <li>6. Practice Session - 02</li> </ul>	terms of		trust and <b>R1], [R2</b> ]
<ul> <li>UNIT-3: Basics of Professional Ethics</li> <li>1. Ethical Human Conduct – based on acceptance of basic human values.</li> <li>2. Humanistic Constitution and universal human order – skills, sincerity and fidel</li> <li>3. To identify the scope and characteristics of people – friendly and eco-friendly pr Technologies and management systems.</li> <li>4. Practice Session – 03.</li> </ul>	ity.	i.	es: 04+1 F1],[R4]
<ul> <li>UNIT-4: Professional Ethics in practice</li> <li>Profession and Professionalism – Professional Accountability, Roles of a profession.</li> <li>Engineering Profession and Ethics - Technology and society, Ethical or professionals, Roles of Engineers in industry, society, nation and the world.</li> <li>Professional Responsibilities – Collegiality, Loyalty, Confidentiality, Corr Blowing</li> <li>Practice Session – 04</li> </ul>	fessional, bligations uflict of	s of Eng	nd image gineering Whistle
Text Books:         [T1]       Professional Ethics, R. Subramanian, Oxford University Press.         [T2]       Professional Ethics & Human Values: S.B. Srivasthva, SciTech Publication	ons (Indi	a) Pvt. L	.td. New

- [T2] Professional Ethics & Human Values: S.B. Srivasthva, SciTech Publications (India) Pvt. Ltd. New Delhi.
- [T3] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

#### **References:**

- [R1] Success Secrets for Engineering Students: Prof. K.V. SubbaRaju, Ph.D., Published by SMARTstudent.
- [R2] Ethics in Engineering Mike W. Martin, Department of Philosophy, Chapman University and Roland Schinzinger, School of Engineering, University of California, Irvine.
- [R3] Human Values: A. N. Tripathy (2003, New Age International Publishers)
- [R4] Value Education website, http://www.universalhumanvalues.info[16]
- [R5] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press.
- [R6] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers" Manual by the same author.

\*PRACTICAL SESSIONS OF 14 HOME ASSIGNMENTS will be followed by the students pursuing this paper. (Ref: Professional Ethics & Human Values: S.B. Srivastava, SciTech Publications (India) Pvt. Ltd. New Delhi. )

#### CONTENT OF PRACTICE SESSION

#### Module 1: Course Introduction – Needs, Basic Guidelines, Content and Process of Value Education

**PS-1:** Imagine yourself in detail. What are the goals of your life? How do you set your goals in your life? How do you differentiate between right and wrong? What have been your achievements and shortcoming in your life? Observe and analyze them.

#### **Expected Outcome:**

The students start exploring themselves; get comfortable to each other and to the teacher and start finding the need and relevance for the course.

**PS-2:**Now a days there is lot of voice about techno-genie maladies such as energy and natural resource depletion, environmental Pollution, Global Warming, Ozone depletion, Deforestation, etc. – all these scenes are man-made problems threatening the survival of life on the earth – what is root cause of these maladies and what is the way out in your opinion?

On the other hand there is rapidly growing danger because of nuclear proliferation, arm race, terrorism, criminalization of politics, large scale corruption, scams, breakdown of relationships, generation gap, depression and suicidal attempts, etc - what do you think the root cause of these threats to human happiness and peace – what could be the way out in your opinion?

#### **Expected Outcome:**

The students start finding out that technical education with study of human values can generate more problems than solutions. They also start feeling that lack of understanding of human values is the root cause of all the problems and the sustained solution could emerge only through understanding of human values and value based living. Any solutions brought out through fear, temptation or dogma will not be sustainable.

**PS-3:1**.Observe that each one of us has Natural Acceptance, based on which one can verify right or not right for him. Verify this in case of following:

a)What is naturally acceptable to you in relationship - feeling of respect or disrespect?

b)What is naturally acceptable to you - to nurture or to exploit others? Is your living the same as your natural acceptance or different?

2.Out of three basic requirements for fulfillment of your aspirations, right understanding, relationship and physical facilities, observe how the problems in your family are related to each. Also observe how much time and efforts you devote for each in your daily routine.

#### **Expected Outcome:**

- 1. The students are able to see that verification on the basis of natural acceptance and experiential
- validation through living is the only way to verify the right or wrong, and referring to any external source life text or instrument or any other person cannot enable them to verify with authenticity, it will only develop assumptions.
- 2. The students are able to see that their practice in living is not in harmony with their natural acceptance at most of the time, and all they need to do is to refer to their natural acceptance to remove this disharmony.

Scheme and Syllabi for B. Tech,  $1^{st}$  year (Common to all branches) w.e.f batch 2014-15 and  $(2^{nd}, 3^{rd} \& 4^{th} \text{ years})$  w.e.f batch 2013-14 approved in the  $22^{nd}$  BOS of USET on  $30^{th}$  June, 2014 and approved in the  $37^{th}$  AC Sub Committee Meeting held on  $10^{th}$  July, 2014.

3. The students are able to see that lack of right understanding leading to lack of relationship is the major cause of the problems in their family and the lack of physical facilities in most of the cases; while they have given higher priority to earning of physical facilities in their life ignoring relationship and not being aware that right understanding is the most important requirement for any human being.

#### Module 2: Understanding harmony in human being – Harmony in myself!

**PS-4:**Prepare the list of your desires. Observe whether the desires. Observe whether the desires are related with self "I" or body. If it appears to be related with the both, see which part of it is related to self "I" and which part is related to body.

#### Expected Outcome:

A}

The students are able to see that they can enlist their desires and the desires are not vague, also they are able to relate their desires to "I" and "body" distinctly. If, any desire appears to be related with both, they are able to see that feeling is related to "I" while the physical facility is related to the body. They are also able to see that "I" and "body" are two realities, and most of their desires are related to "I" and not with the "Body"; while their efforts are mostly connected on the fulfillment of the need of the body assuming that it will meet the needs of "I" too.

#### PS-5:

1.

- Observe that any physical facilities you use, follows the given sequence with time; Necessary and tasteful unnecessary & tasteful unnecessary & tasteless.
- {B}. In contrast, observe that any feelings in you are either naturally acceptable or not acceptable at all. If, naturally acceptable, you want it continuously and if not acceptable, you do not want it at any moment.
- 2. List Down all your activities. Observe whether the activity is of "I" or of "body" or with the participation both "I" and "body".
- 3. Observe the activities with "I". Identify the object of your attention for different moments (over a period say 5 to 10 minute) and draw a line diagram connecting these points. Try to observe the link between any two nodes.

#### Expected Outcome:

- 1. The students are able to see that all physical facilities they use are required for limited time in a limited quantity. Also they are able to see that cause of feeling, they want continuity of the naturally acceptable feelings and they do not want feelings which are not naturally acceptable eve for a single moment.
- 2. The students are able to see that activities like understanding, desires, thoughts and selection are the activities of "I" only; the activities like breathing, palpitation of different parts of the body are fully the activities of the body. With the acceptance of "I", while activities they do with their sense organs like hearing through ears, seeing through eyes, sensing through touch, tasting through tongue and smelling through nose or the activities they do with their work organs like hands, legs, etc. are such activities that require the participation of both "I" and "body"
- 3. The students become aware of their activities of "I" and start finding their focus of attention at different moments. Also they are able see that most of their desires are coming from outsides (through preconditioning or sensation) and are not based on their natural acceptance.
- PS-6: 1.Chalk out the program to ensure that you are responsible to your body for the nurturing, protection and right utilization of the body.
  2.Find out the plants and shrubs growing in and your campus. Find out their use for curing different

# diseases.

#### **Expected Outcome:**

The students are able to list down activities related to a proper upkeep of the body and practice them in their daily routine. They are also able to appreciate the plants wildly growing in and around the campus which can be beneficial in curing the different diseases.

#### Module 3: Understanding harmony in the family and society - Harmony in Human - Human relationship

**PS-7:** Form small groups in the class and in that group initiate the dialogue and ask the eight questions related to trust. The eight questions are-

S.No.	Intention (Natural Acceptance)	S.No.	Competence
1.a.	Do I want to make myself happy?	1.b.	Am I liable to make myself always Happy?
2.a.	Do I want to make the other happy?	2.b.	Am I liable to make the other always happy?
3.a.	Does the other want to make him happy?	3.b.	Is the other able to make him always happy?
4.a.	Does the other want to make me happy? What is answer?	4.b.	Is the other able to make me always happy? What is answer?

Let each student answer the question for himself and everyone else. Discuss the difference between intention and competence.

#### **Expected Outcome:**

The students are able to see that the first four questions are related to our natural acceptance i.e. intention and the next four to our competence. They are able to note that the intention is always correct, only competence is lacking. We generally evaluate ourselves on the basis of our intention and other on the basis of their competence. We seldom look at our competence and other's intention as a result we conclude that I am a good person and other is a bad person.

#### **PS-8:**

1. Observe that on how many occasions you are respecting your related ones (by doing the right evaluation) and on how many occasion you are disrespecting by way of under evaluation, over evaluation or otherwise evaluation.

2. Also observe whether your feeling of respect is based on treating the other as yourself or on differentiations based on body, physical facilities or beliefs.

#### **Expected Outcome:**

The students are able to see that respect is right evaluation and only right evaluation leads to fulfilment of relationship. Many present problems in the society are an outcome of differentiation (lack of understanding of respect) like gender biasness, generation gap, caste conflicts, class struggle, and domination through poor play, communal violence, and clash of isms and so on so forth.

All these problems can be solved by realizing that the other is like me as he has the same natural acceptance, potential and program to ensure a happy and prosperous life for him and for others though he may have different body, physical facilities or beliefs.

#### **PS-9:**

- 1. Write a note in the form of a story, poem, skit, essay, narration, dialogue, to educate a child. Evaluate it in a group.
- Develop three chapters to introduce "social science", its needs, scope and content in the primary education of children.

#### **Expected Outcome:**

The students are able to use their creativity for educating children. The students are able to see that they can play a role in providing value education for children. They are able to put in simple words the issues that are essential to understand for children and comprehensible to them. The students are able to develop an outline of holistic model for social science and compare it with the existing model.

#### Module 4: Understanding harmony in the nature and existence - Whole existence as Co - existence -

**PS-10:** Prepare the list of units (things) around you. Classify them into four orders. Observe and explain the mutual fulfilment of each unit with other orders.

#### **Expected Outcome:**

The students are able to differentiate between the characteristics and activities of different orders and study the mutual fulfilment among them. They are also able to see that human beings are not fulfilling to their orders today and need to take appropriate steps to ensure right participation (in term of nurturing, protection and right utilization) in the nature.

#### **PS-11:**

- 1. Make a chart for the whole existence. List down different courses of studies and relate them to different or levels in the existence.
- 2. Choose any one subject being taught today. Evaluate and suggest suitable modifications to make it appropriate and holistic.

#### **Expected Outcome:**

The students are confident that they can understand the whole existence; nothing is a mystery in this existence. They are also able to see the interconnectedness in the nature, and point out how different courses of study relate to the different units and levels. Also they are liable to make out how these courses can be made appropriate and holistic.

#### Module 5: Implication of the above Holistic Understanding of Harmony at all Levels of Existence.

**PS-12:** Choose any two current problem of different kind in the society and suggest how they can be solved on the basis of the natural acceptance of human values. Suggest the steps you will take in present conditions.

#### **Expected Outcome:**

The students are liable to present sustainable solutions to the problem in society and nature. They are also able to see that these solutions are practicable and draw road maps to achieve them.

#### **PS-13:**

1. Suggest ways in which you can use your knowledge of engineering / technology / management for universal human order from your family to world family.

2. Suggest one format of humanistic constitution at the level of nation from your side.

#### **Expected Outcome:**

The students are able to grasp the right utilization of their knowledge in their streams of technology , engineering / management to ensure mutually enriching and recyclable production systems.

PS-14: The course is going to be over now. Evaluate your state before and after the course in terms of-

- Thoughts
- Behavior
- Work and
- Realization

Do you have any plan to participate in the transition of the society after graduating from the institute? Write a brief note on it.

#### **Expected Outcome:**

The students are able to sincerely evaluate the course and share with their friends. They are also able to suggest measures to make the course more effective and relevant. They are also able to make use of their understanding in the course for happy and prosperous society.

#### FUNDAMENTALS OF COMPUTING

Paper Code: ETCS-111	L	Т	С
Paper: Fundamentals of Computing	2	0	2

#### **INSTRUCTIONS TO PAPER SETTERS:** 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective

or short answer type questions. It should be of 25 marks. 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 10 marks

Objective: The objective of the paper is to facilitate the student with applied working knowledge of computers. This is the first course of computing and does not assume any pre-requisite.

#### UNIT-I

Five Component Model of a Computer, System and Application software (introduction) storage devices primary (RAM, ROM, PROM, EPROM, cache) Memory and secondary (magnetic tape, hard disk, Compact disks) memory, peripheral devices, printers. [T1], [T2][8 Hours]

#### UNIT-II

Operating Systems: DOS Internal, External commands, Windows (2000 and NT), Overview of architecture of Windows, tools and system utilities including registry, partitioning of hard disk, Overview of Linux architecture, File system, file and permissions, concept of user and group, installation of rpm and deb based packages.

#### UNIT-III

Basics of programming through flow chart, Networking Basics - Uses of a network and Common types of networks, Network topologies and protocols, Network media and hardware, Overview of Database Management System.

#### [T1],[T2],[R1][8 Hours]

#### **UNIT-IV**

Libre / Open Office Writer : Editing and Reviewing, Drawing, Tables, Graphs, Templates Libre / Open Office Calc : Worksheet Management, Formulas, Functions, Charts Libre / Open Office Impress: designing powerful power-point presentation

#### Text:

Peter Norton, Introduction to computers, Sixth Edition Tata McGraw Hill (2007). [T1]

Andrews Jean, A+Guide to Managing & Maintaining Your PC, Cengage Publication 6/e [T2]

#### **References:**

- [R1] Anita Goel, Computer Fundamentals, Pearson Education.
- Joiner Associates Staff, Flowcharts: Plain & Simple: Learning & Application Guide, Oriel Inc [R2]

DRAPRAST

- http://www.openoffice.org/why/ [R3]
- http://www.libreoffice.org/get-help/documentation/ [R4]

# UNIVERSIT

#### Maximum Marks : 75

[T1], [T2][8 Hours]

[R2][R3] [8 Hours]

<b>Applied</b>	Chemistry	

Paper Code: ETCH – 113	$\mathbf{L}$	Т	С
Paper : Applied Chemistry	2	1	3

INSTRUCTIONS TO	PAPER SETTER:
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1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Each unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: The objective of the paper is to facilitate the student with the basics of Applied Chemistry aspects that are required for his understanding of basic chemistry* 

#### UNIT I: FUELS

Definition, Classification & Calorific value of fuels (gross and net), Dulong's formula (Numericals), Determination of calorific value of fuels using bomb's calorimeter (Numericals), Determination of calorific value of fuels using Boy's Gas Calorimeter (Numericals), Cracking – Thermal & catalytic cracking, Octane & Cetane numbers with their significance. High & Low temperature carbonization, Manufacture of coke (Otto – Hoffmann oven) Proximate and ultimate analysis of Coal (Numericals) Combustion of fuels (Numericals).

[T1,T2][No. of hrs. 08]

#### UNIT II: THE PHASE RULE & CATALYSIS

**UNIT IV: CORROSION & ITS CONTROL** 

Definition of various terms, Gibb's Phase rule & its derivation, Application of phase rule to One component system. The water system, Application of phase rule to Two component system. The Lead-Silver system (Pattinson's process).

Catalyst and its characteristics, Types of catalysts, Concept of promoters, inhibitors and poisons. Theories of catalysis: Intermediate compound formation theory, adsorption or contact theory. Application of catalysts for industrially important processes Enzyme catalysis: Characteristics, Kinetics & Mechanism of enzyme catalysed reaction (Michaelis-Menten equation), Acid-Base catalysis: Types, Kinetics & Mechanism, Catalysis by metals salts (Wilkinson's Catalyst), Auto-catalysis, Heterogeneous catalysis (Langmuir-Hinshelwood mechanism.

[T1,T2][No. of hrs. 08]

#### UNIT III: WATER

Introduction and specifications of water, Hardness and its determination by EDTA method (Numericals), Alkalinity and its determination (Numericals), Reverse Osmosis, Electrodialysis, Disinfection by break-point chlorination. Boiler feed water, boiler problems– scale, sludge, priming & foaming: causes & prevention, Boiler problems– caustic embrittlement & corrosion: causes & prevention, Water Softening by Internal Treatment: carbonate & phosphate conditioning, colloidal conditioning & calgon treatment Water Softening by External Treatment: Lime-Soda Process (Numericals) Zeolite & Ion-Exchange Process.

[T1,T2][No. of hrs. 08]

#### Causes, effects & consequences; Chemical or Dry corrosion & its mechanism (Pilling-Bedworth Rule) Electrochemial or Wet Corrosion & Its mechanism, Rusting of Iron Passivity, Galvanic series, Galvanic Corrosion, Soil Corrosion Pitting Corrosion, Concentration Cell or Differential Aeration Corrosion, Stress Corrosion. Factors Influencing Corrosion: Nature of metal and nature of corroding environment; Protective measures: Galvanization, Tinning Cathodic Protection, Sacrificial Anodic protection, Electroplating, Electroless

#### [T1,T2][No. of hrs. 08]

- **Text Books:**
- [T1] P. C. Jain & Monika Jain, *Engineering Chemistry*, Latest edition, Dhanpat Rai Publishing Co., 2002.
- [T2] P. Mathew, *Advance Chemistry*, 1 & 2 Combined Editions, Cambridge University Press, 2003.

#### **Reference Books:**

- [R1] P. W. Atkins and J. De Paula, *Atkins' Physical Chemistry*, Oxford, 2010.
- [R2] T. Engel and P. Reid, *Physical Chemistry*, Pearson Education, 2013.

plating, Prevention of Corrosion by Material selection & Design.

- [R3] K. Qanungo, *Engineering Chemistry*, PHI Learning Private Limited, New Delhi, 2009.
- [R4] O. G. Palanna, *Engineering Chemistry*, Tata McGraw Hill Education Private Limited, 2012.
- [R5] D. A. Jones, *Principles and Prevention of Corrosion*, Prentice Hall, 2<sup>nd</sup> Edition, 1996.
- [R6] H. K. Chopra and A. Parmar, *Engineering Chemistry- A Text Book*, Narosa Publishing House, 2012.
- [R7] S. Chawla, *Engineering Chemistry*-All India Edition, Dhanpat Rai & Co., 2003.
- [R8] R. Gadi, S. Rattan and S. Mohapatra, *Environmental Studies*, S.K. Kataria & Sons, 2<sup>nd</sup> Edition 2009.

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#### MAXIMUM MARKS: 75

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#### APPLIED PHYSICS LAB – I

#### Paper Code: ETPH-151 Paper : Applied Physics Lab – I

# P C 2 1

#### LIST OF EXPERIMENTS

- 1. To determine the wavelength of sodium light by Newton's Rings.
- 2. To determine the wavelength of sodium light by Fresnel's biprism.
- 3. To determine the wavelength of sodium light using diffraction grating.
- 4. To determine the refractive index of a prism using spectrometer.
- 5. To determine the dispersive power of prism using spectrometer and mercury source.
- 6. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
- 7. To find the wavelength of He-Ne laser using transmission diffraction grating.
- 8. To determine the numeral aperture (NA) of an optical fibre.
- 9. To plot a graph between the distance of the knife-edge from the center of the gravity and the time period of bar pendulum. From the graph, find
  - (a) The acceleration due to gravity
  - (b) The radius of gyration and the moment of inertia of the bar about an axis.

10. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil).

- 11. To verify inverse square law.
- 12. To determine Planck's constant.

#### **Text Books:**

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand

**Note:** Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.



#### ELECTRICAL TECHNOLOGY LAB

Paper Code: ETEE 153	L	Р	С
Paper: Electrical Technology Lab	0	2	1

1	
1.	To Design the circuit for a given load and selection of its various Components and instruments from the safety point of view
2.	Study and applications of CRO for measurement of voltage, frequency and phase of signals.
3.	Connection of lamp by
	(1)Single Switch Method.(2) Two-way Switch Method. OR
	Performance comparison of of fluorescent Tube & CFL Lamp.
4.	To Verify Thevenin's & Norton's Theorem
	OR
	To Verify Superposition & Reciprocity Theorem.
	OR
	To Verify Maximum Power Transfer Theorem.
5.	To Measure Power & Power Factor in a Single-Phase A.C Circuit using Three Ammeters or three
	Voltmeters.
6.	To Measure Power & Power Factor in a Balanced Three Phase Circuit using Two Single Phase
7	Wattemeters.
7.	To study of Resonance in a series R-L-C or Parallel R-L-C Circuits.
8.	To perform open circuit and short circuit test on 1-phase transformer.
9.	Starting, Reversing and speed control of DC shunt Motor
10	
	To Study different types of Storage Batteries & its charging system.
12.	.To Study different types of earthing methods including earth leakage circuit breaker (GFCI)

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY WORKSHOP PRACTICE

Paper Code: ETME-155 С L Р 3 2 **Paper: Workshop Practice** 0 LIST OF EXPERIMENTS Sheet Metal Shop 1. To study the tools and machineries used in sheet metal shop. 2. To make a tray using sheet metal tools. 3. To make a Funnel using sheet metal tools. 4. To make a cylindrical mug in sheet metal shop. Foundry Shop 5. To make a mould in Foundry Shop. **Carpentry Shop** 6. To make a half lap T-joint in Carpentry Shop. a ch 7. To make a half cross lap joint in Carpentry Shop. 8. To make a pattern using Carpentry Tools. Welding Shop 9. To study arc and gas welding equipments and tools. 10. To make Lap Joint, T-Joint and Butt Joint in Welding shop. Fitting Shop 11. To make V-Section and T-Slot in fitting shop. Machine Shop 12. To study basic operations on lathe, shaper, milling, drilling and grinding machines. 13. To perform step turning, knurling and threading operations on lathe. 14. To prepare a simple job on shaper. Note:- Any 8-10 Experiments out of the list may be chosen. GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

Scheme and Syllabi for B. Tech, 1st year (Common to all branches) w.e.f batch 2014-15 and (2nd, 3rd & 4th years) w.e.f batch 2013-14 approved in the 22<sup>nd</sup> BOS of USET on 30<sup>th</sup> June, 2014 and approved in the 37<sup>th</sup> AC Sub Committee Meeting held on 10<sup>th</sup> July, 2014.

#### **ENGINEERING GRAPHICS**

Paper Code: ETME-157	L	Р	С
Paper: Engineering Graphics Lab	0	3	2

#### LIST OF EXPERIMENTS

#### UNIT - I

**General**: Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic Projection, B.I.S. Specifications,

**Projections of Point and Lines**: Introduction of planes of projection, Reference and auxiliary planes, projections of points and Lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on Auxiliary planes, shortest distance, intersecting and non-intersecting lines.

#### $(T_1, T_2, R_1, R_2, R_3)$

#### <u>Unit - II</u>

**Planes other than the Reference Planes**: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., Projections of points and lines lying in the planes, conversion of oblique plane into auxiliary Plane and solution of related problems.

**Projections of Plane Figures**: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one of both reference planes). Obtaining true shape of the plane figure by projection.

 $(T_1, T_2, R_1, R_2, R_3)$ 

 $(T_1, T_2, R_1, R_2, R_3)$ 

**Projection of Solids:** Simple cases when solid are placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.  $(T_1, T_2, R_1, R_2, R_3)$ 

Unit-IV

Unit - III

Isometric Projection of plain surface and bodies. Text Books:

[T1] Engineering drawing by N.D.Bhatt (Charotar Publications).

- [T2] Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications) Reference Books:
- [R1] Engineering Drawing by Venugopalan, (New Age International).
- [R2] Engineering Drawing by P.S.Gill (S.K. Kataria & Sons)
- [R3] Engineering Graphics by K.C.John (PHI)

Note:- Any 8-10 Experiments out of the list may be chosen.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### FUNDAMENTAL OF COMPUTING LAB

#### Paper Code: ETCS 157 Paper: Fundamental of Computing Lab

#### L Р 0 2

**LIST OF EXPERIMENTS** For program development an IDE e.g. CodeBlock<sup>[a]</sup>, Eclipse CDT<sup>[b]</sup>, Netbeans<sup>[c]</sup> is recommended

- Dismantling a PC Part -1 1.
- 2. Dismantling a PC Part -2
- 3. Internal and External commands of DOS
- 4. System utilities of windows including regedit
- 5. Installation of any rpm or debianlinux distribution with emphasis on drive partitioning
- 6. Installation of rpm and deb based packages
- 7. Understanding of File system of Linux
- 8. Creating user and group (through CLI)
- Understanding and working knowledge of .Libre / Open Office Writer 9. : Editing and Reviewing, Drawing, Tables, Graphs, Templates
- 10. Understanding and working knowledge of Libre / Open Office Calc
- Understanding and working knowledge Libre / Open Office Impress 11.
- 12. Understanding of flow chart development through Dia \*
- Two Mini Projects based on the skills learned in experiments 1-12 13.
  - [Dia] http://projects.gnome.org/dia/

Note:- Any 8-10 Experiments out of the list may be chosen.

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1

#### APPLIED CHEMISTRY LAB

#### Paper Code – ETCH-161 Paper : Applied Chemistry Lab

#### P C 2 1

#### LIST OF EXPERIMENTS

1. Determination of alkalinity of water sample. 2. Determination of hardness of water sample by EDTA method. 3. Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide and sodium chloride. Determine the amount of oxalic acid and Sulphuric acid in one litre of solution, given standard sodium 4. hydroxide and Potassium Permanganate. Determine the amount of copper in the copper ore solution, provided hypo-solution (Iodometric 5. Titration). 6. Determine the amount of chloride ions present in water using silver nitrate (Mohr's Precipitation Method). 7. Determine the strength of MgSO<sub>4</sub> solution by Complexometric titration. 8. Determine the surface tension of a liquid using drop number method. 9 Determine the viscosity of a given liquid (density to be determined). Determine the cell constant of conductivity cell and titration of strong acid/strong base 10 conductometrically. 11. To determine (a)  $\lambda$  max of the solution of KMnO<sub>4</sub>. (b) Verify Beer's law and find out the concentration of unknown solution by spectrophotometer. 12. Determination of the concentration of iron in water sample by using spectrophotometer. Determination of the concentration of Iron (III) by complexometric titration. 13. 14. Proximate analysis of coal. Determination of eutectic point and congruent melting point for a two component system by method of 15. cooling curve. (At least 8 to 10 experiments are to be performed) Suggested Books: A. I. Vogel, G. H. Jeffery, Vogel's Text Book of Quantitative Chemical Analysis, Published by 1. Longman Scientific & Technical, 5th Edition, 1989. S. Chawla, Essentials of Experimental Engineering Chemistry, Dhanpat Rai & Co., 3rd Edition, 2008. 2. 3. S. Rattan, Experiments in Applied Chemistry, Published by S.K.Kataria & Sons, 2<sup>nd</sup> Edition, 2003. 4. O. P. Pandey, D. N. Bajpai and S. Giri, Practical Chemistry, Published by S. Chand, 2005. 5. M. S. Kaurav, Engineering Chemistry with Laboratory Experiments, Published by PHI Learning Private Limited, 2011. S. K. Bhasin and Sudha Rani, Laboratory Manual on Engineering Chemistry, Published by Dhanpat 6. Rai Publishing Company, 2006. Note:- Any 8-10 Experiments out of the list may be chosen. GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### **APPLIED MATHEMATICS-II**

Paper Code	: ETMA-102	L	Т	С
Paper: APPLIE	D MATHEMATICS-II	3	1	4

#### INSTRUCTIONS TO PAPER SETTERS:

#### Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

*Objective: The objective of the paper is to facilitate the student with the basics of Applied Mathematics that are required for an engineering student.* 

#### Unit –I

Partial differentiation and its Applications: Partial derivatives of first and second order. Euler's theorem for homogeneous functions (without proof). Derivatives of Implicit Functions, total derivatives. Change of variables. Jacobian. Taylor's theorem for function of two variables(without proof). Error and approximation. Extreme values of function of several variables(maxima ,minima, saddle points). Lagrange method of undetermined multipliers. Partial differential equations: Formulation, solution of first order equations, Lagranges equations, Charpit's method.
[T2][No. of 12hrs.]

#### Unit-II

Laplace Transformation: Definition, Laplace transformation of basic functions, existence condition for Laplace transformation, Properties of Laplace transformation(Linearity, scaling and shifting). Unit step function, Impulse Function, Periodic Functions. Laplace transformation of derivatives, Laplace transformation of integrals, differentiation of transforms, Integration of transforms, Convolution theorem, inverse Laplace transformation. Solution of ordinary Differential equations.

[T1, T2] [No. of 12hrs.]

#### Unit-III

Complex Function: Definition, Derivatives, Analytic function, Cauchy's Riemann equation (without proof). Conformal and bilinear mappings, Complex Integration: Complex Line integration, Cauchy's integral theorem and integral formula(without proof). Zeros and Singularities, Taylor's and Laurent's series (without proof). Residues, Residue theorem (without proof). Evaluation of real definite integrals: Integration around the unit circle, Integration around a small semi circle and integration around rectangular contours.

#### Unit-IV

Multiple integrals: Double integrals, Change of order of integration, Triple integrals. Vector Calculus: Scalar and vector functions, Gradient, Divergence and curl. Directional derivatives, Line Integrals. Surface integrals, volume integrals. Green's theorem, Stoke's theorem and Gauss divergence theorem (without proof).

#### [T1, T2][No. of 12hrs.]

[T1,T2][No. of 12hrs.]

#### Text:

- [T1]. E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [T2] Michael Greenberg, "Advance Engineering mathematics", Pearson.

#### **References:**

- [R1] R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications
- [R2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications.
- [R3] S. Ponnusamy, "Foundation of Complex Analysis" Narosa Publication
- [R4] G.B. Thomas and R. N. Finny "Calculus and Analytic Geometry" Addison Wesley/ Narosa
- [R5] Wylie R, "Advance Engineering mathematics", McGraw-Hill
- [R6] M. Spiegel, "Schaum's Outline on Laplace Transform, Tata McGraw-Hill

Paper Code: ETPH-104	L	Т	С
Paper : APPLIED PHYSICS – II	2	1	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Applied Physics aspects that are required for his understanding of basic physics.

#### UNIT I

Electromagnetic Theory : Gradient, Divergence, Curl, Gauss' law, Ampere's Law, Continuity equation, Maxwell's equations (differential and integral forms), Significance of Maxwell's equations, Poynting Theorem, Electromagnetic wave propagation in dielectrics and conductors.

#### UNIT II

Statistical Physics: Black body radiation, Planck's radiation formula, Wien's and Rayleigh-Jeans Laws, Distribution laws: Qualitative features of Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac statistics & their comparison (without derivation).

**Quantum Mechanics:** Postulates of Quantum mechanics, de-Broglie hypothesis, Davisson Germer experiment, Wave function and its physical significance, Wave Packet, Phase and group velocities, Uncertainty principle, Schrodinger equation for free particle, Time dependent Schrodinger equation, Particle in a box (1-D).

#### UNIT III

**Crystal Structure:** Types of solids, Unit cell, Types of crystals, Translation vectors, Lattice planes, Miller indices, Simple crystal structures, Interplaner spacing, Crystal structure analysis: Bragg's law, Laue method, Point defects: Schottcky and Frankel defects.

#### UNIT IV

Band Theory of Solids: Introduction, Kronig-Penney model: E-k diagram, Effective mass of an electron, Intrinsic semiconductors: Electron concentration in conduction band, Hole concentration in valence band, Extrinsic semiconductor: p-type and n-type semiconductors, Fermi level, Hall Effect: Hall voltage and Hall coefficient.

[T1][T2][No. of Hrs. 8]

[T1], [T2][No. of Hrs. 8]

[T1][T2][No. of Hrs. 8]

[T1], [T2][No. of Hrs. 8]

#### Text Books:

[T1]. Arthur Beiser 'Concepts of Modern Physics', [McGraw-Hill], 6<sup>th</sup> Edition 2009.

[T2]. A. S.Vasudeva, 'Modern Engineering Physics', S. Chand, 6<sup>th</sup> Edition, 2013.

#### **Reference Books**

- [R1]. Richard Wolfson 'Essential University Physics' Pearson, Ist edition, 2009.
- [R2]. H.K. Malik & A. K. Singh 'Engineering Physics' [McGraw-Hill], I<sup>st</sup> Edition, 2009.
- [R3]. C. Kittle, 'Mechanics', Berkeley Physics Course, Vol.- I. Latest Edition.
- [R4]. Irving Kaplan 'Nuclear Physics' Latest Edition.
- [R5]. John R. Taylor, Chris D. Zafirator and Michael A. Dubson, 'Modern Physics For Scientists and Engineers', PHI, 2<sup>nd</sup> Edition.
- [R6]. D.J. Griffith, 'Introduction to Electrodynamics', Prentice Hall, Latest Edition.

#### **ELECTRONIC DEVICES**

Paper Code: ETEC-106	$\mathbf{L}$	Т	С
Paper : Electronic Devices	3	0	3

#### INSTRUCTIONS TO PAPER SETTERS: MAXIMUM MARKS: 75

1. This is the first introductory course in Electronics Engineering to the students of all the branches of engineering during the first year.

2. Question No.1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions from each unit. It should be of 25 marks.

3. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: Objective of the paper is to facilitate the student with the basics of electronic aspects that are required for his understanding and applications in their respective field of study. The pre-requisites are, to have a basic understanding of Applied Physics and Mathematics.

UNIT-I

**Evaluation Of Electronics:** Introduction & Application Of Electronics, Energy Band Theory Of Crystals, Energy Band Structures In Metals, Semiconductors And Insulators, Theory Of Semiconductors: Classification Of Semiconductors, Conductivity Of Semiconductors, Carrier Concentration In Intrinsic & Extrinsic Semiconductors, Properties Of Intrinsic And Extrinsic Semiconductors, Variation In Semiconductors Parameters With Temperature, Fermi-Dirac Function, Fermi Level In A Semiconductor Having Impurities, Band Structure Of Open-Circuited P-N Junction, Drift And Diffusion Currents, Carrier Life Time, Continuity Equation (Elementary Treatment Only)

#### UNIT – II

#### [T1][T2][T3][No. Of Hours: 12]

**Theory of p-n junction Diode:** Diode Current Equation, Diode Resistance, Transition Capacitance, Diffusion Capacitance, (Elementary treatment only), Effect of Temperature on p-n Junction Diode, Switching Characteristics, Piecewise Linear Model, **Special Diodes:** Zener Diode, Varactor Diode, Tunnel Diode, Photodiode, Light Emitting Diodes, Schottky Barrier Diode, **Applications of Diodes:** Half-Wave Diode Rectifier, Full-Wave Rectifier, Clippers and Clampers (Elementary treatment only).

#### Unit – III

[T1][T2][T3][No. of Hours: 11]

[T1][T2][T3][No. of Hours: 11]

**Bipolar junction transistor:** Introduction of transistor, construction, transistor operations, BJT characteristics, load line, operating point, leakage currents, saturation and cut off mode of operations, Eber-moll's model.

#### Unit – IV

**Application of BJT:** CB, CE, CC configurations, hybrid model for transistor at low frequencies, Introduction to FETs and MOSFETs.

Fundamentals of digital electronics: Digital and analog signals, number systems, Boolean algebra, logic gates with simple applications, logic gates, karnaugh maps.

#### [T1][T2][T3][No. of Hours: 11]

- **TEXT BOOKS** 1. S. Salivahanan, N. Suresh Kr. & A. Vallavaraj, "Electronic Devices & Circuit", Tata McGraw Hill, 2008
  - Millman, Halkias and Jit, "Electronic devices and circuits" McGraw Hill
  - 3. Boylestad & Nashelsky, "Electronic Devices & Circuits", Pearson Education, 10<sup>TH</sup> Edition.

#### **REFERENCE BOOKS**

- 1. Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, VI Edition
- 2. Robert T. Paynter, "Introducing Electronic Devices & Circuits", Pearson Education, VII Edition, 2006

#### INTRODUCTION TO PROGRAMMING

Paper Code: ETCS-108	L	Т	С
Paper: Introduction to Programming	3	0	3

INSTRUCTIONS TO PAPER SETTERS: Maximum Marks : 75 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: The objective of the paper is to facilitate the student with the basics of programming aspects, using C as the primary language. This course focuses on the programming constructs which are used in other languages as well. This is the first course on programming and does not assume any prerequisite.

# UNIT I

Concept of algorithms, Flow Charts, Overview of the compiler (preferably GCC), Assembler, linker and loader, Structure of a simple Hello World Program in C, Overview of compilation and execution process in an IDE (preferably Code Block)

### UNIT II

Programming using C: Preprocessor Directive, C primitive input output using get char and put char, simple I/O Function calls from library, data type in C including enumeration, arithmetic, relational and logical operations, conditional executing using if, else, switch and break. Concept of loops, for, while and do-while, Storage Classes: Auto, Register, Static and Extern

# UNIT III

[T1], [T2], [R7][No. of hrs 8]

[T2], [R1], [R7] [No. of hrs 8]

[T1],[T2], [R4][R5][No. of hrs 8]

Arrays (one and two dimensional), 2-d arrays used in matrix computation. Concept of Sub-programming, functions. Parameter transmission schemes i.e. call by value and call by reference, Pointers, relationship between array and pointer, Argument passing using pointers, Array of pointer, passing arrays as arguments

# UNIT IV

Structure and unions, Strings and C string library, File Handling in C Using File Pointers, fopen(), fclose(), Input and Output using file pointers, Character Input and Output with Files, String Input / Output Functions, Formatted Input / Output Functions, Block Input / Output Functions, Sequential Vs Random Access Files, Positioning the File Pointer

# [T1], [T2], [R2] [R7] [No. of hrs 8]

#### Text Books:

- [T1] Herbert Schildt, "C: The Complete Reference", OsbourneMcgraw Hill, 4th Edition, 2002.
- [T2] Forouzan Behrouz A. "Computer Science: A Structured Programming Approach Using C, Cengage Learning 2/e

# Reference Books:

- [R1] Kernighan & Ritchie, "C Programming Language", The (Ansi C version), PHI, 2/e
- [R2] K.R Venugopal, "Mastering C", TMH
- [R3] R.S. Salaria "Application Programming in C " Khanna Publishers4/e
- [R4] Yashwant Kanetkar "Test your C Skills", BPB Publications
- [R5] http://www.codeblocks.org/
- [R6] <u>http://gcc.gnu.org/</u>
- [R7] Programming in ANSI C, E. Balagurusamy; Mc Graw Hill, 6<sup>th</sup> Edition.

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#### **ENGINEERING MECHANICS**

Paper Code: ETME 110	L	Т	С
Paper: Engineering Mechanics	2	1	3

#### INSTRUCTIONS TO PAPER SETTERS:

#### MAXIMUM MARKS: 75

- Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to give the basic principles of mechanic applied in different disciplines of engineering.

#### UNIT- I

Force system: Free body diagram, Parallel force system, concurrent force system, Equilibrium equations and applications in different force systems.

**Friction:** Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, Belt drive- derivation of equation  $T_1/T_2 = e^{\mu\theta}$  and its application, M.A, V.R and Efficiency of Screw Jack, Application of friction in pivot and collar bearing.

# UNIT- II

**Structure:** Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section, graphical method.

**Distributed Force**: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, Pappus theorems, polar moment of inertia. [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### Unit-III

Kinematics of Particles: Rectilinear motion, plane curvilinear motion-rectangular coordinates, normal and tangential component.

Kinetics of Particles: Equation of motion, rectilinear motion and curvilinear motion, work energy equation, conservation of energy, impulse and momentum, conservation of momentum, impact of bodies, co-efficient of restitution, loss of energy during impact.

#### Unit-IV

[T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

[T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

**Kinematics of Rigid Bodies**: Concept of rigid body, type of rigid body motion, absolute motion, introduction to relative velocity, instantaneous center of velocity, Velocity polygons for four bar mechanism and single slider mechanism.

Kinetics of Rigid Bodies: Equation of motion, translatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy.

#### [T1, T2, R1, R2, R4, R5][No. of Hrs. 08]

#### Text Books:

- T1. Engg Mechanics by A.K.Tayal (Umesh Publications).
- T2. Engg Mechanics by Basudeb Bhattacharya (Oxford university Press) **Reference Books:**
- R1. Engg Mechanics by Irving H. Shames (Pearson publications).
- R2. Engg Mechanics by U.C.Jindal (Galgotia Publications).
- R3. Engg Mechanics by Beer & Johnston( TMH).
- R4. Engg Mechanics by K.L.Kumar (TMH).

Shear force and bending Moment Diagram.

R5. Engg Mechanics by Sadhu Singh (Khanna Publishers).

# **COMMUNICATION SKILLS**

Paner (	<u>COMMUNICATION SKILLS</u>			
	Code: ETHS – 112 Communication Skills	L 2	Т 1	C 3
INSTR 1. Que or sho 2. Ap should		as per the syllabu	ave obje s. Every	y unit
	ve: To enhance the language and communication competence of profe for Specific Purposes (ESP) through communication skills related act		vith emp	hasis o
l. Basi	e Remedial Grammar (Errors in Parts of Speech, Tenses, Verbs and	l Modal; Reported	Speech	; Activ
	sive Voice; Conditional clauses; Question Tags and Short Responses)	[T1],[R2],[R3	][No. of	f hrs 00
	abulary and usage (Synonyms and Antonyms; Suffixes and Prefixes or substitution; Prepositions; Phrasal verbs and Idioms, Indianism)		2	•
UNIT- (A)		[T1],[R2],[R3	][No. of	f hrs 00
I. II. III. ( <b>B)</b> I. II. III.	Types of writing (Expository, Descriptive, Narrative, Analytical and Definition, description and explanation of scientific objects, instrume Interpretation and use of charts, graphs and tables in technical writing Paragraph writing Precis writing Comprehension [T1],[R2],[R3]	ents and processes	etc.	
			[No. of	f hrs 1
UNIT-				
I.	Reading different types of texts (speed and purpose)[T1]			
II.	Reading five essays [T2]	(D. 102)		
III. IV.	E.M. FORSTER, <i>What I Believe</i> JAMES BRYCE, <i>Some Hints on Public Speaking</i>	(Pg-123) (Pg-135)		
V.	L.A. HILL, <i>Principles of Good Writing</i>	(Pg-155) (Pg-15	0)	
VI.	A.P.J. ABDUL KALAM, Work Brings Solace	(Pg-20		
VII.	SALIM ALI, Man and Nature in India: The Ecological Balance	(Pg-213)	,	
		[No.	of hrs	10]
	BOOKS	1'D 10		<b>C1</b>
T1]		ishi Kaman and Sa	ngeeta	Sharm
	Technical Communication: Principles and practice (OUP), (Meenal			
T21	OXFORD UNIVERSITY PRESS	INCH		
[T2] [T3]	OXFORD UNIVERSITY PRESS Communication Skills for Engineers, Murli Krishna, Pearson.	INGH		
T3]	OXFORD UNIVERSITY PRESS	INGH		
[T3] [T4]	OXFORD UNIVERSITY PRESS Communication Skills for Engineers, Murli Krishna, Pearson. Wren and Martin: High School English Grammar and Composition; Exploration of Ideas; An Anthology of Prose: Orient Blackswan.	INGH		
[T3] [T4] REFEI	OXFORD UNIVERSITY PRESS Communication Skills for Engineers, Murli Krishna, Pearson. Wren and Martin: High School English Grammar and Composition; Exploration of Ideas; An Anthology of Prose: Orient Blackswan. RENCE BOOKS:	S. Chand	TD	
[T3] [T4] <b>REFEI</b> [R1]	OXFORD UNIVERSITY PRESS Communication Skills for Engineers, Murli Krishna, Pearson. Wren and Martin: High School English Grammar and Composition; Exploration of Ideas; An Anthology of Prose: Orient Blackswan. RENCE BOOKS: Professional Communication: Aruna Koneru, MCGRAW HILLS ED	S. Chand UCATION PVT. I	LTD	
[T3] [T4] <b>REFEI</b>	OXFORD UNIVERSITY PRESS Communication Skills for Engineers, Murli Krishna, Pearson. Wren and Martin: High School English Grammar and Composition; Exploration of Ideas; An Anthology of Prose: Orient Blackswan. RENCE BOOKS:	S. Chand UCATION PVT. I S. Chand		

# ENVIRONMENTAL STUDIES

Paper Code: ETEN-114	L	Т	С
Paper : Environmental Studies	2	1	3

# **INSTRUCTIONS TO PAPER SETTER:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Each unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** The objective of this course is to make students environment conscious. They will be exposed through the fundamental concepts of environment and ecosystem so that they can appreciate the importance of individual and collective efforts to preserve and protect our environment. This course must raise various questions in student's mind that how our environment is inter dependent on various factors and how human being must care for their natural surroundings.

# UNIT I: Environmental Studies: Ecosystems, Bio-diversity and its Conservation

(i) The Multidisciplinary Nature of Environmental Studies-

Definition, scope and importance of Environmental Studies. Biotic and a biotic component of environment, need for environmental awareness.

#### (ii) Ecosystems

Concept of an ecosystem, structure and function of an ecosystem, producers, consumers and decomposers, energy flow in the ecosystem, ecological succession, food chains, food webs and ecological pyramids. Introduction, types, characteristic features, structures and function of the following ecosystem:

- (a) Forest ecosystem
- (b) Grassland ecosystem
- (c) Desert ecosystem
- (d) Aquatic ecosystem (ponds, streams, lakes, rivers, oceans, estuaries).

# (iii) Bio-diversity and its Conservation

Introduction to biodiversity —definition: genetic, species and ecosystem diversity, Bio-geographical classification of India, Value of biodiversity: Consumptive use, productive use, social, ethical, aesthetic and option values, Biodiversity at global, national and local levels, India as a mega-diversity nation, Hot-spots of biodiversity, Threats to biodiversity : Habitat loss, Poaching of wildlife, man-wildlife conflicts, rare endangered and threatened species(RET) endemic species of India, method of biodiversity conservation: *In-situ* and *ex-situ* conservation.

[T1], [R3][No. of hrs. 08]

# UNITII: Natural Resources: problems and prospects

(i) Renewable and Non-renewable Natural Resources

Concept and definition of Natural Resources and need for their management

- Forest resources: Use and over-exploitation, deforestation, case studies, timber extraction, mining, dams and their effects on forests and tribal people.
- *Water resources:* Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems, Water conservation, rain water harvesting, watershed management.
- *Mineral resources:* Uses are exploitation, environmental effects of extracting and using mineral resources, case studies.
- *Food resources:* World food problems, changes causes by agriculture and over-grazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
- *Energy resources:* Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, Urban problems related to energy, case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

[T1], [R3][No. of hrs. 08]

#### **UNIT III: Environmental Chemistry and Pollution Control**

# (i) Chemistry of Environment

(a) Green Technology

Principles of Green technology, Zero Waste Technology, Green Chemistry & Its basic principles, Atom Economy, Green Methodologies. clean development mechanisms (CDM), concept of environmental impact assessment,

(b) Eco-Friendly polymers

Environmental degradation of polymers, Biodegradable, Photo-biodegradable polymers, Hydrolysis & Hydrobiodegradable, Biopolymers & Bioplastics: polylactic acid, polyhydroxybutyrate, polycaprolactone,. Concept of bioremediation.

#### (ii)Environmental Pollution

Definition, types, causes, effects and control measures of (a) Air pollution, (b) Water pollution, (c) Soil pollution, (d) Marine pollution, (e) Noise pollution, (f) Thermal pollution, (g) Nuclear hazards. Pollution case studies. Solid waste and its management: causes, effects and control measures of urban and industrial waste.

Chemical toxicology-Terms related to toxicity, impact of chemicals (Hg, As, Cd, Cr, Pb) on environment.

UNIT IV: Disaster Management, Social Issues, Human Population and the Environment

(i) Disaster Management Disaster management: floods, earthquake, cyclone and land-slides, nuclear accidents and holocaust, *case* studies.

#### (ii) Social Issues, Human Population and the Environment

Sustainable development, Climate change, global warming, acid rain, ozone layer depletion, Environmental ethics: Issues and possible solutions, Consumerism and waste products, , Wasteland reclamation. Population growth, problems of urbanisation.

Environment Protection Act, 1986; Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and Control of Pollution) Act, 1974; Wildlife Protection Act, 1972; Forest Conservation Act, 1980; Environmental management system standards-ISO 14000 series.

[T1][No. of hrs. 08]

#### Text Books:

- [T1] E. Barucha, *Textbook of Environmental Studies for Undergraduate Courses*, Universities Press (India) Pvt. Ltd., 2005.
- [T2] S. Chawla, *A Textbook of Environmental Studies*, McGraw Hill Education Private Limited, 2012 **References Books:**
- [R1] G. T. Miller, *Environmental Science*, Thomas Learning, 2012
- [R2] W. Cunningham and M. A. Cunningham, Principles of Environment Science: Enquiry and Applications, Tata McGraw Hill Publication, N. Delhi, 2003.
- [R3] R. Rajagopalan, *Environmental Studies*: From Crisis to Cure, 2<sup>nd</sup> Edition, Oxford University Press, 2011.
- [R4] A.K. De, *Environmental Chemistry*, New Age Int. Publ. 2012,
- [R5] A. Kaushik and C.P. Kaushik, Perspectives in Environment Studies, 4<sup>th</sup> Edition, New Age International Publishers, 2013
- [R6] Environmental Engineering by Gerard Kiely, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 2010.

UNIVERSIT

# **APPLIED PHYSICS LAB – II**

# Paper Code: ETPH-152 Paper: Applied Physics Lab – II

### P C 2 1

# **LIST OF EXPERIMENTS**

- 1. To determine the e/m ratio of an electron by J.J. Thomson method.
- 2. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave signals from two signal generators.
- 3. To determine the frequency of A.C. mains by using Sonometer.
- 4. To determine the frequency of electrically maintained tuning fork by Melde's method.
- 5. Computer simulation (simple application of Monte Carlo): Brownian motion, charging & discharging of a capacitor.
- 6. To study the charging and discharging of a capacitor and to find out the time constant.
- 7. To study the Hall effect.
- 8. To verify Stefan's law.
- 9. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
- 10. To study the I-V characteristics of Zener diode.
- 11. To find the thermal conductivity of a poor conductor by Lee's disk method.
- 12. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.

## **Suggested Books:**

[T1] C. L. Arora 'B. Sc. Practical Physics' S. Chand, Latest edition.

Note: Any 8-10 experiments out of the list may be chosen. Proper error – analysis must be carried out with all the experiments.



### **Electronic Devices**

#### Paper Code: ETEC-156 Paper: Electronic Devices Lab

# P C 2 1

A

# **LIST OF EXPERIMENTS**

- 1. Introduction to C.R.O, Function Generator Bread Board Kit & to generate different types of waveform with the help of Function Generator & to calculate their frequency, amplitude AC & DC voltage.
  - 2. Identification & testing of Active & passive components
  - 3. To plot V-I characteristics of a semiconductor diode &
  - Calculate Static & Dynamic Resistance 4. To Study the Reverse characteristics of Zener diode
  - 5. To Study the Rectifier circuit.
    - a) Half Wave Rectifier
    - b) Centre Tapped Rectifier.
    - c) Bridge Rectifier.
  - 6. To Study the output waveforms of different Filter Ckts of Rectifier.
  - 7. To Plot Input & Output characteristics CB transistor.
  - 8. To Plot Input & Output characteristics of CE transistor.
  - 9. Realization of basic gates.
  - 10. Implementation of Boolean functions (two or three variables).
- 11. Few experiments mentioned above to be performed on P-spice.
- 12. To develop a working model of any electronic circuit.
- Note:- Any 8-10 Experiments out of the list may be chosen.

#### ENGINEERING MECHANICS LAB

# Paper Code: ETME-158 Paper: Engineering Mechanics Lab

#### LIST OF EXPERIMENTS:

- 1. To verify the law of Force Polygon
- 2. To verify the law of Moments using Parallel Force apparatus. (simply supported type)
- 3. To determine the co-efficient of friction between wood and various surface (like Leather, Wood, Aluminum) on an inclined plane.
- 4. To find the forces in the members of Jib Crane.
- 5. To determine the mechanical advantage, Velocity ratio and efficiency of a screw jack.
- 6. To determine the mechanical advantage, Velocity ratio and Mechanical efficiency of the

Wheel and Axle

- 7. To determine the MA, VR, O of Worm Wheel (2-start)
- 8. Verification of force transmitted by members of given truss.
- 9. To verify the law of moments using Bell crank lever

10. To find CG and moment of Inertia of an irregular body using Computation method.

# Note:- Any 8-10 Experiments out of the list may be chosen.



С

1

Р

2

PROGRAMMING LAB Paper Code : ETCS 154 Paper : Programming Lab	P 2	C 1
LIST OF EXPERIMENTS	-	•
For program development an IDE e.g. CodeBlock <sup>[a]</sup> , Eclipse CDT <sup>[b]</sup> , Netbeans <sup>[c]</sup> is recommended	mended	
<ol> <li>Write a program to find divisor or factorial of a given number.</li> <li>Write a program to find sum of a geometric series</li> </ol>		
3. Write a program for tower of Hanoi problem		
4. Write a recursive program to print the first m Fibonacci number		
5. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices		
Addition of two matrices		
Subtraction of two matrices		
Finding upper and lower triangular matrices Transpose of a matrix		
Product of two matrices.	1	
<ol> <li>Write a program to copy one file to other, use command line arguments.</li> <li>An array of record contains information of managers and workers of a company.</li> </ol>	2	
Print all the data of managers and workers in separate files.	12	
8. Write a program to perform the following operators an Strings without using Stri	ing	
To find the Length of String.	L.	
To concatenate two string.	1 41	
To find Reverse of a string.	11-1-1	
<ul><li>To Copy one sting to another string.</li><li>9. Write a Program to store records of an student in student file. The data must be stated at a must be stated at</li></ul>	tored	
using Binary File.Read the record stored in "Student.txt" file in Binary code.Edi		tored in
Binary File.Append a record in the Student file. 10. Write a programmed to count the no of Lowercase, Uppercase numbers and spec	vial	
Characters presents in the contents of File.	-iai	
11. Two Mini Projects based on the skills learned in experiments 1-10 [ These mini	projects may	be done
in a group not exceeding group size of 4 ] [a] http://www.codeblocks.org/	1	
[b] <u>http://www.eclipse.org/cdt/</u>		
[c] <u>https://netbeans.org/features/cpp/</u> Note:- Any 8-10 Experiments out of the list may be chosen.		
Note:- Any 8-10 Experiments out of the list may be chosen.		
GURU GOBIND SING		
GORO GODIND SING		
INDRAPRASTHA		
INDIALIKASIIIA		
UNIVERSITY		
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#### ENVIRONMENTAL STUDIES LAB

Paper Code – ETEN-160
<b>Paper : Environmental Studies Lab</b>

#### Р С 2 1

# LIST OF EXPERIMENTS

- Determination of pH, conductivity and turbidity in drinking water sample. 1. 2.
  - Determination of pH and conductivity of soil/sludge samples.
- 3. Determination of moisture content of soil sample.
- 4. Determination of Total Dissolved Solids (TDS) of water sample.
- 5. Determination of dissolved oxygen (DO) in the water sample.
- 6. Determination of Biological oxygen demand (BOD) in the water sample.
- 7. Determination of Chemical oxygen demand (COD) in the water sample.
- 8. Determination of Residual Chlorine in the water sample.
- 9. Determination of ammonia in the water sample.
- 10. Determination of carbon dioxide in the water sample.
- 11. Determination of nitrate ions or sulphate ions in water using spectrophotometer.
- Determination of the molecular weight of polystyrene sample using viscometer method. 12.
- 13. Base catalyzed aldol condensation by Green Methodology.
- 14 Acetylation of primary amines using eco-friendly method.
- To determine the concentration of particulate matter in the ambient air using High Volume Sampler. 15.

**<u>P.S.</u>**: For better understanding of various aspects of environment visits to local areas, depending upon easy access and importance may be planned to any nearby river, forest, grassland, hills and students should write a report based on their observations.

#### Suggested Books:

- A. I. Vogel, G. H. Jeffery, Vogel's Text Book of Quantitative Chemical Analysis, Published by Longman Scientific & Technical, 5<sup>th</sup> Edition, 1989. 1.
- 2. dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments).
- S. Chawla, Essentials of Experimental Engineering Chemistry, Dhanpat Rai & Co., 3<sup>rd</sup> Edition, 2008. 3.
- 4. S. Rattan, *Experiments in Applied Chemistry*, Published by S.K.Kataria & Sons, 2<sup>nd</sup> Edition, 2003.
- 5. W. Cunningham and M. A. Cunningham, Principles of Environment Science: Enquiry and Applications, Tata McGraw Hill Publication, N. Delhi, 2003.
- A. Kaushik and C. P. Kaushik, Perspectives in Environment Studies, 4th Edition, New Age 6. International Publishers, 2013.
  - Note:- Any 8-10 Experiments out of the list may be chosen.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

# SCHEME OF EXAMINATION

&

# SYLLABI

for

# Bachelor of Technology Programmes of Studies under the aegis of University School of Information and Communication Technology offered at Affiliated Institutions of the University

(1<sup>st</sup> Year Common Scheme and Syllabus & Scheme of Studies for higher semesters)



# Guru Gobind Singh Indraprastha University Sector

# 16C, Dwarka, Delhi – 110 078 [INDIA] www.ipu.ac.in

# **Programme Outcomes**

- 1. *Engineering Knowledge* (PO01): Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- 2. *Problem Analysis* (PO02): Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.
- 3. *Design/Development of Solutions* (PO03): Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- 4. *Conduct Investigations of Complex Problems* (PO04): Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems:
  - a. that cannot be solved by straightforward application of knowledge, theories and techniques applicable to the engineering discipline as against problems given at the end of chapters in a typical text book that can be solved using simple engineering theories and techniques;
  - b. that may not have a unique solution. For example, a design problem can be solved in many ways and lead to multiple possible solutions;
  - c. that require consideration of appropriate constraints / requirements not explicitly given in the problem statement such as cost, power requirement, durability, product life, etc.;
  - d. which need to be defined (modelled) within appropriate mathematical framework; and
  - e. that often require use of modern computational concepts and tools, for example, in the design of an antenna or a DSP filter.
- 5. *Modern Tool Usage* (PO05): Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.
- 6. *The Engineer and Society* (**PO06**): Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- 7. *Environment and Sustainability* (PO07): Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

- 8. *Ethics* (**PO08**): Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- 9. *Individual and Team Work* (PO09): Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- 10. *Communication* (PO10): Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- 11. *Project Management and Finance* (PO11): Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- 12. *Life-long Learning* (PO12): Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

# Course / Paper Group Codes:

BS: Basic Science

HS: Humanities, social science, management

ES: Engineering Science

MC: Mandatory courses

PC: Programme Core, that is course / paper offered in the discipline of the programme as a compulsory paper.

PCE: Programme Core Elective, that is elective course / paper offered in the discipline of the programme.

EAE/OAE: Emerging Area Elective offered by institutions or open area electives offered in the institution

# Definitions:

Batch: The batch of the student shall mean the year of the first time enrolment of the students in the programme of study in the first semester. Lateral entry students admitted in the  $3^{rd}$  semester /  $2^{nd}$  year shall be designated as students admitted in the previous batch as they are admitted one year later. A student re-admitted in a programme of study in a lower / later batch shall be considered as the student of the original batch for the purpose calculation of duration of study.

Programme of study shall mean Bachelor of Technology.

Major specialization shall mean the discipline in which the student is admitted / upgraded or transferred.

Minor specialization shall mean the specializations earned through the EAE or OAE route subject to fulfilment of requirements specified in the scheme of study for the concerned minor specialization.

# Acronyms:

APC: Academic programme committee comprising of all faculty of the school and as defined in the implementation rules.

L: Number of Lecture hours per week

T/P: Number of Tutorial / Practical Hours per week

C: Number of credits assigned to a course / paper

COE: Controller of Examinations of the Examinations Division of the University.

SGPA/CGPA: Semester/Cumulative Grade Point Average.

NUES: No term end examination shall be held. The evaluation shall be conducted as per the scheme of examinations as described in the scheme of study.

# FIRST YEAR

# **Common Scheme and Syllabus for**

Bachelor of Technology Programmes of Study under the aegis of University School of Information and Communication Technology offered at Affiliated Institutions of the University

		First Semester								
Group	Code	Paper	L	Р	Credits					
Theory P	apers									
		*Any one of the following:								
ES	ES101	Programming in 'C'	3	-	3					
BS	BS103	Applied Chemistry								
BS	BS105	Applied Physics - I	3 -							
		*Any one of the following:								
ES	ES107	Electrical Science	3	-	3					
BS	BS109	Environmental Studies								
BS	BS111	Applied Mathematics - I	4	-	4					
		**Group 1 or Group 2 shall be offered:								
HS	HS113	Group 1: Communications Skills	3	-	3					
		OR								
		Group 2:								
HS	HS115	Indian Constitution	2		2					
HS	HS117	Human Values and Ethics	1		1					
ES	ES119	Manufacturing Process	4	-	4					
Practical	/Viva Voce				<u>.</u>					
BS	BS151	Physics-I Lab	-	2	1					
		Any of the following corresponding to the theory								
		paper offered:								
ES	ES153	Programming in 'C' Lab	-	2	1					
BS	BS155	Applied Chemistry								
ES	ES157	Engineering Graphics-I	-	4	2					
		Any of the following corresponding to the theory								
		paper offered:								
ES	ES159	Electrical Science Lab	-	2	1					
BS	BS161	Environmental Studies Lab								
Total			20	10	25					

\*For a particular batch of a programme of study one out of these two papers shall be taught in the first semester while the other shall be taught in the 2<sup>nd</sup> semester. Students who have to re-appear can only reappear in the odd semester if originally offered to the student in the 1<sup>st</sup> semester and similarly for the students who study the paper in the second semester. The institution shall decide which paper to offer in which semester.

\*\* For a particular batch of a programme of study either the paper on "Communications Skills" (Group 1), or Group 2: papers ("Indian Constitution" and "Human values and ethics") shall be taught in the first semester while the other group shall be taught in the 2<sup>nd</sup> semester. Students who have to re-appear can only reappear in the odd semester if originally offered to the student in the 1<sup>st</sup> semester and similarly for the students who study the paper(s) in the second semester. The institution shall decide which paper group to offer in which semester.

		Second Semester			
Group	Paper	Paper	L	Р	Credits
	Code				
Theory Pa	apers				
		*Any one of the following:			
ES	ES102	Programming in 'C'	3	-	3
BS	BS104	Applied Chemistry			
BS	BS106	Applied Physics - II	3	-	3
		*Any one of the following:			
ES	ES108	Electrical Science	3	-	3
BS	BS110	Environmental Studies			
BS	BS112	Applied Mathematics - II	4	-	4
		**Group 1 or Group 2 shall be offered:			
HS	HS114	Group 1: Communications Skills	3	-	3
		OR			
		Group 2:			
HS	HS116	Indian Constitution	2		2
HS	HS118	Human Values and Ethics	1		1
ES	ES114	Engineering Mechanics	3	-	3
Practical/	Viva Voce				
BS	BS152	Physics-II Lab	-	2	1
		*Any of the following corresponding to the theory			
		paper offered:			
ES	ES154	Programming in 'C' Lab	-	2	1
BS	BS156	Applied Chemistry			
ES	ES158	Engineering Graphics-II	-	2	1
		*Any of the following corresponding to the theory			
		paper offered:			
ES	ES160	Electrical Science Lab	-	2	1
BS	BS162	Environmental Studies Lab			
ES	ES164	Workshop Practice		4	2
Total	•	· ·	19	12	25

\*For a particular batch of a programme of study one out of these two papers shall be taught in the first semester while the other shall be taught in the 2<sup>nd</sup> semester. Students who have to re-appear can only reappear in the odd semester if originally offered to the student in the 1<sup>st</sup> semester and similarly for the students who study the paper in the second semester. The institution shall decide which paper to offer in which semester.

\*\* For a particular batch of a programme of study either the paper on "Communications Skills" (Group 1), or Group 2: papers ("Indian Constitution" and "Human values and ethics") shall be taught in the first semester while the other group shall be taught in the 2<sup>nd</sup> semester. Students who have to re-appear can only reappear in the odd semester if originally offered to the student in the 1<sup>st</sup> semester and similarly for the students who study the paper(s) in the second semester. The institution shall decide which paper group to offer in which semester.

PaperCo	de: ES1	01 / ES1	02	Pa	aper: Pro	ogrammi	ng in 'C'				L	T/P	C
PaperID:					•						3	-	3
Marking	Scheme	:											
1.	Teacher	rs Contin	uous Eva	luation:	25 marks	5							
2.	Term er	nd Theor	y Examin	ations: 7	75 marks								
Instructi													
1. Ther													
2. The										This que	stion	1 shou	ıld be
			answers										
	part from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus.												
	Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to attempt only one of the two questions in the unit. Individual questions may												
											l que	estion	s may
			arts / sub								,		
4. The													. The
			ne questi										
5. The Course C			scientino	.) Calcula		g-lables	/ Uala -	Lables II	iay be sp	ecinedi	rreq	uirea	•
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	'C'.		0		•				0,				
3:			wledge		ising arr	ays, po	inters, f	iles, un	ion and	structu	res	to de	evelop
			programs										
4:			ledge at	out how	/ to appr	roach for	dividing	g a probl	em into	sub-prol	olem	s and	solve
		blem in	ʻC'.										
Course C													
C01:	'Č'.		op simpl.	•				• ·				ent th	em in
CO2:			ment cor										
CO3:			rrays, poi										
CO4:			npose a p		into func	tions an	d synthes	size a co	mplete p	orogram (	using	, divid	le and
			ch in 'C'										
Course C	Jutcome	es (CO) t	o Progra	mme Ou	tcomes	(PO) Map	oping (sc	ale 1: lo	w, 2: Me	edium, 3	: Hig	gh)	
CO/PO	PO01	P002	PO03	P004	PO05	P006	P007	P008	P009	PO10	PO	11	PO12
CO1	3	3	2	1	1	-	-	-	2	1	1	1	3
CO2	3	3	2	1	1	-	-	-	2	1	1	1	3
CO3	3	3	3	1	1	-	-	-	2	1	1	1	3
CO4	3	3	3	1	1	-	-	-	2	1	1	1	3

Introduction to Programming: Computer system, components of a computer system, computing environments, computer languages, creating and running programs, Preprocessor, Compilation process, role of linker, idea of invocation and execution of a programme. Algorithms: Representation using flowcharts, pseudocode.

Introduction to C language: History of C, basic structure of C programs, process of compiling and running a C program, C tokens, keywords, identifiers, constants, strings, special symbols, variables, data types, I/O statements. Interconversion of variables.

Operators and expressions: Operators, arithmetic, relational and logical, assignment operators, increment and decrement operators, bitwise and conditional operators, special operators, operator precedence and associativity, evaluation of expressions, type conversions in expressions. [8Hrs][T2]

# Unit II

Control structures: Decision statements; if and switch statement; Loop control statements: while, for and do while loops, jump statements, break, continue, goto statements.

Arrays: Concepts, One dimensional array, declaration and initialization of one dimensional arrays, two dimensional arrays, initialization and accessing, multi dimensional arrays.

Functions: User defined and built-in Functions, storage classes, Parameter passing in functions, call by value, Passing arrays to functions: idea of call by reference, Recursion.

Strings: Arrays of characters, variable length character strings, inputting character strings, character library functions, string handling functions. [8Hrs] [T2]

Unit III

Pointers: Pointer basics, pointer arithmetic, pointers to pointers, generic pointers, array of pointers, functions returning pointers, Dynamic memory allocation. Pointers to functions. Pointers and Strings

Structures and unions: Structure definition, initialization, accessing structures, nested structures, arrays of structures, structures and functions, self referential structures, unions, typedef, enumerations. File handling: command line arguments, File modes, basic file operations read, write and append. Scope and life of variables, multi-file programming. [8Hrs][T2]

# Unit IV

C99 extensions. 'C' Standard Libraries: stdio.h, stdlib.h, assert.h, math.h, time.h, ctype.h, setjmp.h, string.h, stdarg.h, unistd.h [3Hrs] [T1, R8] Basic Algorithms: Finding Factorial, Fibonacci series, Linear and Binary Searching, Basic Sorting Algorithms-

Basic Algorithms: Finding Factorial, Fibonacci series, Linear and Binary Searching, Basic Sorting Algorithms-Bubble sort, Insertion sort and Selection sort. Find the square root of a number, array order reversal, reversal of a string [7Hrs][T1]

#### Textbooks:

- 1. How to solve it by Computer by R. G. Dromey, Prentice-Hall India EEE Series, 1982.
- 2. The C programming language by B W Kernighan and D M Ritchie, Pearson Education, 1988.

- 1. Programming Logic & Design by Tony Gaddis, Pearson, 2<sup>nd</sup> Ed. 2016.
- 2. Programming Logic and Design by Joyce Farrell, Cengage Learning, 2015.
- 3. Engineering Problem Solving With C by Delores M. Etter, Pearson, 2013.
- 4. Problem Solving and Program Design in C by Jeri R. Hanly and Elliot B. Koffman, Pearson, 2016.
- 5. Structure and Interpretation of Computer Programs by Harold Abelson and Gerald Sussman with Julie Sussman, MIT Press, 1985.
- 6. *How to Design Programs* by Matthias Felleisen, Robert Bruce Findler, Matthew Flatt, and Shriram Krishnamurthi, MIT Press, 2018.
- 7. ANSI/ISO 9899-1990, American National Standard for Programming Languages 'C' by American National Standards Institute, Information Technology Industry Council, 1990 (C89).
- 8. ISO/IEC 9899:1999. International Standard for Programming Languages C (ISO/IEC 9899) by American National Standards Institute, Information Technology Industry Council, 2000 (C99).
- 9. INCITS/ISO/IEC 9899-2011. American National Standard for Programming Languages 'C' by American National Standards Institute, Information Technology Industry Council, 2012 (C11).

PaperCo	de: BS10	3 / BS10	4	Pape	r: Applie	ed Chem	istry				L	T/P	C
PaperID:	99103 /	99104									3	-	3
Marking													
1.	Teachers	Continu	ous Evalı	uation: 2	5 marks								
		d Theory		tions: 75	i marks								
Instruction													
						aminatior							
						entire s							
			•	ed to an	swer any	THREE p	oarts of S	5 marks	each. Th	nis unit w	vill ha	ve a	total
		15 marks											
3. Apart													
						the corr							
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						ould be a					DOOK		
5. The re Course O			nunc) cau	cutators /	log-lable	s / data -	Lables ma	ay be spe	cined if i	equirea.			
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Course O			Program	me Outc	omes (P	0) Manni	ng (scal	e 1: low	2: Mer	lium 3.	High		
CO/PO	PO01	PO02	PO03	P004	PO05	PO06	PO07	PO08	, 2. mee PO09	PO10	PO1	1	PO12
CO1	2	2	3	3	2	-	-	-	1	1	-		1
CO2	2	2	3	3	2	-	-	-	1	1	-		1
CO3	2	2	3	3	2	-	-	-	1	1	-		1
CO4	2	2	3	3	2	1	1	-	1	1	-		1

Fuels: Classification and Characteristics of fuels, Calorific values, Comparison between solid, liquid and gaseous fuels, calorimeter, Calorific value of fuel, Theoretical calculation of calorific value of a fuel, Types of fuels: Solid (coal), Liquid (Petroleum products, refining, cracking, synthetic petrol, Knocking and rating), Gaseous (Natural, CNG, LPG, Coal gas, Oil gas, Producer Gas, Water gas), Non-Conventional sources of energy. Water treatment: Introduction, Hardness of water, Disadvantages of hard water, Water usage in Industries, boiler problems with hard water, Water-softening, Drinking Water, Desalination, Defluoridation, Waster Water Management, Chemical Analysis of Water, and corrosion (effect, type, mechanism, control). [9Hrs] [T1]

# Unit II

Phase rule: Phase diagram, Water System, Sulphur System, Two Component System (Pb-Ag, Zn-Mg, Fe-C), Metalals, Alloys, Heat treatment of steel.

Polymers: Classification, functionality, Mechanism of Polymerization, Molecular weight of Polymers, Plastics, Rubbers, Fibres, Specialty Polymers, Degradation of Polymers, Polymer Composites, Adhesives.

Lubricants: Functions, Mechanism of lubrication, classification, synthetic and natural lubricants, lubricating emulsions, properties, selection on the basis of usage. [9Hrs][T1, T2]

# Unit III

Spectroscopic Techniques: Basic principles of spectroscopic methods. Electronic (UV-Visible) spectroscopy, IR spectroscopy, Rotational and Vibrational-Rotational Spectroscopy of diatomic molecules, NMR, Raman Spectroscopy. [T1,T2]

Thermodynamics: The laws (zeroth, 1<sup>st</sup> and 2<sup>nd</sup>), Heat Capacity, Ideal Gases and Thermodynamic processes (isothermal, adiabatic), laws of thermochemistry, Kichhoff's eqs., Joule-Thomson effect, Entropy and its usage in thermodynamic systems, Gibbs - Helmholtz equation, Claypeyron - Clausius eq., Maxwell's relations, spontaneity and equilibrium. [9Hrs][T2]

Green Chemistry: Principles, Biofuels, Innocuous Reagents, Alternative Solvents, Design of safer chemicals, minimizing energy consumption.

Nanochemistry: Properties, Synthesis and characterization of Nanomaterials, Applications.

Chemical Aspects of Biotechnology: Biocatalysts or Enzymes, Fermentation, Outline of fermentation process. [9Hrs][T2]

# Textbooks:

- 1. Applied Chemistry by Achyutananda Acharya and Biswajit Samantray, Pearson, 2017.
- 2. Engineering Chemistry: Fundamentals and Applications by Shikha Agarwal, Cambridge University Press, 2019.

- 1. Applied Chemistry: A Textbook of Engineers and Technologists by O. V. Roussk and H. D. Gesser, Springer, 2013.
- 2. Engineering Chemistry by Raghupati Mukhopadhyay and Sriparna Datta, New Age Int. (P0 Ltd., 2007.
- 3. Engineering Chemistry by K. Shesha Maheswaramma and Mridula Chugh, Pearson, 2017.
- 4. Basic Engineering Chemistry by S.S. Dara, A. K.Singh, and Abhilasha Asthana, S. Cand and Co., 2012.
- 5. Engineering Chemistry by K. N. Jayaveera, G.V. Subba Reddy, and C. Ramachandraiah, McGraw Hill, 2016.
- 6. Engineering Chemistry by O. G. Palanna, McGraw-Hill, 2017.
- 7. Textbook of Engineering Chemistry by Jaya Shree Anireddy, Wiley, 2017.
- 8. Engineering Chemistry by E.R. Nagarajan and S. Ramalingam, Wiley, 2017.

	ode: BS1	05	Paper	: Applied	d Physics	5 - I					L	T/P	C
PaperID	: 99105										3	-	3
Marking	Scheme	:											
1.	Teacher	rs Contin	uous Eva	luation:	25 marks	5							
2.	Term er	nd Theor	y Examin	ations: 7	75 marks								
Instruct	ion for p	oaper set	ter:										
		be 9 quest											
	The first (1 <sup>st</sup> ) question should be compulsory and cover the entire syllabus. This question should be objective, single												
	line answers or short answer type question of total 15 marks.												
	Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus. Every unit shall have two questions covering the corresponding unit of the syllabus. However, the student shall be asked to												
										sub-part			
						annauac	questions	may conc	un upto s	sub part	3730	ib que	scions.
	ach Unit shall have a marks weightage of 15. he questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level												
	of the questions to be asked should be at the level of the prescribed textbook.												
		ent of (sci								required.			
Course	Objectiv	es:			-					-			
1:	To und	erstand t	hermody	namic p	rinciples	•							
2:	To und	erstand a	and mode	el oscillat	tions anc	l waves.							
3:	To und	erstand a	and mode	el interfe	erence, d	liffractio	n and po	larizatio	n phenor	nenon.			
4:	To und	erstand a	and appre	eciate re	lativistic	systems	and Las	ers.					
Course	Outcome	es (CO):											
C01:	Ability	to apply	thermod	ynamic p	orinciple	s to solut	tion of er	ngineerir	ng proble	ms.			
CO2:		to under						•	•				
CO3:	Ability	to under	stand an	d model	interfere	ence, dif	fraction	and pola	rization	phenome	enon.		
C04:		to under											
										dium, 3:	High	ו	
CO/PO	PO01	<b>P</b> O02	PO03	P004	PO05	PO06	P007	PO08	PO09	PO10	PÕ		PO12
CO1	2	2	3	3	2	-	-	-	1	1	-		2
CO2	2	2	3	3	2	-	-	-	1	1	-		2
CO3	2	2	3	3	2	-	-	-	1	1	-		2
CO4	2	2	3	3	2	-	-	-	1	1	-		2

Introduction to Thermodynamics: Fundamental Ideas of Thermodynamics, The Continuum Model, The Concept of a "System", "State", "Equilibrium", "Process". Equations of state, Heat, Zeroth Law of Thermodynamics, Work, first and second laws of thermodynamics, entropy [8Hrs]

# Unit II

Waves and Oscillations: Wave motion, simple harmonic motion, wave equation, superposition principle. Introduction to Electromagnetic Theory: Maxwell's equations. work done by the electromagnetic field, Poynting's theorem, Momentum, Angular momentum in electromagnetic fields, Electromagnetic waves: the wave equation, plane electromagnetic waves, energy carried by electromagnetic waves [8Hrs]

# Unit III

Interference: Interference by division of wave front (Young's double slit experiment, Fresnel's biprism), interference by division of amplitude (thin films, Newton's rings, Michelson's interferometer), Coherence and coherent sources

Diffraction: Fraunhofer and Fresnel diffraction; Fraunhofer diffraction for Single slit, double slit, and N-slit (diffraction grating), Fraunhofer diffraction from a circular aperture, resolving power and dispersive power of a grating, Rayleigh criterion, resolving power of optical instruments

Polarization: Introduction to polarization, Brewster's law, Malu's law, Nicol prism, double refraction, quarterwave and half-wave plates, optical activity, specific rotation, Laurent half shade polarimeter. [12Hrs]

#### Unit IV

Theory of relativity: The Michelson-Morley Experiment and the speed of light; Absolute and Inertial frames of reference, Galilean transformations, the postulates of the special theory of relativity, Lorentz transformations, time dilation, length contraction, velocity addition, mass energy equivalence. Invariance of Maxwell's equations under Lorentz Transformation.

Introduction to Laser Physics: Introduction, coherence, Einstein A and B coefficients, population inversion, basic principle and operation of a laser, the He-Ne laser and the Ruby laser

[12Hrs]

# Textbooks:

- 1. Concepts of Modern Physics (SIE) by Arthur Beiser, Shobhit Mahajan, and S. Rai Choudhury, McGraw-Hill, 2017.
- 2. Physics for Scientists and Engineers by Raymond A. Serway and John W. Jewett, 9th Edition, Cengage, 2017

- Modern Physics by Kenneth S. Krane, Wiley, 2020.
   Principles of Physics by Robert Resnick, Jearl Walker and David Halliday, Wiley, 2015.
   Optics by Ajoy Ghatak, McGraw Hill, 2020.

PaperC	ode: ES1	07 / ES1	08	Pape	r: Electr	ical Scie	nce				L	T/P	С
	D: 19910		08								3	-	3
	g Scheme												
1.	Teache	rs Contin	uous Eva	luation:	25 marks	5							
	Term ei		/	ations: 7	75 marks								
	tion for p												
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	first (1 <sup>s</sup>									This que	stion	shoul	d be
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	requiren												
	Objectiv		SCIEITUITU			g-lables	/ uala -	lables II	iay be sp	ecineu i	riequ	ineu.	
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	Outcome		KIIOWICU	ige abou		at mach	incs.						
C01:			stand an	d uso Kir	choff's l	aws to s	olvo rosi	stive cire	uit prob	loms			
CO1:	Ability	to anal	yse resis	tivo in	ductive	and car	acitive	circuits	for tran	ciont an	d ste	vhee	stato
C02.		dal solut		scive, in	uuctive	and cap		circuits		siene an	u ste	auy	state
CO3:			first ord	er filters	and ma	onetic ci	rcuits						
CO4:			design o				icuits.						
	Outcome	es (CO to	Program	nme Out	comes (	PO) Man	ping (sca	le 1: lov	v. 2: Me	dium. 3:	High		
CO/PO	PO01	PO02	PO03	P004	PO05	PO06	PO07	PO08	PO09	PO10	PO1		2012
C01	3	3	3	3	3	-	-	-	1	1	1		2
CO2	3	3	3	3	3	-	-	-	1	1	1		2
001									1				
CO3	3	3	3	3	3	-	-	-	1	1	1		2

# Unit - I

DC Circuits: Passive circuit components, Basic laws of Electrical Engineering, Temperature Resistance Coefficients. voltage and current sources, Series and parallel circuits, power and energy, Kirchhoff's Laws, Nodal & Mesh Analysis, delta-star transformation, superposition theorem, Thevenin's theorem, Norton's theorem, maximum power transfer theorem. Time domain analysis of first Order RC & LC circuits.

[9Hrs] [T1]

# Unit - II

AC Circuits: Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, RL, RC, RLC combinations (series and parallel), resonance. Three phase balanced circuits, voltage and current relations in star and delta connections.

[9Hrs] [T1]

# Unit - III

D. C. Generators & Motors: Principle of operation of Generators & Motors, Speed Control of shunt motors, Flux control, Rheostatic control, voltage control, Speed control of series motors.

A. C. Generators & Motors: Principle of operation, Revolving Magnetic field, Squirrel cage and phase wound rotor, Starting of Induction motors, Direct on line and Star Delta starters, Synchronous machines. [9Hrs [T1]]

# Unit - IV:

Transformers: Construction and principle of operation, equivalent circuit, losses in transformers, regulation and efficiency. Auto-transformer and three-phase transformer connections.

Measuring Instruments: Electromagnetism, Different Torques in Indicating instruments, Moving Iron Instruments: Construction & Principle, Attraction and Repulsion type; Moving Coil instruments: Permanent Magnet type; Dynamometer type Instruments.

[9Hrs] [T1]

# Textbooks:

1. Electrical Engineering Fundamentals by Vincent Del Toro, PHI (India), 1989

# **References:**

1. An Introduction to Electrical Science by Adrian Waygood, Routledge, 2<sup>nd</sup> Ed. 2019.

2. Electrical Circuit Theory and Technology by John Bird, Elsevier, 2007.

- 3. Principles and Applications of Electrical Engineering by Giorgio Rizzoni, MacGraw-Hill, 2007.
- Electrical Engineering by Allan R. Hambley, Prentice-Hall, 2011.
   Hughes Electical & Electronic Technology by Edward Hughes revised by Hohn Wiley, Keith Brown and Ian Hughes Electrical a Electronic Technology by Edward Hughes Tevised by Holm V McKenzie Smith, Pearson, 2016.
   Electrical and Electronics Technology by E. Hughes, Pearson, 2010.
   Basic Electrical Engineering by D.C. Kulshrestha, McGraw-Hill, 2009.
   Basic Electrical Engineering by D. P. Kothai and I.J. Nagrath, McGraw-Hill, 2010.

PaperCo	ode: BS1	09 / BS1	10	Paper: E	nvironm	ental Stu	udies				L	Р	С
	: 99109			-							3	-	3
Marking	Scheme	:											
			uous Eva										
2.	2. Term end Theory Examinations: 75 marks												
	struction for paper setter:												
	There should be 9 questions in the term end examinations question paper.												
	ie first (1 $^{ m st}$ ) question should be compulsory and cover the entire syllabus. This question should be										uld be		
	ective, single line answers or short answer type question of total 15 marks.												
	art from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus												
	ery unit shall have two questions covering the corresponding unit of the syllabus. However, the												
			ed to att								l que	stion	s may
			arts / sub										
			be frame										
			scientific	c) calcula	ators / lo	g-tables	/ data -	tables m	hay be sp	ecified i	t requ	ured	•
	Objectiv						6.1						
1:	The course is designed to impart basic knowledge of the environment and its components. The course deals in creating awareness about the energy resources and current environmental												
2:					wareness	about t	he ener	gy resou	rces and	current	env	ironn	nental
2			by the v		•								6
3:			and learn	i about e	nvironme	ent pollu	tion, rela	ated case	e studies	and mea	asure	s tak	en for
4.		to pollu											
4:			and explo	ore diffe	rent app	roacnes	of conse	rving and	i protect	ing envi	ronme	ent f	or the
Course		of socie	ty.										
	Outcome		·		ال معمية ما								
CO1:			Studies c						ina know	ledge at	bout t	.ne v	arious
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CO3:			ronmenta										ط برما م
CO3:			them t					cies and	protocol	s, social	issue	es an	a role
CO4:			servatio will he					1 ability	of unde	retandia	a	iron	mont
C04:		, course relations		ip stude		evelop s	okills and	ability		rstandin	g en	non	ment-
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CO/PO	PO01	PO02	Program PO03	PO04	PO05	PO)) Maj PO06	PO07		PO09	PO10			PO12
C0/P0	-	1	1	-	-	3	3	2	1	1	1	1	1
CO1	-	1	1	-	-	3	3	2	1	1	1		1
CO2 CO3	-	1	1		-	3	3	2	1	1	1		1
CO3	-	1	1	-	-	3	3	2	1	1	1		1
CU4	-	I	I	-	-	3	3	Ζ	I	I			I

Fundamentals: The Multidisciplinary nature of environmental studies: Definition, components, scope and importance, need for public awareness; Natural Resources.

Ecosystems: Concept, Structure and function of an ecosystem, Types, Functional Components, Different ecosystems, biogeochemical cycles.

Biodiversity: Introduction to biodiversity, biogeographical classification, India as a mega diversity nation, endangered and endemic species of India, threats to biodiversity and conservation of biodiversity. Bioprospecting and Biopiracy.

[10Hrs] [T1,T2]

# Unit III

Environmental Pollution: (a) Air Pollution: Source, Types, effects on biosphere and Meterology, Air Quality, Control. (b) Water Pollution: Types and Sources. (c) Soil Pollution: Types and Control. (d) Noise Pollution: Effect, Control (e) Thermal Pollution. (f) Radiation Pollution (g) Solid waste Management, (h) Pollution Prevention, (i) Disaster Management [10Hrs][T1,T2]

# Unit III

Social Issues and Environment: Concept of Sustainable Development; Urban problem related to energy; Water Conservation; Wasteland reclamation; Resettlement and Rehabilitation; Climate Change; Nuclear Accidents; Consumerism and Waste Products; Laws related to Environment, Pollution, Forest and Wild life; Environmental Impact Assessment. [8Hrs] [T1,T2]

# Unit IV

Human Population and Environment: Population Growth, Human Rights, Family Welfare Programmes, Environment and Human Health, HIV/AIDS, Women and Child Welfare, Role of IT. [8Hrs] [T1,T2]

# Textbooks:

- 1. Environmental Studies by Anindita Basak, Pearson, 2009.
- 2. Environmental Studies: Simplified by Benny Joseph, McGraw-Hill, 2017.

- 1. Environmental Studies by D. L. Manjunath, Pearson, 2007.
- 2. Environmental Studies by Anil Kumar De and Arnab Kumar De, New Age Int. (P) Ltd, Publishers, 2005.
- 3. Companion to Environmental Studies edited by Coel Castree, Mike Hulme, and James D. Proctor, Routledge, 2018.
- 4. Environmental Studies by Deepa Sharma and Bhupendra Singh Chabbra, New Age Int. (P) Ltd, Publishers, 2007.
- 5. Environmental Studies: Simplified by Raj Kumar Singh, McGraw-Hill, 2012.
- 6. Basics of Environmental Studies by U. K. Khare, McGraw-Hill, 2014.

	ode: BS1	11	Paper	: Applied	d Mather	natics -					L	T/P	C
PaperID	: 99111										4	•	4
Marking	Scheme	:											
1.	Teache	rs Contin	uous Eva	luation:	25 marks	5							
2.	Term ei	nd Theor	y Examir	nations: 7	75 marks								
	ion for p												
	nere should be 9 questions in the term end examinations question paper.												
	e first (1 <sup>st</sup> ) question should be compulsory and cover the entire syllabus. This question should be											id be	
	objective, single line answers or short answer type question of total 15 marks.												
	Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus												
	Every unit shall have two questions covering the corresponding unit of the syllabus. However, the												
									e unit. Ir		l que	estions	may
	contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.												
	The questions are to be framed keeping in view the learning outcomes of the course / paper. The standard / level of the questions to be asked should be at the level of the prescribed textbook.												
			scientific	c) calcula	ators / lo	g-tables	/ data -	tables n	nay be spe	ecified i	t req	uired.	
	Objectiv									<u> </u>			
1:			use ser	ies, diff	erential	and inte	egral me	ethods t	o solve 1	rormulat	ted e	engine	ering
2.	probler							. <b>f</b> a waa u la					
2:									ted engi		prob	lems.	
3: 4:									oroblems.				
			use vecto	or calcult	is to solv	e tormu	ated eng	gineering	problem	s.			
	Outcome	. ,		(									
C01:									mulated o				ms.
CO2: CO3:									engineerii	ng probl	ems.		
CO3:			near alge										
			ector cal						w, 2: Mec	11	ارونا		
CO/PO	PO01	PO02	Program PO03	nme Out PO04	PO05	PO) map PO06	PING (SCa	PO08	v, 2: med PO09	PO10	PO		PO12
C0/P0	2	3	3	3	1	-	P007	P008	-	-	1		2
C01	2	3	3	3	1	-	-	-	-	-	2		2
CO2 CO3	2	3	3	3	1	-	-	-	-	-	2		2
CO3	2	3	3	3	1	-		-	-	-	2		2
CU4	۷.	3	3	3	1	-	-	-	-	-	Ζ	4	۷

Partial derivatives, Chain rule, Differentiation of Implicit functions, Exact differentials. Maxima, Minima and saddle points, Method of Lagrange multipliers. Differentiation under Integral sign, Jacobians and transformations of coordinates.

# [8Hrs][T2]

# Unit II

Ordinary Differential Equations (ODEs): Basic Concepts. Geometric Meaning of y' = f(x, y). Direction Fields, Euler's Method, Separable ODEs. Exact ODEs. Integrating Factors, Linear ODEs. Bernoulli Equation. Population Dynamics, Orthogonal Trajectories. Homogeneous Linear ODEs with Constant Coefficients. Differential Operators. Modeling of Free Oscillations of a Mass-Spring System, Euler-Cauchy Equations. Wronskian, Nonhomogeneous ODEs, Solution by Variation of Parameters.

Power Series Method for solution of ODEs: Legendre's Equation. Legendre Polynomials, Bessel's Equation, Bessels's functions Jn(x) and Yn(x). Gamma Function [12Hrs][T1]

# Unit III

Linear Algebra: Matrices and Determinants, Gauss Elimination, Linear Independence. Rank of a Matrix. Vector Space. Solutions of Linear Systems and concept of Existence, Uniqueness, Determinants. Cramer's Rule, Gauss-Jordan Elimination. The Matrix Eigenvalue Problem.

Determining Eigenvalues and Eigenvectors, Symmetric, Skew-Symmetric, and Orthogonal Matrices. Eigenbases. Diagonalization. Quadratic Forms. Cayley - Hamilton Theorem (without proof) [10Hrs][T1]

#### Unit IV

Vector Calculus: Vector and Scalar Functions and Their Fields. Derivatives, Curves. Arc Length. Curvature. Torsion, Gradient of a Scalar Field. Directional Derivative, Divergence of a Vector Field, Curl of a Vector Field, Line Integrals, Path Independence of Line Integrals, Double Integrals, Green's Theorem in the Plane, Surfaces for Surface Integrals, Surface Integrals, Triple Integrals, Stokes Theorem. Divergence Theorem of Gauss.

[10Hrs][T1]

# Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley, 10<sup>th</sup> Ed., 2011.

2. Mathematical Methods for Physics and Engineering, by K. F. Riley, M. P. Hobson and S. J. Bence, CUP, 2013. (for Unit I)

- 1. Engineering Mathematics by K.A. Stroud with Dexter J. Booth, Macmillan, 2020.
- 2. Advanced Engineering Mathematics by Larry Turyn, Taylor and Francis, 2014.
- Advanced Engineering Mathematics by Dennis G. Zill, Jones & Bartlett Learning, 2018.
   Advanced Engineering Mathematics with MATLAB by Dean G. Duffy, Taylor and Francis, 2017.
- 5. Advanced Engineering Mathematics by Merle C. Potter, Jack L. Lessing, and Edward F. Aboufadel, Springer (Switzerland), 2019.

PaperCode: HS113 / HS11	4 Paper:	Communi	cations S	Skills				L	T/P	C		
PaperID: 98113 / 98114								3	-	3		
Marking Scheme:												
3. Teachers Continue	3. Teachers Continuous Evaluation: 25 marks											
4. Term end Theory	Examinations:	75 marks										
Instruction for paper sette												
	here should be 9 questions in the term end examinations question paper.											
	e first (1 <sup>st</sup> ) question should be compulsory and cover the entire syllabus. This question should be											
	bjective, single line answers or short answer type question of total 15 marks.											
	Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus.											
Every unit shall have												
student shall be asked								lque	stions	may		
	ntain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.											
	ne questions are to be framed keeping in view the learning outcomes of the course / paper. The											
	standard / level of the questions to be asked should be at the level of the prescribed textbook.											
Course Objectives:												
	To understand the communication system paradigm.											
2: To understand ho		ocabulary	can be	increased	d and di	ference	betweer	n Indi	an, Bi	ritish		
and American Eng	,											
3: To understand ho				make a s	speech.							
4: To improve gram	mar and senter	nce struct	ure.									
Course Outcomes (CO):												
CO1: Ability to Commu												
CO2: Ability to learn ne					British a	nd Amerio	can Engl	ish.				
CO3: Ability to write bu				es.								
CO4: Improved gramma												
Course Outcomes (CO to P												
	PO03 PO04	P005	P006	P007	P008	PO09	PO10	PO1	1 F	PO12		
CO1		-	-	-	-	3	3	-		3		
CO2		-	-	-	-	3	3	-		3		
CO3		-	-	-	-	3	3	-		3		
CO4		-	-	-	-	3	3	-		3		

Role and Importance of Communications, Attributes of Communications, Verbal and Non-Verbal Communications, Verbal Communications Skills, Non-verbal Communication Methods, Body Language, Barriers to Communications, Socio-psychological barriers, Inter-Cultural barriers, Overcoming barriers, Communication Mediums: Characterization and Choice of medium, Effective Communication: Correctness, Clarity, Conciseness, Courtesy, Group Communication: Meetings (types, purpose), Group Discussions, Conduct of Meeting, Participant Role, Making Presentations.

[8Hrs][T1]

# Unit II

Spoken and Written English: Attributes of spoken and written communication, Formal & Informal Communication, Variation in between Indian, British and American English. Etiquette and Manners: Personal Behaviour, Greetings, Introductions, Telephone Etiquette. Vocabulary Development: Dictionaries and Thesaurus, Words often confused, generally used one word substitutions, Comprehension.

[8Hrs][T1]

#### Unit III

Letter writing: Planning the message, Planning Content, Structure, Language use, Layout, enquires and replies, asking for or giving quotations, Bargaining letters, Seller's reply, etc.; Complaints and Replies; Memos, Circulars and notices;

Papragraph Writing, Writing Scientific and Technical Reports: Types, Structure, Drafting and Delivering a Speech: Understanding the Environment, Understanding the Audience, Text preparing, Composition, Practicing, Commemorative Speeches, Welcome and Introduction, Farewell and Send-offs, Condolence [8Hrs][T1]

# Unit IV

Articles: Indefinite, Definite; Tenses: Present, Past, Future, Perfect (Present, Past and Future), Tenses in conditional sentences; Active and Passive Voice: Formation, conversion; Direct and Indirect Speech, Degrees of Comparison, Common errors, Concepts of Learning and Listening [8Hrs][T1]

# Textbooks:

1. English Language Communication Skills by Urmilla Rai, Himalaya Publishing House, 10<sup>th</sup> Ed., 2010.

- 1. Technical Communication: Principles and Practice by Meenakshi Raman and Sangeeta Sharma, Oxford University Press, 2015.
- 2. Communication Skills for Engineers by C. Muralikrishna and Sunita Mishra, Pearson, 2011.
- Effective Technical Communication by M. Ashraf Rizvi, McGraw-Hill, 2018.
   Business Communication: Skills, Concepts, and Applications by P.D. Chaturvedi and Mukesh Chaturvedi, Pearson, 2013.
- 5. Business Correspondence and Report Writing by R.C. Sharma and Krishan Mohan, McGraw-Hill, 2016.
- 6. English for Technical Communications by Aysha Viswamohan, Tata McGraw-Hill, 2008.

PaperCo	de: HS1	15 / HS1	16	Paper: Ir	ndian Co	nstitutio	n				L	T/P	C
PaperID	98115	/ 99116									2	-	2
Marking	Scheme	:											
1.	1. Teachers Continuous Evaluation: 25 marks												
	2. Term end Theory Examinations: 75 marks												
	3. This is an NUES paper, hence all examinations to be conducted by the concerned teacher.												
Instruction for paper setter (Maximum Marks for Term End Examinations: 75):													
	1. There should be 9 questions in the term end examinations question paper.												
	2. The first (1 <sup>st</sup> ) question should be compulsory and cover the entire syllabus. This question should be										d be		
	objective, single line answers or short answer type question of total 15 marks. 3. Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus.												
	Every unit shall have two questions covering the corresponding unit of the syllabus. However, the												
	student shall be asked to attempt only one of the two questions in the unit. Individual questions may												
	contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15. 4. The questions are to be framed keeping in view the learning outcomes of the course / paper.												
Course (				а кеерп	ig ili vie	w the lea	arning ou	icomes		urse / p	aper.		
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2:										and er	chrin	od in	the
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Course (			india										
C01:		<u>, ,</u>	institutio	nal mec	hanism	and fund	lamental	values	enshrine	d in the	Cons	titutio	on of
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CO2:		erstand t	he inter	relation	betweer	n Centre	and Stat	e Gover	nment				
	To und	erstand F	undame	ntal Rig	hts and [	Duties							
CO4:							cial syste	ems in th	e countr	v.			
Course (											High	1	
CO/PO	PO01	PO02	POOJ	P004	,	/	PO07		PO09	PO10	PO		012
CO1	-	-	-	-	-	3	-	2	-	-	-		1
CO2	-	-	-	-	-	3	-	2	-	-	-		1
CO3	-	-	-	-	-	3	-	2	-	-	-		1
CO4	-	-	-	-	-	3	-	2	-	-	-		1

Introduction to Constitution of India: Definition, Source and Framing of the Constitution of India. Salient Features of the Indian Constitution. Preamble of the Constitution.

[6Hrs]

# Unit II

Fundamental Rights and Duties: Rights To Equality (Article 14-18). Rights to Freedom (Article 19-22). Right against Exploitation (Article 23-24). Rights to Religion and Cultural and Educational Rights of Minorities (Article 25-30). The Directive Principles of State Policy - Its significance and application. Fundamental Duties - Necessary obligations and its nature, legal status and significance

[6Hrs]

# Unit III

Executives and Judiciary: Office of President, Vice President and Governor: Power and Functions, Parliament, Emergency Provisions-, President Rule; Union Judiciary: Appointment of Judges, Jurisdiction of the Supreme Court, State Judiciary: Power and functions, Writ Jurisdiction [6Hrs]

# Unit IV

Centre- States Relation: Is Indian Constitution Federal in Nature, Legislative relations between Union and States, Administrative Relations between Union and States, Financial Relations between Union and States [6Hrs]

# Textbooks:

- 1. Constitutional Law of India by J.N Pandey, Central Law Publication, 2018.
- 2. Introduction to the Indian Constitution of India by D.D. Basu, PHI, New Delhi, 2021
- 3. The Constitution of India by P.M. Bakshi, Universal Law Publishing Co., 2020.

- 1. Indian Constitutional Law by M.P. Jain, Lexis Nexis, 2013
- 2. Constitution of India by V.N. Shukla, Eastern Book Agency, 2014

PaperCo	ode: HS1	17 / HS1	18 Pa	aper: Hu	man Val	ues and	Ethics				L	Ρ	C
PaperID	: 98117	/ 99118									1	-	1
Marking	Scheme	:											
1.	Teacher	rs Contin	uous Eva	luation:	25 marks	5							
2.	Term er	nd Theory	y Examin	nations: 7	75 marks								
3.	This is a	an NUES j	paper, th	ne exami	nations a	are to be	conduct	ed by the	e concer	ned teac	her.		
	nstruction for paper setter:												
	There should be 9 questions in the term end examinations question paper.												
	The first (1 <sup>st</sup> ) question should be compulsory and cover the entire syllabus. This question should be										ld be		
	bjective, single line answers or short answer type question of total 15 marks.												
	part from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the syllabus.												
	y unit s												
	ent shall										l que	stion	s may
	ain upto												
	4. The questions are to be framed keeping in view the learning outcomes of the course / paper.												
	Objectiv												
1:		student									S		
2:	To make students aware of the impact of taking non-ethical engineering decisions. To understand that mind and desire control is needed for being ethical.												
3:													
4:		lerstand	organiza	ational c	ulture a	ind to a	dapt to	varying	cultures	without	t con	npror	nising
	ethical												
	Outcome												
C01:		the imp								1 11			<i>.</i>
CO2:		tand that					ake a pe	erson une	ethical a	nd restle	ess, w	hile	fewer
603		lead to p						1/					
CO3:		different			nvolved	in uneth	ical prac	tices. Kr	now vari	ous mear	ns of	prot	esting
<b>CO</b> 4:		unethica						. 121. a. h. ad			4	•	
CO4:		the bene				ietnical	practices	s like dri	bery, exi	cortion, r	repot	ısm,	nexus
		en politic						la 4. I			Lint		
	Outcome	es (CO to PO02					ping (sca PO07		•	•			0012
CO/PO	PO01	P002	PO03	P004	P005	P006	PUU7	P008	PO09	PO10	P01	1	PO12
CO1	-	-	-	-	-	3	-	3	1	1	-		1
CO2 CO3	-	-	-	-	-	3	-	3	1	1	-		1
CO3	-	-	-	-	-	3	-	3	1	1	-		1
CU4	-	-	-	-	-	3	-	3	I		-		1

Human Values: Morals, Values, Ethics, Integrity, Work ethics, Service learning, Virtues, Respect for others, Living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Selfconfidence, Challenges in the work place, Spirituality [3Hrs]

# Unit II

Engineering Ethics: Senses of engineering ethics, Variety of moral issues, Types of inquiries, Moral dilemma, Moral autonomy, Moral development (theories), Consensus and controversy, Profession, Models of professional roles, Responsibility, Theories about right action (Ethical theories), Self-control, Self-interest, Customs, Religion, Self-respect, Case study: Choice of the theory

Engineering as experimentation, Engineers as responsible experimenters, Codes of ethics, Industrial standards, A balanced outlook on law, Case study: The challenger [3Hrs]

# Unit III

Safety definition, Safety and risk, Risk analysis, Assessment of safety and risk, Safe exit, Risk-benefit analysis Sefety lessons from 'the challenger', Case study: Power plants, Collegiality and loyalty, Collective bargaining, Confidentiality, Conflict of interests, Occupational crime, Human rights, Employee rights, Whistle blowing, Intellectual property rights. [4Hrs]

# Unit IV

Globalization, Multinational corporations, Environmental ethics, Computer ethics, Weapons development, Engineers as managers, Consulting engineers, Engineers as expert witness, Engineers as advisors in planning and policy making, Moral leadership, Codes of ethics, Engineering council of India, Codes of ethics in Business Organizations [3Hrs]

# Textbooks:

1. A Textbook on Professional Ethics and Human Values, by R. S. Naagarazan, New Age Publishers, 2006.

- 1. Professional Ethics and Human Values by D. R. Kiran, McGraw-Hill, 2014.
- 2. Engineering Ethics, by Charles E Harris and Micheal J Rabins, Cengage Learning Pub., 2012.
- 3. Ethics in Engineering, Mike Martin and Roland Schinzinger, McGraw Hill Pub., 2017.
- 4. Unwritten laws of Ethics and Change in Engineering by The America Society of Mechanical Engineers, 2015.
- 5. Engineering Ethics by Charles B. Fleddermann, Pearson, 2014.
- 6. Introduction to Engineering Ethics by Mike W. Martin and Roland Schinzinger, McGraw-Hill, 2010.
- 7. Engineering Ethics: Concept and Cases by Charles E. Harris, Michael S. Pritchard and Michael J.Rabins, Cengage, 2009.
- 8. Ethics in Engineering Practice and Research by Caroline Whitbeck, Cambridge University Press, 2007.

CO1         2         1         1         2         -         -         -         1         1           CO2         2         1         1         1         2         -         -         -         1         1           CO3         2         1         1         1         2         -         -         -         1         1		ode: ES1		Paper	: Manufa	cturing	Process					L	T/P	С
<ol> <li>Teachers Continuous Evaluation: 25 marks</li> <li>Term end Theory Examinations: 75 marks</li> <li>Instruction for paper setter:         <ul> <li>There should be 9 questions in the term end examinations question paper.</li> <li>The first (1<sup>st</sup>) question should be compulsory and cover the entire syllabus. This question should objective, single line answers or short answer type question of total 15 marks.</li> <li>Apart from question 1 which is compulsory, rest of the paper shall consist of 4 units as per the sylla Every unit shall have two questions covering the corresponding unit of the syllabus. However, student shall be asked to attempt only one of the two questions in the unit. Individual questions contain upto 5 sub-parts / sub-questions. Each Unit shall have a marks weightage of 15.</li> <li>The questions are to be framed keeping in view the learning outcomes of the course / paper. standard / level of the questions to be asked should be at the level of the prescribed textbook.</li> <li>The requirement of (scientific) calculators / log-tables / data - tables may be specified if required.</li> </ul> </li> <li>Course Objectives:         <ul> <li>The students will have understanding of joining processes.</li> <li>The students will have understanding of forging and sheet metal works.</li> <li>The students will have basic idea of powder metallurgy and manufacturing of plastic components.</li> <li>CO2: Understand forging and sheet metal work.</li> <li>CO3: Understand forging and sheet metal work.</li> <li>CO4: Basic understanding of powder metallurgy and manufacturing of plastic components.</li> </ul> </li> <li>Course Outcomes (CO): PO03 PO04 PO05 PO06 PO07 PO08 PO09 PO10 PO11 P</li> <li>CO17 2 1 1 1 2 1 1</li> <li>CO3 2 1 1 1 1 2 1 1</li> <li>CO3 2 1 1 1 1 2 1 1</li> </ol>												4	•	4
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Definition of manufacturing, Importance of manufacturing towards technological and social economic development, Classification of manufacturing processes, Properties of materials.

Metal Casting Processes: Sand casting, Sand moulds, Type of patterns, Pattern materials, Pattern allowances, Types of Moulding sand and their Properties, Core making, Elements of gating system. Description and operation of cupola.

Working principle of Special casting processes - Shell casting, Pressure die casting, Centrifugal casting. Casting defects. [10Hrs]

# Unit II

Joining Processes: Welding principles, classification of welding processes, Fusion welding, Gas welding, Equipments used, Filler and Flux materials. Electric arc welding, Gas metal arc welding, Submerged arc welding, Electro slag welding, TIG and MIG welding process, resistance welding, welding defects. [10Hrs]

# Unit III

Deformation Processes: Hot working and cold working of metals, Forging processes, Open and closed die forging process. Typical forging operations, Rolling of metals, Principle of rod and wire drawing, Tube drawing. Principle of Extrusion, Types of Extrusion, Hot and Cold extrusion.

Sheet metal characteristics -Typical shearing operations, bending and drawing operations, Stretch forming operations, Metal spinning. [10Hrs]

# Unit IV

Powder Metallurgy: Introduction of powder metallurgy process, powder production, blending, compaction, sintering

Manufacturing Of Plastic Components: Types of plastics, Characteristics of the forming and shaping processes, Moulding of Thermoplastics, Injection moulding, Blow moulding, Rotational moulding, Film blowing, Extrusion, Thermoforming. Moulding of thermosets- Compression moulding, Transfer moulding, Bonding of Thermoplastics.

# Textbooks:

1. Manufacturing Technology: Foundry, Forming and Welding Volume 1, P. N Rao, , McGrawHill, 5e, 2018.

2. Elements of Workshop Technology Vol. 1 and 2 by Hajra Choudhury, Media Promoters Pvt Ltd., 2008.

### **References:**

- 1. *Manufacturing Processes for Engineering Materials*, by Serope Kalpajian and Steven R.Schmid, Pearson Education, 5e, 2014.
- 2. Fundamentals of Modern Manufacturing: Materials, Processes, and Systems by Mikell P. Groover, John Wiley and Sons, 4e, 2010.
- 3. Production Technology by R.K. Jain and S.C. Gupta, Khanna Publishers. 16th Edition, 2001.

PaperCode: BS151		Paper:	Applied Physics - I La	ıb.	L	Р	С
PaperID: 99151					-	2	1
Teachers	Cor	ntinuous	40 marks	Term End Examinations	60	Marks	
Evaluation:							
Instructions:			·	·			

- 1. The course objectives and course outcomes are identical to that of (Applied Physics I) as this is the practical component of the corresponding theory paper.
- The practical list shall be notified by the teacher in the first week of the class commencement under 2. intimation to the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 8 experiments must be performed by the students
- 1. To determine the wavelength of sodium light by Newton's Rings.
- 2. To determine the wavelength of sodium light by Fresnel's biprism.
- 3. To determine the wavelength of sodium light using diffraction grating.
- 4. To determine the refractive index of a prism using spectrometer.
- 5. To determine the dispersive power of prism using spectrometer and mercury source.
- 6. To determine the specific rotation of cane sugar solution with the help of half shade polarimeter.
- 7. To find the wavelength of He-Ne laser using transmission diffraction grating.
- 8. To determine the numeral aperture (NA) of an optical fibre.
- 9. To plot a graph between the distance of the knife-edge from the center of the gravity and the time period of bar pendulum. From the graph, find (a) The acceleration due to gravity (b) The radius of gyration and the moment of inertia of the bar about an axis.
- 10. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil).
- 11. To verify inverse square law.
- 12. To determine Planck's constant.

Note: Teacher's may use the prescribed books to choose the practicals in addition to above. Total 8 practicals minimum shall be performed by the students, they may be asked to do more. Atleast 4 experiments must be from the above list.

Textbook:

- 1. B.Sc. Practical Physics by C. L. Arora, S.Chand & Co., 2020.
- 2. Practical physics by R. K. Shukla and A. Srivastava, New Age Int. (P) Ltd., 2006.

PaperCode: ES1	53 / ES154	Paper: Programmin	ng in 'C'∣	Lab.	L	Р	С
PaperID: 19915	3 / 199154				-	2	1
Teachers	Continuous	40 marks		Term End Examinations:	60 I	Narks	
Evaluation:							
Instructions:							

Instructions:

- 1. The course objectives and course outcomes are identical to that of "Programming in 'C'" as this is the practical component of the corresponding theory paper.
- 2. The practical list shall be notified by the teacher in the first week of the class commencement under intimation to the office of the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 8 experiments must be performed by the students

1. Write a program to find divisor or factorial of a given number.

- 2. Write a program to find sum of a geometric series
- 3. Write a recursive program for tower of Hanoi problem
- 4. Write a recursive program to print the first m Fibonacci number
- 5. Write a menu driven program for matrices to do the following operation depending on whether the operation requires one or two matrices
  - a. Addition of two matrices
  - b. Subtraction of two matrices
  - c. Finding upper and lower triangular matrices
  - d. Transpose of a matrix
  - e. Product of two matrices.
- 6. Write a program to copy one file to other, use command line arguments.

7. An array of record contains information of managers and workers of a company. Print all the data of managers and workers in separate files.

8. Write a program to perform the following operators on Strings without using String functions

- a. To find the Length of String.
- b. To concatenate two string.
- To find Reverse of a string.
- c. To find Reverse of a string.d. To copy one string to another string.

9. Write a Program to store records of a student in student file. The data must be stored using Binary File.Read the record stored in "Student.txt" file in Binary code.Edit the record stored in Binary File.Append a record in the Student file.

10. Write a programmed to count the no of Lowercase, Uppercase numbers and special Characters presents in the contents of text File.

Note:

1. At least 8 Experiments out of the list shall be performed by the students. Teachers may introduce new experiments for the class in addition to above.

2. In addition Two Mini Projects based on the skills learnt shall be done by the students. Teachers shall create the mini projects so that the same is not repeated every year. These mini projects may be done in a group not exceeding group size of 4 students.

3. Usage of IDE like Visual Studio Community Edition, Codeblocks, etc. are recommended.

PaperCode: BS1	55 / BS156	Paper: Applied Che	mistry Lab.		L	Р	C	
PaperID: 99155	/ 99156							
Teachers	Continuous	40 marks	Term	End Examinations:	60 /	Marks		
Evaluation:								
Instructions:		-						

1. The course objectives and course outcomes are identical to that of "Applied Chemistry" as this is the practical component of the corresponding theory paper.

- 2. The practical list shall be notified by the teacher in the first week of the class commencement under intimation to the office of the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 8 experiments must be performed by the students
- Determination of alkalinity of water sample. 1.
- Determination of hardness of water sample by EDTA method. 2.
- Determine the percentage composition of sodium hydroxide in the given mixture of sodium hydroxide and 3. sodium chloride.
- 4. Determine the amount of oxalic acid and Sulphuric acid in one litre of solution, given standard sodium hydroxide and Potassium Permanganate.
- 5. Determine the amount of copper in the copper ore solution, provided hypo-solution (lodometric Titration).
- 6. Determine the amount of chloride ions present in water using silver nitrate (Mohr's Precipitation Method).
- Determine the strength of MgSO4 solution by Complexometric titration. 7.
- Determine the surface tension of a liquid using drop number method. 8.
- Determine the viscosity of a given liquid (density to be determined). 9.
- 10. Determine the cell constant of conductivity cell and titration of strong acid/strong base conductometrically.
- 11. To determine (a)  $\lambda$  max of the solution of KMnO4. (b) Verify Beer's law and find out the concentration of unknown solution by spectrophotometer.
- 12. Determination of the concentration of iron in water sample by using spectrophotometer.
- Determination of the concentration of Iron (III) by complexometric titration.
   Proximate analysis of coal.
- 15. Determination of eutectic point and congruent melting point for a two component system by method of cooling curve.

### **References:**

- 1. Vogel's Text Book of Quantitative Chemical Analysis by G.H. Jefferey, J. Bassett, J. Mendham, and R.C. Denney, Logmaan Scientific & Technical, 1989
- 2. Essentials of Experimental Engineering Chemistry by S. Chawla, Dhanpat Rai & Co., 2008.
- 3. Experiments in Applied Chemistry by S. Ratan, S.K. KAtaria & Sons, 2003.
- 4. Practical Chemistry by O.P.Pandey, D. N. Bajpai and S. Giri, S.Chand & Co., 2005.
- 5. Engineering Chemistry with Laboratory Experiments by M. S. Kaurav, PHI Learning Pvt. Ltd., 2011.
- 6. Laboratory Manual on Engineering Chemistry by S. K. Bhasin, and Sudha Rani, Dhanpat Rai & Co., 2006.

### Note:

1. At least 8 Experiments out of the list shall be performed by the students. Teachers may introduce new experiments for the class in addition to above.

PaperCo	de: ES1	57	Paper	: Engine	ering Gr	aphics-I					L	Ρ	С
PaperID	: 199157	7									-	4	2
Marking	Scheme	:											
1.	Teacher	rs Contin	uous Eva	luation:	40 marks	5							
2.	Term er	nd Theor	y Examin	ations: 6	60 marks								
Course													
1:					oduction								
			ons and	BIS code	es used v	vhile ma	king drav	wings for	r various	streams	of e	ngine	ering
	discipli												
2:					project								
3:	The stu	idents wi	ll learn p	projectio	n of line	s and pro	ojection	of planes	i.				
4:	The stu	idents wi	ll learn t	he proje	ection of	solid and	d develop	oment of	surfaces	;			
Course	Outcome	es (CO):											
C01:	To unde	erstand t	he theor	y of proj	jections a	and proje	ection of	points.					
CO2:	Ability	to do lin	e project	tions.									
CO3:	Ability	to do pla	ine proje	ections.									
CO4:	Ability	to do sol	id projec	ctions an	d develo	pment o	f surface	S					
Course	Outcome	es (CO to	Progran	nme Out	comes (	PO) Map	ping (sca	ale 1: lov	v, 2: Me	dium, 3:	High		
CO/PO	PO01	P002	PO03	P004	PO05	P006	P007	P008	P009	PO10	P01	1   F	PO12
CO1	3	3	3	3	2	-	-	-	1	2	1		2
CO2	3	3	3	3	2	-	-	-	1	2	1		2
СО3	3	3	3	3	2	-	-	-	1	2	1		2
CO4	3	3	3	3	2	-	-	-	1	2	1		2

### Unit I

Introduction: Engineering Graphics/Technical Drawing, Introduction to drawing equipments and use of instruments, Conventions in drawing practice. Types of lines and their uses, BIS codes for lines, technical lettering as per BIS codes, Introduction to dimensioning, Types, Concepts of scale drawing, Types of scales Theory of Projections: Theory of projections, Perspective, Orthographic, System of orthographic projection: in reference to quadrants, Projection of Points, Projection in different quadrants, Projection of point on auxiliary planes. Distance between two points, Illustration through simple problems.

### Unit II

Projection of Lines: Line Parallel to both H.P. and V.P., Parallel to one and inclined to other, Other typical cases: three view projection of straight lines, true length and angle orientation of straight line: rotation method, Trapezoidal method and auxiliary plane method, traces of line.

### Unit III

Projection of Planes: Projection of Planes Parallel to one and perpendicular to other, Perpendicular to one and inclined to other, Inclined to both reference planes, Plane oblique to reference planes, traces of planes. Planes Other than the Reference Planes: Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., projections of points and lines lying in the planes, conversion of oblique plane into auxiliary plane and solution of related problems.

### Unit IV

Projection of Solids: Projection of solids in first or third quadrant, Axis parallel to one and perpendicular to other, Axis parallel to one inclined to other, Axis inclined to both the principal plane, Axis perpendicular to profile plane and parallel to both H.P. and V.P., Visible and invisible details in the projection, Use of rotation and auxiliary plane method.

Development of Surface: Purpose of development, Parallel line, radial line and triangulation method, Development of prism, cylinder, cone and pyramid surface for both right angled and oblique solids, Development of surface.

### Note: The sheets to be created shall be notified by the concerned teacher.

### Textbooks:

1. Engineering Drawing by N.D. Bhatt, 53rd Ed., Charotar Publishing House Pvt. Ltd., Gujarat, 2017.

### **References:**

- 1. Engineering Drawing by P.S. Gill, S.K Kataria & Sons, New Delhi, 2013.
- 2. *Technical Drawing with Engineering Graphics* by Frederick E. Giesecke, Shawna Lockhart, Marla Goodman, and Cindy M. Johnson, 15th Ed., Prentice Hall, USA, 2016
- 3. Engineering Drawing by M.B. Shah and B.C. Rana, 3rd Ed., Pearson Education, New Delhi, 2009.

Pap	perCode: ES159 / ES160	Paper: Electrical Science L	ab.	L	Р	С
Pap	oerID: 199159 / 199160			-	2	1
Tea	achers Continuou	s 40 marks	Term End Examinations:	60 I	∕larks	
Eva	lluation:					
Inst	tructions:					
1.	The course objectives and c	ourse outcomes are identical	to that of "Electrical Science		ن منطع	
	practical component of the o			cer as	i this is	s the

1. To Design the circuit for a given load and selection of its various Components and instruments from the safety point of view

### OR

To study different types of symbols and standard currently being used in electrical engineering.

- 2. Study and applications of CRO for measurement of voltage, frequency and phase of signals.
- 3. Connection of lamp by (1)Single Switch Method.(2) Two-way Switch Method. OR

Performance comparison of fluorescent Tube & CFL Lamp.

3. To Verify Thevenin's & Norton's Theorem

OR

OR

To Verify Superposition & Reciprocity Theorem.

To Verify Maximum Power Transfer Theorem.

- 4. To Measure Power & Power Factor in a Single-Phase A.C Circuit using Three Ammeters or three Voltmeters.
- 5. To Measure Power & Power Factor in a Balanced Three Phase Circuit using Two Single Phase Wattcmeters.
- 6. To study of Resonance in a series R-L-C or Parallel R-L-C Circuits.
- 7. To perform open circuit and short circuit test on 1-phase transformer.
- 8. Starting, Reversing and speed control of DC shunt Motor
- 9. Starting, Reversing and speed control of 3-phase Induction Motor
- 10. To Study different types of Storage Batteries & its charging system.
- 11. To Study different types of earthing methods including earth leakage circuit breaker (GFCI)

### Note:

students

1. At least 8 Experiments out of the list shall be performed by the students. Teachers may introduce new experiments for the class in addition to above.

Dan	erCode: BS161 /BES162	Paper: Environmenta	a studies Lab.		L	Р	С
rape	erID: 99161 / 99162				-	2	1
Tead	chers Continuous	40 marks	Term End Examina	ations:	60 N	<b>Narks</b>	
Eval	uation:				1		
Instr	ructions:		·				
1.	The course objectives and co	ourse outcomes are ide	entical to that of "Environi	mental St	udies	" as th	nis is
	the practical component of t	he corresponding theor	ry paper.				
2.	The practical list shall be no	tified by the teacher i	in the first week of the cla	iss comm	encen	nent u	nder
	intimation to the office of t						
	being offered from the list	of practicals below.	Atleast 8 experiments mu	ist be pe	erform	ned by	the
	students						
1.	Determination of pH, conduc						
2.	Determination of pH and con		e samples.				
3.	Determination of moisture co		t				
4.	Determination of Total Disso						
5. 4	Determination of dissolved o Determination of Biological of						
6. 7.	Determination of Chemical o						
7. 8.	Determination of Residual Ch						
0. 9.	Determination of ammonia in		npte.				
10.	Determination of carbon diox	-	le				
11.	Determination of nitrate ions			er.			
12.	Determination of the molecu						
13.	Base catalyzed aldol condens						
	Acetylation of primary amine						
14.							

### Note:

- 1. For better understanding of various aspects of environment visits to local areas, depending upon easy access and importance may be planned to any nearby river, forest, grassland, hills and students should write a report based on their observations.
- 2. At least 8 Experiments out of the list shall be performed by the students. Teachers may introduce new experiments for the class in addition to above

### **References:**

- 1. Vogel's Text Book of Quantitative Chemical Analysis by G.H. Jefferey, J. Bassett, J. Mendham, and R.C. Denney, Logmaan Scientific & Technical, 1989.
- 2. dst.gov.in/green-chem.pdf (monograph of green chemistry laboratory experiments).
- 3. Essentials of Experimental Engineering Chemistry by S. Chawla, Dhanpat Rai & Co., 2008.
- 4. Experiments in Applied Chemistry by S. Ratan, S.K. KAtaria & Sons, 2003.
- 5. Principles of Environment Science: Enquiry and Applications by W. Cunningham and M. A. Cunningha, Tata McGraw Hill, 2003.
- 6. Perspectives in Environment Studies by A. Kaushik and C. P. Kaushik, New Age Int. (P) Pub., 2013.

PaperCo	de: BS10	6	Paper	: Applie	d Physic	s - ll					L	T/P	C
PaperID:											3	-	3
Marking	Scheme:												
-		s Continu											
2.	Term en	d Theory	Examina	tions: 75	i marks								
Instruction													
		be 9 ques											
		will be o											
		nts will b	•	ed to an	swer any	THREE p	oarts of !	5 marks	each. Th	is unit w	/ill ha	ve a	total
5		15 marks											
3. Apart													
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		be asked									ques	tions	may
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		s are to											The
		el of the											
5. The r Course O			cientific)	calculat	ors / log	-tables /	data - t	ables ma	ay be spe	ecified if	requ	rea.	
	-					124							
1:		n about t											
2: 3:		n about o				significa	nce.						
4:		erstand t				nd prop	setion on	d charac	toristics	ofdiada			
1		n about t	ne band	theory o	or solids a	and prope	ercies an	u charac	lensuics		25.		
Course O													
CO1: CO2:		tand and											
C02:		tand qua				inicance	•						
CO3: CO4:		tand Crys							istics of	diadaa			
		tand the									Liak		
Course O												4 5	012
CO/PO	PO01	PO02	PO03	P004	PO05	P006	P007	P008	P009	PO10	P01	1 1	2012
CO1	2	2	3	3	2	-	-	-	1	1	-		1
CO2	2	2	3	3		-	-	-	1	1	-		1
CO3 CO4	2	2	3	3	2	-	-	-	1	1	-		1
CU4	Z	Z	3	5	Z	-	-	-	1	1	-		1

### Unit I

Quantum Mechanics: Introduction: Wave particle duality, de Broglie waves, the experiment of Davisson and Germer, electron diffraction, physical interpretation of the wave function, properties, the wave packet, group and phase velocity, the uncertainty principle. The Schrödinger wave equation (1D), Eigen values and Eigen functions, expectation values, simple Eigen value problems - solutions of the Schrödinger's equations for the free particle, the infinite well, the finite well, tunneling effect, the scanning electron microscope, the quantum simple harmonic oscillator (qualitative), zero point energy.

[8Hrs][T1,T2]

### Unit II

Quantum Statistics: The need for statistics, statistical distributions: Maxwell Boltzmann, Bose-Einstein and Fermi-Dirac statistics, their comparisons, Fermions and Bosons, Applications of quantum statistics: 1. Molecular speed and energies in an ideal gas; 2. The Black body spectrum, the failure of classical statistics to give the correct explanations - Bose-Einstein statistics applied to the Black Body radiation spectrum; Fermi-Dirac distribution, free electron theory, electronic specific heats, Fermi energy and average energy; Dying stars.

### Unit III

Crystal Structure: Types of solids, Unit cell, Types of crystals, Translation vectors, Lattice planes, Miller indices, Simple crystal structures, Interplaner spacing, Crystal structure analysis: Bragg's law, Laue method, Point defects: Schottcky and Frankel defects.

### [8Hrs][T1,T2]

### Unit IV

Band Theory of Solids: Origin of energy bands in solids, motion of electrons in a periodic potential - the Kronig-Penny model (Qualitative). Brillouin zones, effective mass, metals, semi-conductors and insulators and their energy band structures. Extrinsic and Intrinsic semiconductors, doping - Fermi energy for doped and undoped semiconductors, the p-n junction (energy band diagrams with Fermi energy), the unbiased diode, forward and reverse biased diodes - tunnel diodes, zener diode, photo diode its characteristics, LED [8Hrs][T1,T2]

### Textbooks:

- 1. Concepts of Modern Physics (SIE) by Arthur Beiser, Shobhit Mahajan, and S. Rai Choudhury, McGraw Hill, 2017.
- 2. Modern Physics by Kenneth S. Krane, Wiley, 2020.

### **References:**

- 1. Physics for Scientists and Engineers by Raymond A. Serway and John W. Jewett, 9th Edition, Cengage, 2017
- Principles of Physics by Robert Resnick, Jearl Walker and David Halliday, Wiley, 2015.
   Solid State Electronic Devices ,by Streetman and Ben G Prentice Hall India Learning Private Limited; 2006

	ode: BS1	12	Paper	: Applied	d Mather	natics -					L	T/P	C
PaperID	: 99112										4	-	4
Marking	Scheme	:											
1.	Teacher	rs Contin	uous Eva	luation:	25 marks	5							
			y Examir	nations: 7	75 marks								
	ion for p												
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			scientific	calcula	ators / lo	g-tables	/ data -	tables m	nay be sp	ecified i	t requ	uired.	
	Objectiv												
1:			Complex		ethods.								
2:			Complex										
3:			ourier a										
4:			now to so	olve spec	ific form	ulated e	ngineerir	ng proble	ems using	PDE me	thods	s.	
	Outcome												
C01:			omplex s										
CO2:			omplex a										
CO3:									gineering		ns		
CO4:									E methoo				
									v, 2: Me				
CO/PO	PO01	PO02	PO03	P004	PO05	P006	P007	P008	PO09	PO10	PO	11 F	PO12
CO1	2	3	3	3	1	-	-	-	-	-	1	2	-
CO2	2	3	3	3	1	-	-	-	-	-	2	2	
СО3	2	3	3	3	1	-	-	-	-	-	2	2	-
CO4	2	3	3	3	1	-	-	-	-	-	2	2	

### Unit I

Complex Analysis - I : Complex Numbers and Their Geometric Representation, Polar Form of Complex Numbers. Powers and Roots, Derivative. Analytic Function, Cauchy-Riemann Equations. Laplace's Equation, Exponential Function, Trigonometric and Hyperbolic Functions. Euler's Formula, de'Moivre's theorem (without proof), Logarithm. General Power. Principal Value. Singularities and Zeros. Infinity,

Line Integral in the Complex Plane, Cauchy's Integral Theorem, Cauchy's Integral Formula, Derivatives of Analytic Functions, Taylor and Maclaurin Series. [10Hrs]

### Unit II

Complex Analysis - II: Laurent Series, Residue Integration Method. Residue Integration of Real Integrals, Geometry of Analytic Functions: Conformal Mapping, Linear Fractional Transformations (Möbius Transformations), Special Linear Fractional Transformations, Conformal Mapping by Other Functions, Applications: Electrostatic Fields, Use of Conformal Mapping. Modeling, Heat Problems, Fluid Flow. Poisson's Integral Formula for Potentials [10Hrs]

### Unit III

Laplace Transforms: Definitions and existence (without proof), properties, First Shifting Theorem (s-Shifting), Transforms of Derivatives and Integrals and ODEs, Unit Step Function (Heaviside Function). Second Shifting Theorem (t-Shifting), Short Impulses. Dirac's Delta Function. Partial Fractions, Convolution. Integral Equations, Differentiation and Integration of Transforms. Solution of ODEs with Variable Coefficients, Solution of

Systems of ODEs. Inverse Laplace transform and its properties.

Fourier Analysis: Fourier Series, Arbitrary Period. Even and Odd Functions. Half-Range Expansions, Sturm-Liouville Problems. Fourier Integral, Fourier Cosine and Sine Transforms, Fourier Transform. Usage of fourier analysis for solution of ODEs. Inverse Fourier transform and its properties. [10Hrs]

### Unit IV

Partial Differential Equations (PDEs): Basic Concepts of PDEs. Modeling: Vibrating String, Wave Equation. Solution by Separating Variables. Use of Fourier Series. D'Alembert's Solution of the Wave Equation. Characteristics. Modeling: Heat Flow from a Body in Space. Heat Equation: Solution by Fourier Series. Steady Two-Dimensional Heat Problems. Dirichlet Problem. Heat Equation: Modeling Very Long Bars. Solution by Fourier Integrals and Transforms. Modeling: Membrane, Two-Dimensional Wave Equation. Rectangular Membrane. Laplacian in Polar Coordinates. Circular Membrane. Laplace's Equation in Cylindrical and Spherical Coordinates. Potential. Solution of PDEs by Laplace Transforms.

### [10Hrs]

### Textbooks:

1. Advanced Engineering Mathematics by Erwin Kreyszig, John Wiley, 10<sup>th</sup> Ed., 2011.

### **References:**

- 1. Engineering Mathematics by K.A. Stroud with Dexter J. Booth, Macmillan, 2020.
- Advanced Engineering Mathematics by Larry Turyn, Taylor and Francis, 2014.
   Advanced Engineering Mathematics by Dennis G. Zill, Jones & Bartlett Learning, 2018.
- 4. Advanced Engineering Mathematics with MATLAB by Dean G. Duffy, Taylor and Francis, 2017.
- 5. Advanced Engineering Mathematics by Merle C. Potter, Jack L. Lessing, and Edward F. Aboufadel, Springer (Switzerland), 2019.
- 6. Mathematical Methods for Physics and Engineering, by K. F. Riley, M. P. Hobson and S. J. Bence, CUP, 2013.

PaperCo			Paper	Engine	ering Me	chanics					L	T/P	C
PaperID	: 199114	4									3	-	3
Marking	Scheme	:											
1.	Teacher	rs Contin	uous Eva	luation:	25 marks	5							
2.	Term er	nd Theory	y Examin	ations: 7	75 marks								
		aper set											
1. Ther	e should	l be 9 qu	estions ir	n the ter	m end e	kaminati	ons quest	tion pape	er.				
							ver the			This que	stion	shoul	d be
							stion of 1						
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4. The													The
							at the le						
			scientific	:) calcula	ators / lo	g-tables	/ data -	tables n	nay be sp	ecified i	f requ	ired.	
Course (													
1:	•		/ledge to	o solve p	oroblems	pertaini	ng to fo	rce syste	ems, equ	ilibrium	and o	distrib	outed
	systems												
2:							n and eng						
3:							f kinema						
4:			ledge to	deal wit	h the pro	oblems o	f kinema	tics and	kinetics	of rigid b	podies	<b>.</b>	
Course (		· /											
CO1:							ems, equi		and distr	ibuted sy	/stem	s.	
CO2:							ng trusse						
CO3:							nd kinetio						
CO4:	Ability	to deal v	vith the <sub>l</sub>	problems	s of kiner	natics ar	nd kinetio	cs of rigi	d bodies.	•			
Course (	Outcome	es (CO) t	o Progra	mme Ou	tcomes	(PO) Map	oping (sc		w, 2: Me	edium, 3	: Higl	ר)	
CO/PO	PO01	PO02	PO03	P004	PO05	P006	P007	P008	P009	PO10	PO1	1 F	PO12
CO1	3	3	3	3	2	-	-	-	1	1	1		2
CO2	3	3	3	3	2	-	-	-	1	1	1		2
СО3	3	3	3	3	2	-	-	-	1	1	1		2
CO4	3	3	3	3	2	-	-	-	1	1	1		2

### Unit I

Force System: Introduction, force, principle of transmissibility of force, resultant of a force system, resolution of a force, moment of force about a line, Varigon's theorem, couple, resolution of force into force and a couple, properties of couple and their application to engineering problems.

Equilibrium: Force body diagram, equations of equilibrium and their applications to engineering problems, equilibrium of two force and three force members.

Distributed Forces: Determination of center of gravity, center of mass and centroid by direct integration and by the method of composite bodies, mass moment of inertia and area moment of inertia by direct integration and composite bodies method, radius of gyration, parallel axis theorem, polar moment of inertial. [10Hrs]

### Unit II

Structure: Plane truss, perfect and imperfect truss, assumption in the truss analysis, analysis of perfect plane trusses by the method of joints, method of section and graphical method.

Friction: Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, frictional lock, friction in flat pivot and collar bearing, friction in flat belts. [10Hrs]

### Unit III

Kinematics of Particles: Rectilinear motion, plane curvilinear motion, rectangular coordinates, normal and tangential coordinates.

Kinetics of Particles: Equation of motion, rectilinear motion and curvilinear motion, work-energy equation, conservation of energy, concept of impulse and momentum, conservation of momentum, impact of bodies, coefficient of restitution, loss of energy during impact. [10Hrs]

### Unit IV

Kinematics of Rigid Bodies: Concept of rigid body, types of rigid body motion, absolute motion, introduction to relative velocity, relative acceleration (Corioli's component excluded) and instantaneous center of zero velocity, Velocity and acceleration.

Kinetics of Rigid Bodies: Equation of motion, translatory motion and fixed axis rotation, application of work energy principles to rigid bodies conservation of energy.

Beam: Introduction, types of loading, methods for the reactions of a beam, space diagram, types of end supports, beams subjected to couple.

[10Hrs]

### Textbooks:

1. Engineering Mechanics by A.K.Tayal, Umesh Publications.

### **References:**

- 'Engineering Mechanics' by K. L. Kumar, Tata Mc-Graw Hill
   'Engineering Mechanics' by S. Timoshenko, D. H. Young, J. V. Rao, Tata Mc-Graw Hill
   'Engineering Mechanics-Statics and Dynamics' by Irwing H. Shames, PHI.
- 4. 'Engineering Mechanics' by Basudev Bhattacharya, Oxford University Press.

PaperCode: BS152	Paper: /	Applied Physics - II La	b.	L	Р	С
PaperID: 99152				-	2	1
Teachers	Continuous	40 marks	Term End Examinations:	60 I	Narks	
Evaluation:						
Instructions:						
1. The course obje	ectives and cou	urse outcomes are ide	ntical to that of (Applied Physics	- I) as	s this is	s the

- practical component of the corresponding theory paper. 2. The practical list shall be notified by the teacher in the first week of the class commencement under
- intimation to the office of the Head of Department / Institution in which the paper is being offered from the list of practicals below. Atleast 8 experiments must be performed by the students
- 1. To determine the e/m ratio of an electron by J.J. Thomson method.
- 2. To measure the frequency of a sine-wave voltage obtained from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave signals from two signal generators. 3. To determine the frequency of A.C. mains by using Sonometer.
- 4. To determine the frequency of electrically maintained tuning fork by Melde's method.
- 5. Computer simulation (simple application of Monte Carlo): Brownian motion, charging & discharging of a capacitor.
- 6. To study the charging and discharging of a capacitor and to find out the time constant.
- 7. To study the Hall effect.
- 8. To verify Stefan's law.
- 9. To determine the energy band gap of a semiconductor by four probe method/or by measuring the variation of reverse saturation current with temperature.
- 10. To study the I-V characteristics of Zener diode.
- 11. To find the thermal conductivity of a poor conductor by Lee's disk method.
- 12. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.

Note: Teacher's may use the prescribed books to choose the practicals in addition to above. Total 8 practicals minimum shall be performed by the students, they may be asked to do more. Atleast 4 experiments must be from the above list.

### Textbook:

- 1. B.Sc. Practical Physics by C. L. Arora, S.Chand & Co., 2020.
- 2. Practical physics by R. K. Shukla and A. Srivastava, New Age Int. (P) Ltd., 2006.

PaperCo	de: ES15	8	Pap	er: Engii	neering	Graphics	s-II				L	Ρ	C
PaperID:	199158										-	2	1
Marking	Scheme:												
1.	Teachers	S Continu	ious Eval	uation:	40 marks	5							
2.	Term en	d Theory	Examin	ations: 6	0 marks								
Course O	bjective	s:											
1:	The stu	idents w	ill learn	sectioni	ng of sol	id figure	s.						
2:	The stu	idents w	ill under	stand 3D	) project	ions. Th	ey will h	ave unde	erstandin	g of ison	netric ar	d ob	lique
	project	ions.											
3:	The stu	idents w	ill have I	understa	nding of	perspec	tive proj	jections,					
4:	The stu	idents w	ill learn	compute	er aided	drafting.	•						
Course O	utcome	s (CO):											
CO1:					ms of sol								
CO2:	Ability	to draw	3S proje	ections (i	sometric	: and obl	lique).						
CO3:	Ability	to draw	perspec	tive proj	ections.								
CO4:	Unders	tand and	l use a C	AD tool	(AutoCAl	D).							
Course O	utcome	s (CO to	Program	nme Out	comes (	PO) Map	ping (sca	ale 1: lo	w, 2: Me	dium, 3:	High		
CO/PO	PO01	P002	PO03	P004	PO05	P006	P007	P008	P009	PO10	P011	PC	012
CO1	3	3	3	3	2	-	-	-	1	2	1		2
CO2	3	3	3	3	2	-	-	-	1	2	1		2
СО3	3	3	3	3	2	-	-	-	1	2	1		2
CO4	3	3	3	3	2	-	-	-	1	2	1		2

### Unit I

Section of Solids: Definition of Sectioning and its purpose, Procedure of Sectioning, Illustration through examples, Types of sectional planes-application to few examples.

### Unit II

Isometric Projection: Classification of pictorial views, Basic Principle of Isometric projection, Difference between isometric projection and drawing, Isometric projection of solids such as cube, prism, pyramid and cylinder.

Oblique Projection: Principle of oblique projection, difference between oblique projection and isometric projection, receding lines and receding angles, oblique drawing of circle, cylinder, prism and pyramid.

### Unit III

Perspective Projection: Principle of perspective projection, definitions of perspective elements, visual ray method, vanishing point method.

Conversion of 3D to 2D figures.

### Unit IV

Introduction to CADD: Interfacing and Introduction to CAD Software, Coordinate System, 2D drafting: lines, circles, arc, polygon, etc., Dimensioning, 2-D Modelling, Use of CAD Software for engineering drawing practices.

### Note: The sheets to be created shall be notified by the concerned teacher.

### Textbooks:

1. Engineering Drawing by N.D. Bhatt, 53rd Ed., Charotar Publishing House Pvt. Ltd., Gujarat, 2017.

### **References:**

- 1. Engineering Drawing by P.S. Gill, S.K Kataria & Sons, New Delhi, 2013.
- 2. Technical Drawing with Engineering Graphics by Frederick E. Giesecke, Shawna Lockhart, Marla Goodman, and Cindy M. Johnson, 15th Ed., Prentice Hall, USA, 2016
- 3. Engineering Drawing by M.B. Shah and B.C. Rana, 3rd Ed., Pearson Education, New Delhi, 2009.
- 4. AutoCAD 2017 for Engineers & Designers by Sham Tickoo,, Dreamtech Press 2016.

PaperCo	de: ES1	64	Paper	: Worksh	op Tech	nology					L	Ρ	C
PaperID	: 199164	4									-	2	1
Marking													
1.	Teach	ers Cont	inuous Ev	valuatior	n: 40 mar	rks							
2.	Term	end The	ory Exam	inations	: 60 marl	ks							
Instruct													
	•	al list sh		-						s comme	encen	nent	under
		o the off	ice of th	e school	in which	n the pap	er is bei	ng offere	ed.				
Course (													
1:		idents wi											
2:		idents wi			ew of dif	ferent m	nachines	used in v	vorkshop	and the	opera	atio	ns
		ned on th											
3:		idents wi											
4:	The stu	idents wi	ll have u	nderstar	iding of s	sheet me	tals hop	and fitti	ng shop				
Course (		· /											
CO1:	Ability	to safely	work in	a Lab./v	vorkshop	•							
CO2:	Ability	to use m	achines	(lathe, m	nill, shap	er, plane	er, grinde	er, drill).					
CO3:	Ability	to weld.											
CO4:	Ability	to use sh	eet meta	al tools a	and fittin	ig shop to	ools.						
Course (	Outcome	es (CO) t	o Progra	mme Ou	tcomes	(PO) Map	oping (sc	ale 1: lo	w, 2: Me	edium, 3	: High	ר)	
CO/PO	PO01	PO02	PO03	P004	PO05	P006	P007	P008	P009	PO10	P01	1	PO12
CO1	2	1	2	2	3	3	-	-	-	-	-		2
CO2	2	1	2	2	3	1	-	-	-	-	-		2
СО3	2	1	2	2	3	1	-	-	-	-	-		2
CO4	2	1	2	2	3	1	-	-	-	-	-		2

### Unit I

Safety, precautions and maintenance: Safety in shop, safety devices, safety and precautions - moving machine and equipment parts, electrical parts and connections, fire, various driving systems like chain, belt and ropes, electrical accidents, an overview of predictive, preventive and scheduled maintenance, standard guidelines to be followed in shop.

### Unit II

Introduction to machine shop: Introduction to Lathe, Milling, shaper, Planer, grinder, drilling and overview of operations performed on these machines by making some jobs.

### Unit III

Introduction to welding shop: Welding, types of welding, tools and applications, gas welding and arc welding, edge preparation, various joints formation by gas welding and electric arc welding.

### Unit IV

Introduction to sheet metal shop: Sheet metal tools and operations, formation of a box using sheet. Introduction to fitting shop: Introduction to fitting, tools and applications, some jobs in fitting shop.

### Textbooks:

1. Workshop Technology Vol. 1 and Vol. 2, Hajra Choudhary and Roy, Media Promoters and Publishers, 2018.

### **References:**

1. A course in Workshop Technology Vol. 1 and Vol. 2, B. S. Raghuvanshi, Dhanpat Rai and Compnay, 2015.

2. Workshop Technology (Manufacturing Processes), Khurmi and Gupta, S. Chand Publication, 2010.

### SCHEME FRAMEWORK FOR 2<sup>nd</sup> to 4<sup>th</sup> year

	Third Semester								
Group	Paper	Paper	L	Ρ	Credits				
	Code								
Theory P	apers								
ES/BS		Computational Methods	4	-	4				
РС		Programme Core Theory Papers	16	-	16				
HS/MS		Elements of Indian History for Engineers	2	-	2				
Practical	/Viva Voce	•							
ES/BS		Computational Methods Lab.	-	2	1				
PC		Programme Core Lab. Papers	-	6	3				
Total	•		22	8	26				

		Fourth Semester			
Group	Paper Code	Paper	L	Р	Credits
Theory P	apers				
ES/BS		Probability, Statistics and Linear Programming	4	-	4
РС		Programme Core Theory Papers	16	-	16
HS/MS		Technical Writing	2	-	2
Practical	/Viva Voce				
ES?BS		Probability, Statistics and Linear Programming Lab.	-	2	1
PC		Programme Core Lab. Papers	-	6	3
Total			22	8	26

		Fifth Semester			
Group	Paper	Paper	L	Р	Credits
•	Code				
Theory Pa	pers	·			
PC		Programme Core Theory Papers	20	-	20
HS/MS		Economics for Engineers	2	-	2
Practical/	Viva Voce	· · ·			
PC		Programme Core Lab. Papers	-	6	3
PC /		Summer Training (after 4th semester) Report *			1
Internship					
Total		·	22	6	26

\*NUES : Comprehensive evaluation by the a committee of teachers, constituted by the Academic Programme Committee, out of 100. The training shall be of 4 to 6 weeks duration. The training can be under the mentorship of a teacher of the institution.

		Sixth Semester						
Group	Paper	Paper	L	Ρ	Credits			
	Code							
Theory Pa	Theory Papers							
PC		Programme Core Elective Papers			12			
EAE /		Emerging Area / Open Area Elective Papers			8			
PAE								
HS/MS		Principles of Management for Engineers	4		4			
Practical/	/iva Voce	·						
HS		*NSS / NCC / Cultural clubs / Technical Society /			2			
		Technical club*						
Total					26			

Note: The elective papers can be (a) Only Theory: In this case, the teachers continuous evaluation shall be of 25 marks, while the term end examinations shall be of 75 marks, (b) The elective paper may have Theory and

practical components, in this case the Theory Credits shall be of 3 credits while the practical component shall be of 1 credit. The Teachers Continuous Evaluation Component for the complete paper (inclusive of Theory and Practical Component) shall be 25 Marks, The Term End Semester Examination for Theory Component shall be of 50 Marks, while the Term End Semester Component for Practical shall be of 25 marks. The marksheet of results for the students shall reflect all components of marks.

\*NUES : Comprehensive evaluation of the students by the concerned coordinator of NCC / NSS / Cultural Clubs / Technical Society / Technical Clubs, out of 100 as per the evaluation schemes worked out by these activity societies, organizations; the co-ordinators shall be responsible for the evaluation of the same. These activities shall start from the 1<sup>st</sup> semester and the evaluation shall be conducted at the end of the 6<sup>th</sup> semester for students admitted in the first semester. Students admitted in the 2<sup>nd</sup> year (3<sup>rd</sup> semester) as lateral entry shall be for the period of 3<sup>rd</sup> semester to 6<sup>th</sup> semester only.

		Seventh Semester						
Group	Paper	Paper	L	Р	Credits			
	Code							
Theory Pa	Theory Papers							
PC		Programme Core Elective Papers			8			
EAE /		Emerging Area / Open Area Elective Papers			12			
PAE								
HS/MS		Principles Entrepreneurship Mindset	2		2			
Practical/\	/iva Voce							
PC /		Minor Project**			3			
Project								
PC /		Summer Training (after 6 <sup>th</sup> semester) Report *	-	-	1			
Internship								
Total					26			

Note: The elective papers can be (a) Only Theory: In this case, the teachers continuous evaluation shall be of 25 marks, while the term end examinations shall be of 75 marks, (b) The elective paper may have Theory and practical components, in this case the Theory Credits shall be of 3 credits while the practical component shall be of 1 credit. The Teachers Continuous Evaluation Component for the complete paper (inclusive of Theory and Practical Component) shall be 25 Marks, The Term End Semester Examination for Theory Component shall be of 50 Marks, while the Term End Semester Component for Practical shall be of 25 marks. The marksheet of results for the students shall reflect all components of marks.

\*NUES : Comprehensive evaluation by the a committee of teachers, constituted by the Academic Programme Committee, out of 100. The training shall be of 4 to 6 weeks duration. The training can be under the mentorship of a teacher of the institution.

\*\* The student shall be allocated a supervisor / guide for project work at the end of 6<sup>th</sup> semester by the department / institution, the project shall continue into the 8<sup>th</sup> semester. In the 7<sup>th</sup> semester evaluation, the criteria for evaluation shall be conceptualization of the project work, the background study / literature survey and identification of objectives and methodology to be followed for project. 40 marks evaluation for the Teachers' Continuous Evaluation / Internal Assessment shall be done by the concerned supervisor while the term end examinations of 60 marks shall be conducted by the supervisor concerned and the external examiner deputed by the Examinations Division. In the absence of the supervisor, the Director of the Institution / Head of Department can assign the responsibility of the supervisor (for purpose of examinations) to any faculty of the Institution / Department.

Eight Semester							
Group	Paper	Paper	L	T/P	Credits		
	Code						
Practical/Viva	Voce/Inte						
PC / Project	ES452	Major Project - Dissertation**,#			14		
	ES454	Major Project Viva Voce <sup>®</sup>			4		
	ES456	Project Progress Evaluation*			2		
PC /	ES458	Internship Report <sup>#</sup>			14		
Internship	ES460	Internship Viva Voce <sup>#</sup>			4		
	ES462	Internship Progress Evaluation <sup>*,#</sup>			2		
Total	-				20		

## \*NUES : Comprehensive evaluation by the a committee of teachers, constituted by the Academic Programme Committee, out of 100.

% By default every student shall do the project work (ES452, ES454, and ES456). A student shall either be allowed to do a project work (ES52, ES454, and ES456) or an internship (ES458, ES460, and ES462). The student must apply for approval to do internship before the commencement of the  $8^{th}$  semester to the school, and only after approval of Head of Department through Training and Placement Officer of the Department, shall proceed for internship.

\*\* The student offered project work shall be allocated a supervisor / guide for project work at the end of 6<sup>th</sup> semester by the School, the project shall continue into the 8<sup>th</sup> semester.

# Students may be allowed to do internship in this semester in lieu of Major project. The students allowed to proceed for internship shall be required to maintain a log-book of activities performed during internship. The same has to be countersigned by the mentor at the organization where internship is completed.

ES452: Evaluation shall be conducted of 40 marks (Teachers' continuous evaluation / internal assessment) by the supervisor. And, 60 marks by an external examiner deputed by examinations division (COE), for a total of 100 marks.

ES454: Evaluation shall be conducted of 40 marks (Teachers' continuous evaluation / internal assessment) by the supervisor. And, 60 marks by a bench of the supervisor and the external examiner deputed by examinations division (COE), for a total of 100 marks.

ES456/ES462: Comprehensive evaluation by the a committee of teachers, constituted by the Academic Programme Committee, out of 100.

ES458/ES460: Evaluation shall be conducted of 40 marks (Teachers' continuous evaluation / internal assessment) by the training and placement officer of the department on the basis of the report submitted by the student. And, 60 marks by a bench of the Training and Placement Officer of the department and the external examiner deputed by examinations division (COE), for a total of 100 marks.

In the absence of the supervisor or the Training and placement officer (as the case may be), the head of department can assign the responsibility of the supervisor or the Training and Placement officer (for purpose of examinations) to any faculty of the department.

Note: Codes are given as example only in Framework for Schemes of 2<sup>nd</sup> to 4<sup>th</sup> year. Actual codes shall be assigned when the final schemes are made.

**Note on Elective Papers:** The elective papers shall be allowed to be taken / studied by the students, by the APC of the School, keeping in view that two papers studied by the student should not have a substantial overlap. All papers studied by the student should be substantially distinct in content.

### Note on Examination of Elective Papers:

- (a) Papers with only theory component shall have 25 marks continuous evaluation by the teacher and 75 marks term-end examinations. Both these component marks shall be reflected on the marksheet of the student.
- (b) Papers with only practical component shall have 40 marks continuous evaluation by the teacher and 60 marks term-end examinations. Both these component marks shall be reflected on the marksheet of the student.
- (c) Papers with both theory and practical components shall have 25 marks continuous evaluation by the teacher and 25 marks term-end examinations for practical and 50 marks term end examination for the theory component. All three component marks shall be reflected on the marksheet of the student.

### Implementation Rules:

1. The examinations, attendance criteria to appear in examinations, promotion and award of the degree shall be governed by the Ordinance 11 of the University. The term "major discipline" / "primary discipline" in this document refers to the discipline in which student is admitted / studies from  $3^{rd}$  semester onwards.

2. Minimum duration of the Bachelor of Technology programme shall be 4 years (N=4 years) (8 semesters).

3. Maximum duration of the Bachelor of Technology programme shall be 6 years (N+2 years). After completion of N+2 years of study, if the student has appeared in the papers of all the semesters upto  $8^{th}$  semester, then a maximum extension of 1 year may be given to the student for completing the requirements of the degree if and only if the number of credits already earned by the student is atleast 150 (for lateral entry students it shall be at least 102 credits) from the (non-honours components). Otherwise, the admission of the student shall stand cancelled. After the period of allowed study, the admission of the student shall be cancelled.

4. The degree shall be awarded only after the fulfilment of all requirements of the scheme and syllabus of Examinations.

5. The scheme and syllabi of the Master of Technology part of the Bachelor / Master of Technology (Dual Degree) shall be notified separately. This document pertains to the Bachelor of Technology part of the Bachelor / Master of Technology (Dual Degree) programme only.

		S	emeste	r (Credi	ts)			Total	Mandatory
Group	&	III	IV	V	VI	VII	VIII	Credits	Credits
BS	24	5	5					34	18
HS	6	2	2	2	6	2		20	10
ES	20							20	16
PC		19	19	24		4	20	86	76
PCE					12	8		20	16
EAE/OAE					8	12		20	16
Total	50	26	26	26	26	26	20	200	150

6. The students shall undergo the following group of Courses / Papers as enumerated in the scheme.

TABLE 1: Distribution of Credits.

7. Mandatory Credits specify the number of credits from each subject group to be mandatorily acquired by the student for the award of the degree. See clause 12 and 13 also.

8. Some of the papers are droppable in the sense that the student may qualify for the award of the degree even when the student has not cleared / passed some of the papers of these group. However, the student has to earn the minimum credits for the programme of study as specified. See clause 12 and 13 also.

9. The open electives of the OAE group of courses may be taken through SWAYAM / NPTEL MOOCs platform. The student desirous of doing a MOOC based course among the OAE group must seek approval of the APC of the school for the same before the commencement of the semester. The APC shall allow the MOOC based OAE option to the student if and only if the MOOC subject / course being considered for the student is being offered in line with the Academic Calendar applicable. The student shall submit the successful completion certificate with marks to the School for onwards

transfer to the Examination Division. The Examinations Divisions shall take these marks on record for incorporation in the result of the appropriate semester. These marks / grades of these courses shall be used for calculation of the SGPA/CGPA of the student concerned by the examination division of the University. If a student takes even one OAE paper through MOOCs, then the student shall not be eligible for minor specialization. The degree to the student on fulfilment of other requirements for such cases shall be through clause 13.b. or 13.c.

These MOOC courses taken by the students, if allowed by the APC of the department / institution shall be of 4 credits or more collectively to be counted for one paper slot in the scheme, through MOOCs, though the marks shall be shown individually. If the credits of these MOOC Courses, allowed to a student is more than 4, then the maximum credit for the programme shall be amended accordingly for the particular student. Also, in a particular semester, a student may take more than one MOOC course with the approval of the APC to meet the credit requirements of EAE/OAE for the semester. The cost of taking the MOOC course is to be borne by the concerned student.

10. To earn an Honours degree, the student may enrol for 20 credits or more through SWAYAM / NPTEL MOOCs platform. This point has to be read together with other points specially point 13 and 14, The acquisition of the credits should be completed before the 15<sup>th</sup> of the July of the admission year plus 4 years. That is, if a student is admitted in the year X, then these credits must be acquired through MOOCs by 15<sup>th</sup> July of the year (X+4), no extra duration or time shall be allocated. Honours in the degree shall be awarded if and only if at least 20 credits are acquired through MOOCs. To obtain Honours in the programme, the student must apply to the department / institution about the same before the commencement of the 5<sup>th</sup> semester and about registration for the MOOCs and the specific courses through MOOCs shall be registered by the student only after approval by the Academic Programme Committee (APC) of the department / institution. The APC shall approve the course if it is not already studied by the student or the student shall not study it in future and adds value to the major area of specialization (which is the degree). The papers for which the student desires to appear for Honours through MOOCs, all papers results shall be submitted by the student to the department / institution for onwards transfer to Examination Division of the University, to be taken on record of the University. The results of these papers shall be a part of the records of the examinations of the students. The records shall be submitted by the student to the department / institution, then transferred to the Examinations division, shall be notified by the examinations division of the University, and a separate marksheet shall be issued by the Examinations divisions. The cost of taking the MOOC course is to be borne by the concerned student. Such courses shall be reflected as additional courses / papers for the student.

If a student acquires less than 20 credits through MOOCs, following the mechanism specified, then also the results of these papers shall be taken on record as specified above, though no Honours degree shall be awarded.

The papers through MOOCs for Honours degree shall not be a part of the set of the papers over which the SGPA / CGPA of the student shall be calculated.

The papers through MOOCs for Honours degree shall be additional papers studied by the students and are to be taken into account only for award of Honours in the degree programme, if 20 credits are earned through MOOCs as approved by APC, by a student. See Clause 14 also.

11. Maximum Credits: at least 188 (Table 1), these are the credits for which the student shall have to study for the non-Honours component of the curriculum. The student has to appear in the examinations for these credits.

12. Minimum Credits: 188 (out of the 196 non Honours papers credits). See clause 7 also.

- 13. The following degree route can be taken by a student (also refer point 14):
  - a. The students shall be awarded one minor specializations, one from EAE/OEA route under the following conditions:
    - i. The student has earned The student has earned the mandatory credits as defined in Table 1 and clause 7.

- ii. The student earns 20 credits from one group of EAE / OAE courses offered as a minor specialization by the institution..
- iii. In addition, the total credits (including the above specified credits) earned by the student is atleast 188 credits.

The degree nomenclature of the degree shall be as: "Bachelor of Technology (Primary Discipline) with minor specializations in <concerned EAE/OAE discipline>)"; if criteria / point 10 is not satisfied for Honours. Otherwise, if criteria / point 10 is met, then the degrees shall be an Honours degree and the nomenclature shall be as: "Bachelor of Technology (Primary Discipline) with minor specializations in <concerned EAE/OAE discipline>) (Honours)", if in addition to point 13.a.i, 13.a.ii, and 13.a.iii, the student fulfils the criteria for Honours as specified at point 10.

- b. The students shall be awarded the a degree without any minor specialization under the following conditions:
  - i. The student has earned The student has earned the mandatory credits as defined in Table 1 and clause 7.
  - ii. In addition, the total credits (including the above specified credits) earned by the student is atleast 188 credits.

The degree nomenclature of the degree shall be as: "Bachelor of Technology (Major Discipline)"; if criteria / point 6 is not satisfied for Honours. Otherwise, if criteria / point 10 is met, then the degrees shall be an Honours degree and the nomenclature shall be as: "Bachelor of Technology (Major Discipline) (Honours)", if in addition to point 13.b.i and 13.b.ii, the student fulfils the criteria for Honours as specified at point 10.

e. If the student does not fulfil any of the above criterions (point 13.a, or 13.b), if the student earns at least 188 credits out of 200 credits as enumerated in Table 1 (disregarding the mandatory credits clause of Table 1 and Clause 7), then the student shall be award the degree as *Bachelor of Technology (Primary Discipline)*. Such students shall not be eligible for the award of an Honours degree. Though if credits are accumulated through MOOCs as per clause 10, the same shall be reflected in the marksheets of the students.

14. The Honours degree shall only be awarded if the CGPA of the student is above or equal to 7.5 in addition to fulfilment of criteria / point 10 and 13 above and the degree is awarded after the immediate completion of the 4<sup>th</sup> of the batch from the year of admission. No Honours shall be conferred if the degree requirements are not completed in the minimum duration.

15. Pass marks in every paper shall be 40.

16. Grading System shall be as per Ordinance 11 of the University.

17. The programme core electives (PCE) shall be specific to a major discipline, minor specializations and papers for EAE shall be defined by the school defining the syllabus for the particular areas and minor specializations and papers for OAE shall be defined by the schools defining the elective streams. The institution shall offer atleast two elective groups for students of each major discipline. The emerging area / open electives can also be offered as standalone papers not forming a part of any elective groups also. The prerequisites for a specific paper, shall be defined in the detailed scheme and syllabus document. The institution shall decide the group(s) and/or individual papers to be offered as electives based on the availability of infrastructure and faculty. From the groups / papers offered by the institution, an elective paper / group shall be taught if and only if the number of students in a paper is at-least 20 or at-least 1/3 of the students of a major discipline for which the paper / group is to be offered. The APC of the department / institution may define a maximum number of students allowed to register for a paper as an elective (EAE / OAE).

18. Teachers of other department, as and when deputed by their department, for teaching the students enrolled in programmes offered by the department offering the programme shall be a part

of the Academic Programme Committee of the discipline. Such teachers, for all academic matters, including teaching, teachers' continuous evaluation, term end examinations etc. shall be governed by the decisions of the APC of department offering the programme of study. Similarly, the guest faculty, the visiting faculty and the contract / Ad Hoc faculty as and when deputed to teach students of a particular department shall form a part of APC of the department.

19. The medium of instructions shall be English.

### SCHEME OF EXAMINATION

and



### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) FIRST SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	APERS					
ETMA-101		Applied Mathematics-I	3	1	4	M
ETPH-103		Applied Physics-I	2	1	3	М
ETME-105		Manufacturing Processes	3	0	3	М
ETEE-107		Electrical Technology	3	0	3	М
ETHS-109		Human Values and Professional Ethics-I#	1	1	1	
ETCS-111	5,115	Fundamentals of Computing	2	0	2	
ETCH-113	55	Applied Chemistry	2	1	3	М
PRACTICA	L/VIVA VOC	E	1	Ch.	20	
ETPH-151	120	Applied Physics Lab-I	·	2	1	
ETEE-153	5	Electrical Technology Lab		2	1	М
ETME-155		Workshop Practice		3	2	М
ETME-157	. /	Engineering Graphics Lab		3	2	
ETCS-157		Fundamentals of Computing Lab		2	1	
ETCH-161		Applied Chemistry Lab		2	1	
		NCC/NSS*#			1	
TOTAL			16	18	27	

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 - Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

### BACHELOR OF TECHNOLOGY (COMMON TO ALL BRANCHES) SECOND SEMESTER EXAMINATION

Paper ID	Paper	L	T/P	Credits	Status
PERS					
	Applied Mathematics-II	3	1	4	М
	Applied Physics-II	2	1	3	
	Electronic Devices	3	0	3	М
	Introduction to Programming	3	0	3	М
0	Engineering Mechanics	2	10	3	
	Communication Skills	2	1	3	
1	Environmental Studies	2	17	3	
/VIVA VO	CE			5	
	Applied Physics Lab-II		2	1	
r /	Programming Lab		2	17	М
	Electronic Devices Lab		2	1	М
	Engineering Mechanics Lab		2	1	
	Environmental Studies Lab		2	1	
-	NCC/NSS*#	+			
		17	15	27	
	APERS	Applied Mathematics-II         Applied Physics-II         Electronic Devices         Introduction to Programming         Engineering Mechanics         Communication Skills         Environmental Studies         //VIVA VOCE         Applied Physics Lab-II         Programming Lab         Electronic Devices Lab         Engineering Mechanics Lab         Environmental Studies Lab	Applied Mathematics-II       3         Applied Physics-II       2         Electronic Devices       3         Introduction to Programming       3         Engineering Mechanics       2         Communication Skills       2         Environmental Studies       2         VIVA VOCE          Programming Lab          Electronic Devices Lab          Engineering Mechanics Lab          Engineering Mechanics Lab          Environmental Studies Lab          NCC/NSS*#	Applied Mathematics-II       3       1         Applied Physics-II       2       1         Electronic Devices       3       0         Introduction to Programming       3       0         Engineering Mechanics       2       1         Communication Skills       2       1         Environmental Studies       2       1         //VIVA VOCE       7       2         Programming Lab        2         Electronic Devices Lab        2         Engineering Mechanics Lab        2         Engineering Mechanics Lab        2         NCC/NSS*#        2	Applied Mathematics-II       3       1       4         Applied Physics-II       2       1       3         Electronic Devices       3       0       3         Introduction to Programming       3       0       3         Engineering Mechanics       2       1       3         Communication Skills       2       1       3         Environmental Studies       2       1       3         Programming Lab        2       1         Engineering Mechanics Lab        2       1         Programming Lab        2       1         Engineering Mechanics Lab        2       1         NCC/NSS*#        2       1

M: Mandatory for award of degree

#NUES (Non University Examination System)

\*#NCC/NSS can be completed in any one semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards. The camps/classes will be held either during Weekends/Holidays or Winter/Summer Vacations.

### **BACHELOR OF TECHNOLOGY** (INFORMATION TECHNOLOGY) THIRD SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY P.	APERS			1	•	
ETMA 201		Applied Mathematics – III	3	1	4	
ETCS 203		Foundation of Computer Science	3	1	4	М
ETEC 205		Switching Theory and Logic Design	3	1	4	
ETEE 207		Circuits and Systems	3	1	4	
ETCS 209	5	Data Structure	3	1	4	М
ETCS 211	1	Computer Graphics and Multimedia	3		4	
PRACTICA	L/VIVA VO	DCE		70		
ETEC 253	~	Switching Theory and Logic Design Lab	0	2	1	
ETCS 255	5/	Data Structure Lab	0	2	24	
ETEE 257		Circuits and Systems Lab	0	2	1	
ETCS 257		Computer Graphics and Multimedia Lab	0	2	1	
		NCC/NSS*#		-	-	
TOTAL		হ বি	18	14	28	

M: Mandatory for award of degree

M: Mandatory for award of degree \*NCC/NSS can be completed in any semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

#NUES(Non University Examination System)

### BACHELOR OF TECHNOLOGY (INFORMATION TECHNOLOGY) FOURTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY PA	APERS					_
ETMA 202		Applied Mathematics - IV	3	1	4	
ETCS 204		Computer Organization and Architecture	3	1	4	М
ETCS 206		Theory of Computation	3	1	4	М
ETCS 208		Database Management Systems	3	1	4	М
ETCS 210	5	Object Oriented Programming	3	0	3	
ETEE 212		Control Systems	3	Ċ	4	
PRACTICA	L/VIVA VOC	CE		0		
ETMA-252		Applied Mathematics Lab	0	2	1	
ETCS-254	5/	Computer Organisation and Architecture Lab	0	2	2	
ETCS-256		Database Management Systems Lab	0	2	1	
ETCS-258		Object Oriented Programming Lab	0	2	1	
ETEE-260		Control Systems Lab	0	2	1	
ETSS-250		NCC/NSS*#		-	1	
TOTAL			18	15	29	

M: Mandatory for award of degree

\*NCC/NSS can be completed in any semester from Semester 1 – Semester 4. It will be evaluated internally by the respective institute. The credit for this will be given after fourth Semester for the students enrolled from the session 2014-15 onwards.

**NOTE:** 4 weeks Industrial / In-house Workshop will be held after fourth semester. However, Viva-Voce will be conducted in the fifth semester.

#NUES(Non University Examination System)

### BACHELOR OF TECHNOLOGY (INFORMATION TECHNOLOGY) FIFTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY F			Ľ	1/1	cituits	platus
	AFERS	1	r	1		1
ETCS 301		Algorithms Design and Analysis	3	1	4	М
ETCS 303		Software Engineering	3	1	4	М
ETCS-307		Java Programming	3	1	4	
ETMS 311		Industrial Management	3	0	3	
ETIT-309	(	Communication Systems	3	~	4	
ETHS 301	~	Communication Skills for Professionals	2	0	1	
PRACTICA	L/VIVA VO	CE		1	1	
ETCS 351	1	Algorithms Design and Analysis Lab	0	2		
ETCS 353		Software Engineering Lab^	0	2	4	
ETCS 357		Java Programming Lab	0	2	1	
ETIT 359		Viva Industrial Training / In-house Workshop *	0	0	1	l.
ETIT 357		Communication Systems Lab	0	2	1	
ETHS 351		Communication Skills for Professionals Lab	0	2	1	
TOTAL			17	14	26	

M: Mandatory for award of degree

\*Viva-Voce for evaluation of Industrial Training / In-house Workshop will be conducted in this semester. ^Using UML 2.0

### **BACHELOR OF TECHNOLOGY** (INFORMATION TECHNOLOGY) SIXTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits	Status
THEORY	PAPERS	I		I		
ETCS 302		Compiler Design	3	1	4	М
ETCS 304		Operating Systems	3	1	4	М
ETEC 310		Data Communication and Networks	3	1	4	М
ETCS 308	0	Web Engineering	3	0	3	
ETCS 310	1	Artificial Intelligence	3	2	4	
ETEE-310	$\langle \nabla$	Microprocessor and Microcontroller	3	71	4	
PRACTICA	AL/VIVA VO	DCE			2	
ETCS 352	51	Operating Systems (Linux Programming and Administration) Lab	0	2	2	
ETEC 358	5 1	Data Communication and Networks Lab	0	2	1	
ETCS 356		Web Engineering Lab	0	2	1	
ETEE 358		Microprocessor and Microcontroller Lab	0	2	1	
TOTAL	-	X M	18	13	27	

M: Mandatory for award of degree

**Note:** Minimum of 4-6 weeks of industrial training related to CSE will be held after 6<sup>th</sup> semester; however, viva-voce will be conducted in 7<sup>th</sup> Semester (ETIT 461). **Imp:-** Elective Paper will be floated in 7<sup>th</sup> Semester, if one-third of the total students opt for the same. It is advised that the decision about the elective subject for 7<sup>th</sup> Semester is done before 15<sup>th</sup> April every year before end of 6<sup>th</sup> semester.

### BACHELOR OF TECHNOLOGY (INFORMATION TECHNOLOGY) SEVENTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits
THEORY I	PAPERS		•		
ETIT-401		Advanced Computer Networks	3	1	4
ETIT-403		Cryptography and Network Security	3	0	3
ETEC-405		Wireless Communication	3	0	3
ELECTIVE	E (SELECT A	ANY TWO, ONE FROM EACH GROUP))			
<b>GROUP-A</b>		KTYPD KK			
ETEC-401	0	Embedded Systems	3	0	3
ETEC-403	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Optoelectronics and Optical Communication	3	0	3
ETIT-407		Cloud Computing	3	0	3
ETIT-409	A.C.	Distributed Databases	3	0	3
ETIT-411	1	Semantic Web Technologies	3	0	3
ETIT-413		Software Testing	3	0	3
ETIT-415	$\nabla$	Digital Signal Processing	3	0	3
<b>GROUP-B</b>	2			1 1	
ETIT-419		.NET and C# Programming	3	0	3
ETIT-421		Enterprise Computing in Java	3	0	3
ETIT-423		System and Network Administration	3	0	3
ETIT-425		Grid Computing	3	0	3
ETIT-427		Advanced Database Administration	3	0	3
ETIT-429		Probablistic Graphical Models	3	0	3
ETHS-419		Sociology and Elements of Indian History for Engineers	3	0	3
PRACTICA	AL/VIVA VC	0			
ETIT-453		Advanced Computer Networks Lab	0	2	1
ETIT-455		Cryptography and Network Security Lab	0	2	1
ETEC-463		Wireless Communication Lab	0	2	1
ETIT-459		Lab based on Elective Group- A or B	0	2	1
ETIT-461		Summer Training / Industrial workshop / Certification	0	0	1
ETIT-463		Minor Project+	0	6	3
TOTAL	GU	RU GOBIND S	15	15	24

**IDENTIFY and SET UP:** The same is advised that the decision about the elective subject for 8<sup>th</sup> Semester is done before 15<sup>th</sup> November every year before end of seventh semester. New Electives may be added as per requirement after getting it duly approved by BOS and AC respectively.

+ The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports.

### BACHELOR OF TECHNOLOGY (INFORMATION TECHNOLOGY) EIGHTH SEMESTER EXAMINATION

Code No.	Paper ID	Paper	L	T/P	Credits
	THEORY H	PAPERS	•		
ETIT 402		Mobile Computing	3	1	4
ETEC 406		Ad hoc and Sensor Networks	3	0	3
ETHS 402		Human Values and Professional Ethics-II	1	0	1
ELECTIVE	(SELECT A	NY TWO, ONE FROM EACH GROUP)			
GROUP A	C.		3		
ETIT-406		Big Data Analytics	3	0	3
ETIT-408	2	Social Network Analysis	3	0	3
ETIT-410	XC.	Soft Computing	3	0	3
ETIT-412	51	Bio Informatics	3	0	3
ETIT-414		Web Application development using .NET	3	0	3
ETIC-414		VLSI Design	3	0	3
ETIT-416		Information Theory and Coding	3	0	3
ETCS-404		Human Computer Interaction	3	0	3
GROUP B					
ETIT418		Digital Image Processing	3	0	3
ETIT420		Next Generation Networks	3	- 0	3
ETIT422		GPS and GIS	3	0	3
ETEC404		Satellite Communication	3	0	3
ETIT428		E-Commerce and M-Commerce	3	0	3
ETIT430		Distributed Systems	3	0	3
ETIT 432		Selected Topics of Recent Trends in Information Technology **	3	0	3
PRACTICA	L/VIVA VO	CE			
ETIT 452		Mobile Computing Lab	0	2	1
ETEC-458		Ad hoc and Sensor Networks Lab	0	2	1
ETIT 456		Lab based on Elective - I	0	2	1
ETIT 458	CIL	Lab based on Elective - II	0	2	1
ETIT-460	90	*Major Project	0	12	8
TOTAL		INDDADDACTU	13	21	26

\*The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format, thereafter he/she will have to present the progress of the work through seminars and progress reports. Seminar related to major project should be delivered one month after staring of Semester. The progress will be monitored through seminars and progress reports.

\*\*Syllabus may be revised after 2 years.

NOTE:

- 1. The total number of the credits of the B.Tech. (IT) Programme = 215.
- 2. Student shall be required to appear in examinations of all courses. However, to award the degree a student shall be required to earn a minimum of 200 credits including mandatory papers (M).

### FOR LATERAL ENTRY STUDENTS:

- 1. The total number of the credits of the B.Tech. (IT) Programme = 161.
- 2. Each student shall be required to appear for examinations in all courses Third Semester onwards. However, for the award of the degree a student shall be required to earn a minimum of 150 credits, including mandatory papers (M).

### NOMENCLATURE OF CODES GIVEN IN THE SCHEME OF

### **B.TECH AND M.TECH**

- 1. ET stands for Engineering and Technology.
- 2. PE stands for Power Engineering.
- 3. ME stands for Mechanical Engineering.
- 4. MT stands for Mechatronics.
- 5. AT stands for Mechanical and Automation Engineering.
- 6. EE stands for Electrical and Electronics Engineering.
- 7. EL stands for Electrical Engineering.
- 8. IT stands for Information Technology
- 9. CS stands for Computer Science and Engineering
- 10. CE stands for Civil Engineering
- 11. EC stands for Electronics and Communications Engineering.
- 12. EN stands for Environmental Engineering
- **13. TE** stands for Tool Engineering
- **14. MA** stands for Mathematics
- 15. HS stands for Humanities and Social Sciences
- 16. SS stands for Social Services

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

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Paper Code: ETMA-201	L	T/P	С
Paper: Applied Mathematics-III	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

### UNIT-I

Fourier series: Definition, Euler's formula, conditions for Fourier expansion, functions having points of discontinuity, change of intervals, even and odd functions ,half range series, Harmonic analysis. Fourier Transforms: Definition, Fourier integral, Fourier transform, inverse Fourier transform, Fourier sine and cosine transforms, properties of Fourier transforms (linearity, scaling, shifting, modulation), Application to partial differential equations.

### UNIT-II

UNIT-III

Difference equation: Definition, formation, solution of linear difference equation with constant coefficients, simultaneous difference equations with constant coefficients, applications of difference equations .Z- transform: Definition, Z- transform of basic functions, properties of Z-transform (linearity, damping, shifting, multiplication), initial value theorem, final value theorem, convolution theorem, convergence of Z- transform, inverse of Z- transform.

[T2][No. of hrs 11]

[T1,T2] [No. of hrs 11]

[T1,T2][No. of hrs 11]

[T2][No. of hrs 11]

Numerical Methods: Solution of algebraic and transcendental equations using bisection method, Regula-Falsi method and Newton – Raphson method. Solution of linear simultaneous equations using Gauss-Jacobi's iteration method and Gauss-Seidal's iteration methods.Finite differences: Forward differences, backward differences and Central differences. Interpolation: Newton's interpolation for equi-spaced values. Stirling's central difference interpolation formula, Divided differences and interpolation formula in terms of divided differences, Lagrange's interpolation formula for unequi-spaced values.

### UNIT-IV

Numerical Differentiation, maxima and minima of a tabulated function. Numerical Integration: Newton-Cote's quadrature formula, Trapezoidal rule, Simpson's one-third rule and Simpson's three-eighth rule .Numerical solution of ordinary differential equations: Picard's method, Taylor's method, Euler's method, modified Euler's method, Runge-Kutta method of fourth order.

#### Text Books:

- [T1] R.K. Jain and S.R.K. Iyengar," Numerical methods for Scientific and Engineering Computation", New Age Publishing Delhi-2014.
- [T2] B. S. Grewal,"Higher Engineering Mathematics" Khanna Publications, 2014 Edition.

### **Reference Books:**

- [R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [R2] P. B. Patil and U. P. Verma, "Numerical Computational Methods", Narosa
- [R3]. Partial Differential Equations" Schaum's Outline Series, McGraw Hill.
- [R4] Michael Greenberg, "Advance Engineering mathematics", Pearson.
- [R5] Schaum's Outline on Fourier Analysis with Applications to Boundary Value Problem, Tata McGraw-Hill

### Maximum Marks : 75

### FOUNDATION OF COMPUTER SCIENCE

Paper Code: ETCS-203	L	T/P	С
Paper: Foundation of Computer Science	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To give basic knowledge of combinatorial problems, algebraic structures and graph theory.

### UNIT- I

Formal Logic: Preposition, Symbolic Representation and logical entailment theory of Inferences and tautologies, Predicates, Quantifiers, Theory of inferences for predicate calculus, resolution. Techniques for theorem proving: Direct Proof, Proof by Contraposition, proof by contradiction.

### UNIT- II

Overview of Sets and set operations, permutation and combination, principle of inclusion, exclusion (with proof) and pigeonhole principle (with proof), Relation, operation and representation of a relation, equivalence relation, POSET, Hasse Diagrams, extremal Elements, Lattices, composition of function, inverse, binary and n-ary operations.

### UNIT- III

Principle of mathematical induction, principle of complete induction, solution methods for linear and non-linear first-order recurrence relations with constant coefficients, Graph Theory: Terminology, isomorphic graphs, Euler's formula (proof), chromatic number of a graph, five color theorem(with proof), Euler &Hamiltonian paths.

[ T1,T2][No of hrs 11]

[T1,T2][No of hrs 11]

[T1.T2][No. of hrs. 12]

[T1,T2][No. of hrs. 10]

### UNIT-IV

Groups, Symmetry, subgroups, normal subgroups, cyclic group, permutation group and cayles's theorem(without proof), cosets lagrange's theorem(with proof) homomorphism, isomorphism, automorphism, rings, Boolean function, Boolean expression, representation & minimization of Boolean function.

### Text Books:

- [T1] Norman L. Biggs, "Discrete Mathematics", Oxford, second edition.
- [T2] Keneth H. Rosen, "Discrete Mathematics and Its Applications", TMH, seventh edition.

### **Reference Books:**

- [R1] Kolman, Busby & Ross, "Discrete Mathematical Structures", PHI, 1996.
- [R2] C.L. Liu, "Elements of Discrete Mathematics", TMH, 2000.
- [R3] J. P. Trembly& P. Manohar, "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1997.

UNIVERSIT

### Scheme and Syllabi for B. Tech-IT, 1<sup>st</sup> year (Common to all branches) w.e.f batch 2014-15 and (2<sup>nd</sup>, 3<sup>nd</sup> & 4<sup>th</sup> years) w.e.f batch 2013-14 approved in the 22<sup>nd</sup> BOS of USET on 30<sup>th</sup> June, 2014 and approved in the 37<sup>th</sup> AC Sub Committee Meeting held on 10<sup>th</sup> July, 2014.

### SWITCHING THEORY AND LOGIC DESIGN

Paper Code: ETEC-205	L	T/P	С
Paper: Switching Theory and Logic Design	3	1	4

### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the knowledge of Logic Systems and Circuits, thereby enabling the student to obtain the platform for studying Digital Systems and Computer Architecture.

### UNIT- I

Number Systems and Codes: Decimal, Binary, Octal and Hexadecimal Number systems, Codes- BCD, Gray Code, Excess-3 Code, ASCII, EBCDIC, Conversion between various Codes.

Switching Theory: - Boolean Algebra- Postulates and Theorems, De' Morgan's Theorem, Switching Functions- Canonical Forms- Simplification of Switching Functions- Karnaugh Map and Quine Mc-Clusky Methods.

**Combinational Logic Circuits:**- Review of basic gates- Universal gates, Adder, Subtractor ,Serial Adder, Parallel Adder- Carry Propagate Adder, Carry Look-ahead Adder, Carry Save Adder, Comparators, Parity Generators, Decoder and Encoder, Multiplexer and De-multiplexer, ALU, PLA and PAL.

[T2,T3][No. of Hrs. 14]

[T2,T3][No. of hrs. 10]

### UNIT- II

Integrated circuits: - TTL and CMOS logic families and their characteristics. Brief introduction to RAM and ROM.

Sequential Logic Circuits: - Latches and Flip Flops- SR, , D, T and MS-JK Flip Flops, Asynchronous Inputs. Counters and Shift Registers:- Design of Synchronous and Asynchronous Counters:- Binary, BCD, Decade and Up/Down Counters, Shift Registers, Types of Shift Registers, Counters using Shift Registers- Ring Counter and Johnson Counter.

### UNIT- III

**Synchronous Sequential Circuits:**- State Tables State Equations and State Diagrams, State Reduction and State Assignment, Design of Clocked Sequential Circuits using State Equations.

Finite state machine-capabilities and limitations, Mealy and Moore models-minimization of completely specified and incompletely specified sequential machines, Partition techniques and merger chart methods-concept of minimal cover table.

[T1][No. of hrs. 10]

[T1][No. of hrs. 10]

### UNIT- IV

Algorithmic State Machine: Representation of sequential circuits using ASM charts synthesis of output and next state functions, Data path control path partition-based design.

**Fault Detection and Location:** Fault models for combinational and sequential circuits, Fault detection in combinational circuits; Homing experiments, distinguishing experiments, machine identification and fault detection experiments in sequential circuits.

### Text Book:

- [T1] Zyi Kohavi, "Switching & Finite Automata Theory", TMH, 2<sup>nd</sup> Edition
- [T2] Morris Mano, Digital Logic and Computer Design", Pearson
- [T3] R.P. Jain, "Modern Digital Electronics", TMH, 2<sup>nd</sup> Ed,

### **Reference Books:**

- [R1] A Anand Kumar, "Fundamentals of Digital Logic Circuits", PHI
- [R2] Taub, Helbert and Schilling, "Digital Integrated Electronics", TMH

#### **CIRCUITS & SYSTEMS**

Paper Code: ETEE-207	L	T/P	С
Paper: Circuits & Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### Maximum Marks:75

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Q. No.1 rest of the paper shall consist of four units as per the syllabus, every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The purpose of this course is for each student to learn and further explore the techniques of advanced circuit analysis. The concepts and analytical techniques gained in this course (e.g., signals, Laplace transformation, frequency response) will enable students to build an essential foundation of many fields within electrical engineering, such as control theory, analog electronic circuits, signal processing.

#### UNIT-I

Introduction to signals, their classification and properties, different types of systems, LTI systems and their properties, periodic waveforms and signal synthesis, properties and applications of Laplace transform of complex waveform.

#### UNIT-II

System modeling in terms of differential equations and transient response of R, L, C, series and parallel circuits for impulse, step, ramp, sinusoidal and exponential signals by classical method and using Laplace transform. [T1.T2][No. of Hours: 12]

#### UNIT-III

Graph theory: concept of tree, tie set matrix, cut set matrix and application to solve electric networks.

Two port networks – Introduction of two port parameters and their interconversion, interconnection of two 2port networks, open circuit and short circuit impedances and ABCD constants, relation between image impedances and short circuit and open circuit impedances. Network functions, their properties and concept of transform impedance, Hurwitz polynomial.

#### Unit IV

Positive real function and synthesis of LC, RC, RL Networks in Foster's I and II, Cauer's I& II forms, Introduction of passive filter and their classification, frequency response, characteristic impedance of low pass, high pass, Band Pass and Band reject prototype section.

[T1,T2][No. of Hours: 10]

[T1,T2][No. of Hours: 10]

[T1,T2][No. of Hours: 10]

#### Text Books:

- [T1] W H Hayt "Engineering Circuit Analysis" TMH Eighth Edition
- [T2] D. R. Choudhary, "Networks and Systems" New Age International, 1999.

- [R1] S Salivahanan "Circuit Theory" Vikas Publishing House 1<sup>st</sup> Edition 2014
- [R2] Valkenburg, "Network analysis" PHI, 2000.
- [R3] Bhise, Chadda, Kulshreshtha, "Engineering network analysis and filter design" Umesh publication, 2000.
- [R4] Kuo, "Network analysis and synthesis" John Weily and Sons, 2<sup>nd</sup> Edition.
- [R5] Allan H Robbins, W.C.Miller "Circuit Analysis theory and Practice" Cengage Learning Pub 5<sup>th</sup> Edition 2013
- [R6] Bell "Electric Circuit" Oxford Publications 7<sup>th</sup> Edition

Paper Code: ETCS-209	L	T/P	С
Paper: Data Structures	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: To understand the programming and the various techniques for enhancing the programming skills for solving and getting efficient results.

#### UNIT – 1:

Introduction to programming methodologies and design of algorithms. Abstract Data Type, array, array organization, sparse array. Stacks and Stack ADT, Stack Manipulation, Prefix, infix and postfix expressions, their interconversion and expression evaluation. Queues and Queue ADT, Queue manipulation. General Lists and List ADT, List manipulations, Single, double and circular lists.

#### UNIT – II:

Trees, Properties of Trees, Binary trees, Binary Tree traversal, Tree manipulation algorithms, Expression trees and their usage, binary search trees, AVL Trees, Heaps and their implementation.

#### UNIT – III:

Multiway trees, B-Trees, 2-3 trees, 2-3-4 trees, B\* and B+ Trees, Graphs, Graph representation, Graph traversal. [T1,T2][No. of hrs. 12]

#### UNIT – IV:

Sorting concept, order, stability, Selection sorts (straight, heap), insertion sort (Straight Insertion, Shell sort), Exchange Sort (Bubble, quicksort), Merge sort (only 2-way merge sort). Searching - List search, sequential search, binary search, hashing concepts, hashing methods (Direct, subtraction, modulo-division, midsquare, folding, pseudorandom hashing), collision resolution (by open addressing: linear probe, quadratic probe, pseudorandom collision resolution, linked list collision resolution), Bucket hashing.

#### Text Books:

- R. F. Gilberg, and B. A. Forouzan, "Data structures: A Pseudocode approach with C", Thomson [T1] Learning.
- A.V. Aho, J. E. Hopcroft, J. D. Ulman "Data Structures and Algorithm", Pearson Education. [T2]

#### Reference Books:

- S. Sahni and E. Horowitz, "Data Structures", Galgotia Publications. [R1]
- [R2]
- Tanenbaum: "Data Structures using C", Pearson/PHI. T.H. Cormen, C.E. Leiserson, R.L. Rivest "Introduction to Algorithms", PHI/Pearson. [R3]
- [R4] A.K.Sharma, "Data Structures", Pearson
- Ellis Horowitz and Sartaz Sahani "Fundamentals of Computer Algorithms", Computer Science [R5] Press

## UNIVERSIT

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 12]

#### COMPUTER GRAPHICS & MULTIMEDIA

Paper Code: ETCS-211	L	T/P	С
Paper: Computer Graphics & Multimedia	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

Maximum Marks : 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, the rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, the student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

*Objective: To understand various aspects of media and to learn the concept of sound, images and videos.* 

#### UNIT- I

Introduction, Applications areas, Components of Interactive Computer Graphics System. Overview of Input devices, Output devices, raster scan CRT displays, random scan CRT displays. DDA and Bresenham's Line Drawing Algorithms, Bresenham's and Mid Point Circle Drawing Algorithms. Homogeneous Coordinate System for 2D and 3D, Various 2D, 3D Transformations (Translation, Scaling, Rotation, Shear).

#### UNIT- II

Clipping Algorithms, Sutherland-Cohen line Clipping Algorithm Bezier Curves, B-Spline Curves. Parallel Projection, Perspective Projection, Illumination Model for diffused Reflection, Ambient light, Specular Reflection Model, Reflection Vector.

#### UNIT- III

Shading Models, Flat shading, Gourard Shading, Phong Model. Visible surface detection, Back Face Detection, Depth Buffer (Z-Buffer, A-Buffer) Method. Overview of multimedia: Classification, basic concepts of sound/audio MIDI: devices, messages, software. , Authoring tools, Video and Animation: controlling animation, display and transmission of animation

[T1,T2][No of hrs 10]

[T1,T2][No of hrs 11]

[T1,T2][No. of hrs. 12]

[T1.T2][No. of hrs. 11]

#### UNIT- IV

Data Compression: storage space, coding requirements, Basic compression techniques: run length code, Huffman code, Lempel-Ziv JPEG: Image preparation, Lossy sequential DCT, expanded lossy DCT, Lossless mode, Hierarchical mode. MPEG, Media synchronization, Media Integration, Production Standards.

#### Text Books:

[T1] Donald Hearn and M.Pauline Baker, "Computer Graphics C version", Second Edition, Pearson Education.

[T2] Ralf Steinmetz & Klara Nahrstedt, "Multimedia Computing Communication & Applications", Pearson Education.

- [R1] C, Foley, VanDam, Feiner and Hughes, "Computer Graphics Principles & practice", 2nd Edition
- [R2] R. Plastock and G. Kalley, Schaum's Series, "Theory and Problems of Computer Graphics", McGraw Hill, 2<sup>nd</sup> edition.
- [R3] Fred Halsall, "Multimedia Communications Applications, Networks, Protocols & Standards", Pearson Education.
- [R4] David F. Rogers, "Procedural elements for computer graphics", McGraw-Hill.

#### SWITCHING THEORY AND LOGIC DESIGN LAB

Paper Code: ETEC-253	L	T/P	С
Paper: Switching Theory and Logic Design Lab	0	2	1

#### List of Experiments:

- 1. Realize all gates using NAND & NOR gates
- 2. Realize Half Adder, Full Adder, Half subtracter, Full subtracter
- 3. Realize a BCD adder
- 4. Realize a Serial Adder
- 5. Realize a four bit ALU
- 6. Realize Master-Save J K Flip-Flop, using NAND/NOR gates
- 7. Realize Universal Shift Register
- 8. Realize Self-Starting, Self Correcting Ring Counter
- 9. Realize Multiplexer and De-Multiplexer
- 10. Realize Carry Look ahead Adder / Priority Encoder
- 11. Simulation of PAL and PLA
- 12. Simulation Mealy and Moore State machines

NOTE: - At least 8 Experiments out of the list must be done in the semester

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<u>CIRCUITS AND SYSTEMS LAB</u>	
	L

Paper Code: ETEE-257	
Paper: Circuits and Systems Lab	

L	Т	С
0	2	1

#### List of Experiments

- 1. Study the transient response of series RLC circuit for different types of waveforms on CRO and verify using MATLAB
- 2. Study the time response of a simulated linear system and verify the unit step and square wave response of first order and second order, type 0,1 system
- 3. Using MATLAB determine current in various resistors connected in network using mesh current and node voltage analysis.
- 4. To determine Z and Y parameters of the given two port network.
- 5. To determine ABCD parameters of the given two port network.
- 6. To verify Reciprocity Theorem for the given two port network.
- 7. To determine Hybrid parameters of the given two port network.
- 8. To design Cascade Connection and determine ABCD parameters of the given two port network.
- 9. To design Series-Series Connection and determine Z parameters of the given two port network.
- 10. To design Parallel-Parallel Connection and determine Y parameters of the given two port network.
- 11. To design Series-Parallel Connection and determine h parameters of the given two port network
- 12. Study the frequency response of different filter circuits.



#### DATA STRUCTURES LAB

#### Paper Code: ETCS-255 Paper: Data Structures Lab

L T/P C 0 2 1

#### List of Experiments :

- Perform Linear Search and Binary Search on an array. Description of programs:
  - a. Read an array of type integer.
  - b. Input element from user for searching.
  - c. Search the element by passing the array to a function and then returning the position of the element from the function else return -1 if the element is not found.
  - d. Display the position where the element has been found.
- 2. Implement sparse matrix using array. Description of program:
  - a. Read a 2D array from the user.
  - b. Store it in the sparse matrix form, use array of structures.
  - c. Print the final array.
- 3. Create a linked list with nodes having information about a student and perform
  - I. Insert a new node at specified position.
  - II. Delete of a node with the roll number of student specified.
  - III. Reversal of that linked list.

4. Create doubly linked list with nodes having information about an employee and perform Insertion at front of doubly linked list and perform deletion at end of that doubly linked list.

5. Create circular linked list having information about an college and perform Insertion at front perform Deletion at end.

6. Create a stack and perform Pop, Push, Traverse operations on the stack using Linear Linked list.

7. Create a Linear Queue using Linked List and implement different operations such as Insert, Delete, and Display the queue elements.

8. Create a Binary Tree (Display using Graphics) perform Tree traversals (Preorder, Postorder, Inorder) using the concept of recursion.

9. Implement insertion, deletion and display (inorder, preorder and postorder) on binary search tree with the information in the tree about the details of a automobile (type, company, year of make).

10. To implement Insertion sort, Merge sort, Quick sort, Bubble sort, Bucket sort, Radix sort, Shell sort, Selection sort, Heap sort and Exchange sort using array as a data structure.

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#### **COMPUTER GRAPHICS & MULTIMEDIA LAB**

Paper Code: ETCS-257	L	Т	С
Paper: Computer Graphics & Multimedia Lab	0	2	1

#### List of Experiments:

- 1. Study of Fundamental Graphics Functions.
- 2. Implementation of Line drawing algorithms: DDA Algorithm, Bresenham's Algorithm
- 3. Implementation of Circle drawing algorithms: Bresenham's Algorithm, Mid Point Algorithm.
- 4. Programs on 2D and 3D transformations
- 5. Write a program to implement cohen Sutherland line clipping algorithm
- 6. Write a program to draw Bezier curve.
- 7. Using Flash/Maya perform different operations (rotation, scaling move etc..) on objects
- 8. Create a Bouncing Ball using Key frame animation and Path animation.



#### APPLIED MATHEMATICS-IV

Paper Code: ETMA-202	L	T/P	С
Paper: Applied Mathematics-IV	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objectives: The objective of this course is to teach the students about the difference equation, probability, curve ftting etc. and other numerical methods to solve various engineering problems.

#### UNIT – I

UNIT II

Partial Differential Equation: linear partial differential equations with constant coefficient, homogeneous and non homogeneous linear equations. Method of separation of variables. Laplace equation, wave equation and heat flow equation in Cartesian coordinates only with initial and boundary value.

#### [T1][No. of Hrs. 11]

Probability Theory: Definition, addition law of probability, multiplication law of probability, conditional probability, Baye's theorem, Random variable: discrete probability distribution, continuous probability distribution, expectation, moments, moment generating function, skewness, kurtosis, binomial distribution, Poisson distribution, normal distribution.

#### UNIT-III

Curve Fitting: Principle of least square Method of least square and curve fitting for linear and parabolic curve, Correlation Coefficient, Rank correlation, line of regressions and properties of regression coefficients. Sampling distribution: Testing of hypothesis, level of significance, sampling distribution of mean and variance, Chi-square distribution, Student's T- distribution, F- distribution, Fisher's Z- distribution.

[T1,T2][No. of Hrs. 12]

[T1,T2][No. of Hrs. 12]

#### UNIT IV

Linear Programming: Introduction, formulation of problem, Graphical method, Canonical and Standard form of LPP, Simplex method, Duality concept, Dual simplex method, Transportation and Assignment problem.

[T1][No. of Hrs. 10]

#### Text Books:

- [T1] B. S. Grewal, "Higher Engineering Mathematics" Khanna Publications.
- [T2]. N.M. Kapoor, "Fundamentals of Mathematical Statistics", Pitambar Publications

- [R1] E. kresyzig," Advance Engineering Mathematics", Wiley publications
- [R2] Miller and Freund, "Probability and statistics for Engineers", PHI
- [R3] Gupta and Kapoor, "Fundamentals of Mathematical Statistics" Sultan Chand and Sons
- [R4] G. Hadley, "Linear Programming", Narosa.
- [R5] Schaum's Outline on Probability and Statistics" Tata McGraw-Hill
- [R6] Gupta and Manmohan, "Problems in Operations Research", Sultan Chand and Sons.
- [R7] R.K. Jain and S.R.K. Iyengar,"Advanced Engineering Mathematics "Narosa Publications.

Paper Code: ETCS-204	L	T/P	С
Paper: Computer Organization & Architecture	3	1	4

#### INSTRUCTIONS TO PAPER SETTERS:

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To understand the architecture and organization of computer in depth.

#### UNIT- I

#### Computer Arithmetic and Register transfer language:

Unsigned notation, signed notation, binary coded decimal, floating point numbers, IEEE 754 floating point standard, Micro-operation, Bus and Memory Transfers, Bus Architecture, Bus Arbitration, Arithmetic Logic, Shift Micro operation, Arithmetic Logic Shift Unit.

UNIT- II

#### Instruction set architecture & computer organization:

Levels of programming languages, assembly language instructions, 8085 instruction set architecture, Instruction Codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycle, Memory Reference Instructions, Input-Output and Interrupts

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

#### UNIT- III

#### **Control Design:**

Instruction sequencing & interpretation, Hardwired & Micro Programmed (Control Unit), Microrogrammed computers, Microcoded CPU: Pentium processor. Specifying a CPU, Design & implementation of simple CPU, General Register Organization, Stack Organization, Instruction Formats, Addressing Modes, Internal architecture of 8085 microprocessor.

UNIT- IV

Memory & Input/Output organization: Memory Technology, Main Memory (RAM and ROM Chips), Virtual memory, High-speed memories

Asynchronous Data Transfers, Programmed I/O, interrupts, Direct memory Access, Serial communication, UARTs, RS-232-C & RS-422 standard

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

#### Text Books:

- [T1] J. D. Carpinelli, "Computer Systems Organization and Architecture", Pearson Education, 2006.
- [T2] J. P. Hayes, "Computer Architecture and Organization", McGraw Hill, 1988.

- [R1] J. L Hennessy and D. A. Patterson, "Computer Architecture: A quantitative approach", Morgon Kauffman, 1992.
- [R2] W. Stallings, "Computer organization and Architecture", PHI, 7<sup>th</sup> ed, 2005.
- [R3] B. Parhami, "Computer Architecture: From Microprocessors to Supercomputers", Oxford University press, 2006.

#### THEORY OF COMPUTATION

Paper Code: ETCS-206	L	T/P	С
Paper: Theory of Computation	3	1	4

### INSTRUCTIONS TO PAPER SETTERS:

**MAXIMUM MARKS: 75** 

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

*Objective: To understand fundamental requirements for building algorithms of any language.* 

#### UNIT- I

Overview: Alphabets, Strings & Languages, Chomsky Classification of Languages, Finite Automata, Deterministic finite Automata (DFA) & Nondeterministic finite Automata (NDFA), Equivalence of NDFA and DFA, Minimization of Finite Automata, Moore and Mealy machine and their equivalence, Regular expression and Kleen's Theorem(with proof), Closure properties of Regular Languages, Pumping Lemma for regular Languages(with proof).

#### UNIT- II

Context free grammar, Derivation trees, Ambiguity in grammar and its removal, Simplification of Context Free grammar, Normal forms for CFGs: Chomsky Normal Form & Greibach Normal Form, Pumping Lemma for Context Free languages, Closure properties of CFL(proof required), Push Down Automata (PDA), Deterministic PDA, Non Deterministic PDA, Equivalence of PDA and CFG, Overview of LEX and YACC.

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

#### UNIT- III

Turing machines, Turing Church's Thesis, Variants and equivalence of Turing Machine, Recursive and recursively enumerable languages, Halting problem, Undecidability, Examples of Undecidable problem.

[T1,T2][No. of hrs. 11]

#### UNIT- IV

Text Books:

Introduction to Complexity classes, Computability and Intractability, time complexity, P, NP, Co-NP, Proof of Cook's Theorem, Space Complexity, SPACE, PSPACE, Proof of Savitch's Theorem, L,NL,Co-NL complexity classes.

[T1,T2][No. of hrs. 11]

- [T1] Hopcroft, John E.; Motwani, Rajeev; Ullman, Jeffrey D "Introduction to Automata Theory, Languages, and Computation", Third Edition, Pearson.
- [T2] Sipser, Michael, "Introduction to the theory of Computation", Third Edition, Cengage.

#### **References Books:**

- [R1] Martin J. C., "Introduction to Languages and Theory of Computations", Third Edition, TMH.
- [R2] Papadimitrou, C. and Lewis, C.L., "Elements of the Theory of Computation", PHI.
- [R3] Daniel I.A. Cohen, "Introduction to Computer Theory", Second Edition, John Wiley.

## UNIVERSITY

#### DATABASE MANAGEMENT SYSTEMS

Paper Code: ETCS-208	L	T/P	С
Paper: Database Management Systems	3	1	4

#### INSTRUCTIONS TO PAPER SETTERS:

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The concepts related to database, database techniques, SQL and database operations are introduced in this subject. This creates strong foundation for application data design.

**UNIT-I : Introductory Concepts of DBMS:** Introduction and application of DBMS, Data Independence, Database System Architecture – levels, Mapping, Database users and DBA, Entity – Relationship model, constraints, keys, Design issues, E-R Diagram, Extended E-R features- Generalization, Specialization, Aggregation, Translating E-R model into Relational model.

#### [T1, T2][No. of Hrs. 10]

**UNIT-II : Relational Model:** The relational Model, The catalog, Types, Keys, Relational Algebra, Fundamental operations, Additional Operations-, SQL fundamentals, DDL,DML,DCL PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Integrity – Triggers.

[T2, R3][No. of Hrs. 10]

**UNIT-III:** Functional Dependencies, Non-loss Decomposition, First, Second, Third Normal Forms, Dependency Preservation, Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

[T2, R1, R3][No. of Hrs. 10]

[T1, T2, R2][No. of Hrs. 12]

**UNIT-IV: Transaction Management:** ACID properties, serializability of Transaction, Testing for Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Database recovery management.

**Implementation Techniques:** Overview of Physical Storage Media, File Organization, Indexing and Hashing, B+ tree Index Files, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Materialized views, Database Tuning.

#### **Text Books:**

- [T1] Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 5<sup>th</sup> Edition, Tata McGraw Hill, 2006
- [T2] Elmsari and Navathe, "Fundamentals of Database Systems", 6th Ed., Pearson, 2013

#### **References Books:**

- [R1] C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8<sup>th</sup> Edition, Pearson Education, 2006.
- [R2] J. D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.

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[R3] Vipin C. Desai, "An Introduction to Database Systems", West Publishing Co.,

#### **OBJECT ORIENTED PROGRAMMING**

Paper Code: ETCS-210	L	T/P	С
Paper: Object Oriented Programming	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

[T1,T2][No. of hrs. 11]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To learn object oriented concepts to enhance programming skills.

#### UNIT – 1:

Objects, relating to other paradigms (functional, data decomposition), basic terms and ideas (abstraction, encapsulation, inheritance, polymorphism). Review of C, difference between C and C++, cin, cout, new, delete operators.

#### UNIT – II:

Encapsulation, information hiding, abstract data types, object & classes, attributes, methods. C++ class declaration, state identity and behavior of an object, constructors and destructors, instantiation of objects, default parameter value, object types, C++ garbage collection, dynamic memory allocation, metaclass/abstract classes.

#### UNIT – III:

Inheritance, Class hierarchy, derivation – public, private & protected; aggregation, composition vs classification hierarchies, polymorphism, categorization of polymorphic techniques, method polymorphism, polymorphism by parameter, operator overloading, parametric polymorphism, generic function – template function, function name overloading, overriding inheritance methods, run time polymorphism.

#### UNIT – IV:

Standard C++ classes, using multiple inheritance, persistant objects, streams and files, namespaces, exception handling, generic classes, standard template library: Library organization and containers, standard containers, algorithm and Function objects, iterators and allocators, strings, streams, manipulators, user defined manipulators, vectors, valarray, slice, generalized numeric algorithm.

#### Text Books:

- [T1] Rumbaugh et. al. "Object Oriented Modelling & Design", Prentice Hall
- [T2] A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH

- [R1] A.K. Sharma, "Object Oriented Programming using C++", Pearson
- [R2] G. Booch "Object Oriented Design & Applications", Benjamin, Cummings.
- [R3] E.Balaguruswamy, "Objected Oriented Programming with C++", TMH
- [R4] S. B. Lippman & J. Lajoie, "C++ Primer", 3<sup>rd</sup> Edition, Addison Wesley, 2000.
- [R4] R. Lafore, "Object Oriented Programming using C++", Galgotia.
- [R5] D. Parasons, "Object Oriented Programming with C++", BPB Publication.
- [R6] Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication.

#### CONTROL SYSTEMS

Paper Code: ETEE- 212	L	T/P	С
Paper: Control Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective**: To teach the fundamental concepts of Control systems and mathematical modeling of the system. To study the concept of time response and frequency response of the system. To teach the basics of stability analysis of the system

#### UNIT I : Control Systems -- Basics & Components

Introduction to basic terms, classifications & types of Control Systems, block diagrams & signal flow graphs. Transfer function, determination of transfer function using block diagram reduction techniques and Mason's Gain formula. Control system components: Electrical/ Mechanical/Electronic/A.C./D.C. Servo Motors, Stepper Motors, Tacho Generators, Synchros, Magnetic Amplifiers, Servo Amplifiers, [T1,T2][No. of Hrs. : 11]

#### UNIT II : Time – Domain Analysis

Time domain performance specifications, transient response of first & second order systems, steady state errors and static error constants in unity feedback control systems, response with P, PI and PID controllers, limitations of time domain analysis.

[T1,T2][No. of Hrs. : 10]

[T1,T2][No. of Hrs. : 10]

### **UNIT III : Frequency Domain Analysis** Polar and inverse polar plots, frequency domain specifications and performance of LTI systems, Logarithmic plots (Bode plots), gain and phase margins, relative stability. Correlation with time domain performance closes loop frequency responses from open loop response. Limitations of frequency domain analysis, minimum/non-

minimum phase systems.

#### UNIT IV : Stability & Compensation Techniques

Concepts, absolute, asymptotic, conditional and marginal stability, Routh-Hurwitz and Nyquist stability criterion, Root locus technique and its application.

Concepts of compensation, series/parallel/ series-parallel/feedback compensation, Lag/Lead/Lag-Lead networks for compensation, compensation using P, PI, PID controllers.

[T1,T2][No. of Hrs. : 11]

#### Text Books:

- [T1] B. C. Kuo, "Automatic control system", Prentice Hall of India, 7<sup>th</sup> edition 2001.
- [T2] Nagraath Gopal "Control Systems Engineering -Principles and Design" New Age Publishers

- [R1] Norman S. Nise, "Control systems engineering" John Wiley & Sons (Asia) Singapore.
- [R2] Raymond T. Stefani, Design of Feedback Control System, Oxford University Press.
- [R3] K. Ogata, "Modern control engineering", Pearson 2002.
- [R4] S. P.Eugene Xavier, "Modern control systems", S. Chand & Company.
- [R5] M. Gopal "Control Systems-Principles and Design" TMH 4<sup>th</sup> Edition 2012

#### APPLIED MATHEMATICS LAB

#### Paper Code: ETMA-252 Paper: Applied Mathematics Lab

L	T/P	С
0	2	1

#### List of Experiments:-

- 1. Solution of algebraic and transcendental equation.
- 2. Algebra of matrices: Addition, multiplication, transpose etc.
- 3. Inverse of a system of linear equations using Gauss-Jordan method.
- 4. Numerical Integration.
- 5. Solution of ordinary differential equations using Runge-Kutta Method.
- 6. Solution of Initial value problem.
- 7. Calculation of eigen values and eigen vectors of a matrix.
- 8. Plotting of Unit step function and square wave function.

It is expected that atleast 12 experiments be performed, including the above specified 8 experiments which are compulsory. The remaining experiments may be developed by faculty and students based on applications of Mathematics in Real Life problem.

#### Text Books:

- 1. B.S. Grewal., "Numerical Methods in Engg. And Science", Khanna Publications
- 2. P. Dechaumphai & N. Wansophark, "Numerical Methods in Engg.: Theories with Matlab, Fortran, C & Pascal Programs", Narosa Publications

#### **Reference Books:**

- 1. P.B. Patil & U.P. Verma, "Numerical Computational Methods", Narosa Publications
- 2. John C. Polking & David Arnold, "Ordinary Differential Equations using MATLAB", Pearson Publications
- 3. Rudra Pratap, "Getting Started With MatLab" Oxford University Press
- 4. Byrom Gottfried, "Programming With C" Shaum's Outline
- 5. Santosh Kumar, "Computer based Numerical & Statistical Techniques", S. Chand Publications.

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### **COMPUTER ORGANIZATION & ARCHITECTURE LAB**

Paper Code: ETCS-254	L	T/P	С
1	0	2	1
Paper: Computer Organization & Architecture Lab	U	2	I

Experimental work based upon the course Computer Organization & Architecture (ETCS-204).

NOTE:- At least 8 Experiments from the syllabus must be done in the semester.



#### DATABASE MANAGEMENT SYSTEMS LAB

Paper Code: ETCS-256	
Paper: Database Management Systems Lab	

L	T/P	С
0	2	1

#### LAB BASED ON DBMS

Lab includes implementation of DDL, DCL, DML i.e SQL in Oracle.

#### List of Experiments:

- 1. Design a Database and create required tables. For e.g. Bank, College Database
- 2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
- 3. Write a SQL statement for implementing ALTER, UPDATE and DELETE
- 4. Write the queries to implement the joins
- 5. Write the queries for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()
- 6. Write the queries to implement the concept of Integrity constrains
- 7. Write the queries to create the views
- 8. Perform the queries for triggers
- 9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints

#### TEXT BOOK:

1. SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications



#### **OBJECT ORIENTED PROGRAMMING LAB**

Paper Code: ETCS-258	L	T/P	С
Paper: Object Oriented Programming Lab	0	2	1

#### List of Experiment:

- 1. Write a program for multiplication of two matrices using OOP.
- 2. Write a program to perform addition of two complex numbers using constructor overloading. The first constructor which takes no argument is used to create objects which are not initialized, second which takes one argument is used to initialize real and imag parts to equal values and third which takes two argument is used to initialized real and imag to two different values.
- 3. Write a program to find the greatest of two given numbers in two different classes using friend function.
- 4. Implement a class string containing the following functions:
  - Overload + operator to carry out the concatenation of strings.
  - Overload = operator to carry out string copy.
  - Overload <= operator to carry out the comparison of strings.
  - Function to display the length of a string.
  - Function tolower() to convert upper case letters to lower case.
  - Function toupper() to convert lower case letters to upper case.
- 5. Create a class called LIST with two pure virtual function store() and retrieve().To store a value call store and to retrieve call retrieve function. Derive two classes stack and queue from it and override store and retrieve.
- 6. Write a program to define the function template for calculating the square of given numbers with different data types.
- 7. Write a program to demonstrate the use of special functions, constructor and destructor in the class template. The program is used to find the bigger of two entered numbers.
- 8. Write a program to perform the deletion of white spaces such as horizontal tab, vertical tab, space ,line feed ,new line and carriage return from a text file and store the contents of the file without the white spaces on another file.
- 9. Write a program to read the class object of student info such as name, age ,sex ,height and weight from the keyboard and to store them on a specified file using read() and write() functions. Again the same file is opened for reading and displaying the contents of the file on the screen.
- 10. Write a program to raise an exception if any attempt is made to refer to an element whose index is beyond the array size.

INDRAPRASTHA

UNIVERSIT

#### CONTROL SYSTEMS LAB

Paper Code: ETEE-260	L	T/P	С
Paper: Control Systems Lab	0	2	1

#### List of Experiments:

- 1. Comparison of open loop & closed loop control in speed control of D.C. motor & to find the transfer function.
- 2. To study the characteristics of positional error detector by angular displacement of two servo potentiometers
  - a. excited with dc
  - b. excited with ac
- 3. To study synchro transmitter in terms of position v/s phase and voltage magnitude with respect to rotor voltage magnitude /phase.
- 4. To study remote position indicator systems using synchro transmitter/receiver.
- 5. To plot speed- torque curves for ac servomotor for different voltages.
- 6. To study ac motor position control system & to plot the dynamic response & calculate peak time, settling time, peak overshoot, damping frequency, steady state error etc.
- 7. To study the time response of simulated linear systems.
- 8. To study the performance of PID Controller.
- 9. Plot impulse response, unit step response, unit ramp response of any 2<sup>nd</sup> order transfer function on same graph using MATLAB.
- 10. To draw the magnetization (Volt Amps) characteristics of the saturable core reactor used in the magnetic amplifier circuits.
- Plot root locus for any 2<sup>nd</sup> order system (with complex poles). For Mp=30%, find the value of K using MATLAB.
- 12. To design lead-lag compensator for the given process using Bode plots in MATLAB.



#### ALGORITHMS DESIGN AND ANALYSIS

Paper Code: ETCS-301	L	T/P	С
Paper: Algorithms Design and Analysis	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

**Objective**: The objective of this paper is to teach the students various problem solving strategies like divide and conquer, Greedy method, Dynamic programming and also the mathematical background for various algorithms. After doing this course, students will be able to select an appropriate problem solving strategies for real world problems. This will also help them to calculate the time, complexity and space complexity of various algorithms.

#### UNIT – I

Asymptotic notations for time and space complexity, Big-Oh notation,  $\Theta$  notation,  $\Omega$  notation, the little-oh notation, the little-omega notation, Recurrence relations: iteration method, recursion tree method, substitution method, master method (with proof), subtract and conquer master method(with proof), Data Structures for Disjoint Sets, Medians and Order statistics. Complexity analysis, Insertion sort, Merge Sort, Quick sort. Strassen's algorithm for Matrix Multiplications. [T1][R1][R2][No. of Hrs. 10]

#### UNIT – II

**Dynamic Programming:** Ingredients of Dynamic Programming, emphasis on optimal substructure, overlapping substructures, memorization. Matrix Chain Multiplication, Longest common subsequence and optimal binary search trees problems, 0-1 knapsack problem, Binomial coefficient computation through dynamic programming. Floyd Warshall algorithm.

#### UNIT – III

[T1][T2][R1] [R3][No. of Hrs. 10]

**Greedy Algorithms:** Elements of Greedy strategy, overview of local and global optima, matroid, Activity selection problem, Fractional Knapsack problem, Huffman Codes, A task scheduling problem. Minimum **Spanning Trees:** Kruskal's and Prim's Algorithm, Single source shortest path: Dijkstra's and Bellman Ford Algorithm(with proof of correctness of algorithms).

#### UNIT – IV

#### [T1][T2][R4] [No. of Hrs. 10]

[T1][R1] [No. of Hrs.: 10]

String matching: The naïve String Matching algorithm, The Rabin-Karp Algorithm, String Matching with finite automata, The Knuth-Morris Pratt algorithm.

**NP-Complete Problem:** Polynomial-time verification, NP-Completeness and Reducibility, NP-Completeness Proof, NP –hard ,Case study of NP-Complete problems (vertex cover problem, clique problem).

#### Text Books:

- [T1] T. H. Cormen, C. E. Leiserson, R. L. Rivest, Clifford Stein, "Introduction to Algorithms", 3<sup>rd</sup> Ed., PHI, 2013.
- [T2] Jon Klenberg, Eva Tardos, "Algorithm Design", Pearson Publications, 2014

- [R1] Sara Basse, "introduction to Design & analysis", Pearson
- [R2] Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Computer Algorithms/C++ "Second Edition, Universities Press.
- [R3] A. V. Aho, J. E. Hopcroft, J. D. Ullman, "The Design and Analysis of Computer Algorithms", Pearson Publication, 2013.
- [R4] Richard Neapolitan, "Foundations of Algorithms", Fifth Edition, Jones & Bartlett Learning

#### SOFTWARE ENGINEERING

Paper Code: ETCS-303	L	T/P	С
Paper: Software Engineering	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To improvise the concept to build any software.

#### UNIT – I

#### Introduction:

Software Crisis, Software Processes, Software life cycle models: Waterfall, Prototype, Evolutionary and Spiral models, Overview of Quality Standards like ISO 9001, SEI-CMM.

Software Metrics:

Size Metrics like LOC, Token Count, Function Count, Design Metrics, Data Structure Metrics, Information Flow Metrics.

#### UNIT – II

Software Project Planning:

Cost estimation, static, Single and multivariate models, COCOMO model, Putnam Resource Allocation Model, Risk management.

Software Requirement Analysis and Specifications:

Problem Analysis, Data Flow Diagrams, Data Dictionaries, Entity-Relationship diagrams, Software Requirement and Specifications, Behavioural and non-behavioural requirements, Software Prototyping.

[T1][R1][R2][No. of Hrs.: 11]

[T1][R1][R2][No. of Hrs.: 10]

#### UNIT – III

Software Design:

Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design, User Interface Design.

Software Reliability:

Failure and Faults, Reliability Models: Basic Model, Logarithmic Poisson Model, Calender time Component, Reliability Allocation. [T1][R1][R2] [No. of Hrs.: 12]

UNIT – IV

Software Testing:

Software process, Functional testing: Boundary value analysis, Equivalence class testing, Decision table testing, Cause effect graphing, Structural testing: Path testing, Data flow and mutation testing, unit testing, integration and system testing, Debugging, Testing Tools & Standards.

Software Maintenance:

Management of Maintenance, Maintenance Process, Maintenance Models, Reverse Engineering, Software Reengineering, Configuration Management, Documentation. [T1][R1][R2] [No. of Hrs.: 11]

#### TEXT BOOKS:

[T1] R. S. Pressman, "Software Engineering – A practitioner's approach", 3<sup>rd</sup> ed., McGraw Hill Int. Ed., 1992.

[T2] K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2001

#### **Reference:**

- [R1] R. Fairley, "Software Engineering Concepts", Tata McGraw Hill, 1997.
- [R2] P. Jalote, "An Integrated approach to Software Engineering", Narosa, 1991.
- [R3] Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, 1996.
- [R4] James Peter, W Pedrycz, "Software Engineering", John Wiley & Sons
- [R5] I. Sommerville, "Software Engineering", Addison Wesley, 1999.

#### JAVA PROGRAMMING

Paper Code: ETCS-307	L	T/P	С
Paper: Java Programming	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

[T1,R2][No. of Hrs.: 11]

[T1,T2][No. of Hrs.: 12]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: To learn object oriented concepts and enhancing programming skills.

#### UNIT I

Overview and characteristics of Java, Java program Compilation and Execution Process Organization of the Java Virtual Machine, JVM as an interpreter and emulator, Instruction Set, class File Format, Verification, Class Area, Java Stack, Heap, Garbage Collection. Security Promises of the JVM, Security Architecture and Security Policy. Class loaders and security aspects, sandbox model

#### UNIT II

Java Fundamentals, Data Types & Literals Variables, Wrapper Classes, Arrays, Arithmetic Operators, Logical Operators, Control of Flow, Classes and Instances, Class Member Modifiers Anonymous Inner Class Interfaces and Abstract Classes, inheritance, throw and throws clauses, user defined Exceptions, The String Buffer Class, tokenizer, applets, Life cycle of applet and Security concerns.

#### UNIT III

Threads: Creating Threads, Thread Priority, Blocked States, Extending Thread Class, Runnable Interface, Starting Threads, Thread Synchronization, Synchronize Threads, Sync Code Block, Overriding Synced Methods, Thread Communication, wait, notify and notify all.

AWT Components, Component Class, Container Class, Layout Manager Interface Default Layouts, Insets and Dimensions, Border Layout, Flow Layout, Grid Layout, Card Layout Grid Bag Layout AWT Events, Event Models, Listeners, Class Listener, Adapters, Action Event Methods Focus Event Key Event, Mouse Events, Window Event

#### UNIT IV

Input/Output Stream, Stream Filters, Buffered Streams, Data input and Output Stream, Print Stream Random Access File, JDBC (Database connectivity with MS-Access, Oracle, MS-SQL Server), Object serialization, Sockets, development of client Server applications, design of multithreaded server. Remote Method invocation, Java Native interfaces, Development of a JNI based application.

Collection API Interfaces, Vector, stack, Hashtable classes, enumerations, set, List, Map, Iterators.

[T1][R1][No. of Hrs.: 10]

[T2][No. of Hrs.: 11]

#### Text Books:

- [T1] Patrick Naughton and Herbertz Schidt, "Java-2 the complete Reference", TMH
- [T2] Sierra & bates, "Head First Java", O'reilly

- [R1] E. Balaguruswamy, "Programming with Java", TMH
- [R2] Horstmann, "Computing Concepts with Java 2 Essentials", John Wiley.
- [R3] Decker & Hirshfield, "Programming.Java", Vikas Publication.

#### INDUSTRIAL MANAGEMENT

Paper Code: ETMS-311	L	T/P	С
Paper: Industrial Management	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The course provides a broad introduction to some aspects of business management and running of business organization.

#### UNIT I

Industrial relations- Definition and main aspects. Industrial disputes and strikes. Collective bargaining. Labour Legislation- Labour management cooperation/worker's participation in management. Factory legislation. International Labour Organization.

#### UNIT II

**Trade Unionism-** Definition, Origin, Objectives of Trade Unions. Methods of Trade unions. Size and finance of Indian Trade unions-size, frequency distribution, factors responsible for the small size. Finance-sources of income, ways of improving finance.

#### UNIT III

Work Study-Method study and time study. Foundations of work study. Main components of method study. Time study standards. Involvement of worker's unions. Work Sampling. Application of work study to office work.

[T1,T2][No. of Hrs. 10]

[T1.T2][No. of Hrs. 10]

#### UNIT IV

Quality Management- What is Quality? Control Charts. Quality is everybody's job. Taguchi Philosophy. Service Quality. What is Total Quality Management (TQM)? Roadmap for TQM. Criticism of TQM. Six Sigma. [T1,T2][No. of Hrs. 10]

#### **Text Books:**

- [T1] Sinha, P.R.N., Sinha I.B. and Shekhar S.M.(2013), Industrial Relations, Trade Unions and Labour Legislation. Pearson Education
- [T2] Chary, S.N. (2012), Production and Operations Management. Tata McGraw Hill Education.

#### **Reference Books:**

- [R1] Srivastava, S.C. (2012), Industrial Relations and Labour Laws, Vikas Publishing
- [R2] Shankar R (2012), Industrial Engineering and Management. Galgotia Publications
- [R3] Telsang, M. (2006), Industrial Engineering and Production Management. S.Chand
- [R4] Thukaram, Rao (2004), M.E. Industrial Management. Himalaya Publishing House.

## UNIVERSITY

#### COMMUNICATION SYSTEMS

Paper Code: ETIT-309	L	T/P	С
Paper: Communication Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

[T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs. 11]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

*Objective:* The objective of the paper is to facilitate the students with the knowledge of electronic communication there by enabling the student to obtain the platform for studying in communication system.

#### UNIT I

Introduction: Overview of Communication system, Communication channels, Mathematical Models for Communication Channels

**Introduction of random Variables:** Definition of random variables, PDF, CDF and its properties, joint PDF, CDF, Marginalized PDF, CDF, WSS wide stationery, strict sense stationery, non stationery signals, UDF, GDF, RDF, Binomial distribution, White process, Poisson process, Wiener process.

#### UNIT II

Analog Modulation: Modulation- Need for Modulation, Amplitude Modulation theory: DSB-SC, SSB, VSB. Modulators and Demodulators. Angle Modulation, Relation between FM and PM Wave. Generation of FM wave- Direct and Indirect Methods. Bandwidth of FM (NBFM, WBFM)

**Pulse Analog Modulation:** Sampling-Natural and Flat top. reconstruction, TDM-Pulse Amplitude Modulation (TDM-PAM), Pulse Width Modulation (PWM), Pulse Position Modulation(PPM), Generation and Recovery.

Pulse Digital Modulation: Pulse Code Modulation (PCM), Differential Pulse Code Modulation (DPCM), Delta Modulation (DM), ADPCM.

#### UNIT III

**Digital Modulation and Transmission:** Advantages of digital communication. Modulation schemes: ASK, PSK, FSK. Spectral Analysis. Comparison. Digital Signaling Formats-Line coding.

**Information and Coding Theory:** Entropy, Information, Channel Capacity. Source Coding Theorem: Shannon Fano Coding, Huffman Coding.

#### UNIT IV

Fiber Optical System: Basic Optical Communication System. Optical fibers versus metallic cables, Light propagation through optical fibers. Acceptance angle and acceptance cone, Fiber configurations. Losses in optical fibers. Introduction to Lasers and light detectors. Applications: Military, Civil and Industrial applications. Advanced Communication Systems: Introduction to cellular radio telephones. Introduction to satellite Communication.

[T1, T2][No. of Hrs. 11]

#### Text Books:

- [T1] George Kennedy, "Electronics Communication System", TMH 1993
- [T2] B.P. Lathi, "Analog& Digital Communication", Oxford University Press 1999.

- [R1] Simon Haykin, "Introduction to Analog & Digital Communication", Wiley, 2000
- [R2] Tannenbaum, "Computer networks", PHI, 2003
- [R3] K. Sam Shanmugam, "Digital & Analog Communication system", John Wiley & Sons 1998.

#### COMMUNICATION SKILLS FOR PROFESSIONALS

Paper Code: ETHS-301	L	T/P	С
Paper: Communication Skills for Professionals	2	0	1

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. This course will also equip them with the basic skills required for a variety of practical applications of communication such as applying for a job, writing reports and proposals. Further, it will make them aware of the new developments in communication that have become part of business organisations today.

#### UNIT I

**Organizational Communication:** Meaning, importance and function of communication, Process of communication, Communication Cycle - message, sender, encoding, channel, receiver, decoding, feedback, Characteristics, Media and Types of communication, Formal and informal channels of communication, 7 C's of communication, Barriers to communication, Ethics of communication (plagiarism, language sensitivity)

**Soft Skills:** Personality Development, Self Analysis through SWOT, Johari Window, Interpersonal skills -Time management, Team building, Leadership skills. Emotional Intelligence.Self Development and Assessment- Self assessment, Awareness, Perception and Attitudes, Values and belief, Personal goal setting, Career planning, Self esteem.

#### [T1,T2][No. of Hrs. 08]

#### UNIT II

**Introduction to Phonetics:** IPA system (as in Oxford Advanced Learner's Dictionary), Speech Mechanism, The Description of Speech Sounds, Phoneme, Diphthong, Syllable, Stress, Intonation, Prosodic Features; Pronunciation; Phonetic Transcription - Conversion of words to phonetic symbols and from phonetic symbols to words. British & American English (basic difference in vocabulary, spelling, pronunciation, structure)

**Non-Verbal Language**: Importance, characteristics, types – Paralanguage (voice, tone, volume, speed, pitch, effective pause), Body Language (posture, gesture, eye contact, facial expressions), Proxemics, Chronemics, Appearance, Symbols.

#### UNIT III

[T1,T2][No. of Hrs. 08]

[T1,T2][No. of Hrs. 08]

**Letters at the Workplace** – letter writing (hard copy and soft copy): request, sales, enquiry, order, complaint. Job Application -- resume and cover letter

Meeting Documentation -- notice, memo, circular, agenda and minutes of meeting.

**Report Writing** - Significance, purpose, characteristics, types of reports, planning, organizing and writing a report, structure of formal report. Writing an abstract, summary, Basics of formatting and style sheet (*IEEE Editorial Style Manual*), development of thesis argument, data collection, inside citations, bibliography; Preparing a written report for presentation and submission. Writing a paper for conference presentation/journal submission.

#### UNIT IV

**Listening and Speaking Skills**: Importance, purpose and types of listening, process of listening, difference between hearing and listening, Barriers to effective listening, Traits of a good listener, Tips for effective listening. Analytical thinking; Speech, Rhetoric, Polemics; Audience analysis. Telephone Skills - making and receiving calls, leaving a message, asking and giving information, etiquettes.

**Presentations:** Mode, mean and purpose of presentation, organizing the contents, nuances of delivery, voice and body language in effective presentation, time dimension.

Group Discussion: Purpose, types of GDs, strategies for GDs, body language and guidelines for group discussion.

**Interview Skills:** Purpose, types of interviews, preparing for the interview, attending the interview, interview process, employers expectations, general etiquettes.

#### [T1,T2][No. of Hrs. 07]

#### **Text Books:**

- [T1] Anna Dept. Of English. Mindscapes: English for Technologists & Engineers PB. New Delhi: Orient Blackswan.
- [T2] Farhathullah, T. M. Communication Skills for Technical Students. Orient Blackswan, 2002.

- [R1] Masters, Ann and Harold R. Wallace. Personal Development for Life and Work, 10th Edition.Cengage Learning India, 2012.
- [R2] Institute of Electrical and Electronics Engineers. IEEE Editorial Style Manual. IEEE, n.d. Web. 9 Sept. 2009.
- [R3] Sethi and Dhamija. A Course in Phonetics and Spoken English. PHI Learning, 1999.
- [R4] Khera, Shiv. You Can Win. New York: Macmillan, 2003.



#### ALGORITHMS DESIGN AND ANALYSIS LAB

Paper Code: ETCS 351	L	T/P	С
Paper: Algorithms Design and Analysis Lab	0	2	1

#### List of Experiments:

1. To implement following algorithm using array as a data structure and analyse its time complexity.

- a. Merge sort
- b. Quick sort
- c. Bubble sort
- d. Bucket sort
- e. Radix sort
- f. Shell sort
- g. Selection sort
- h. Heap sort
- 2. To implement Linear search and Binary search and analyse its time complexity.
- 3. To implement Matrix Multiplication and analyse its time complexity.
- 4. To implement Longest Common Subsequence problem and analyse its time complexity.
- 5. To implement Optimal Binary Search Tree problem and analyse its time complexity.
- 6. To implement Huffman Coding and analyse its time complexity.
- 7. To implement Dijkstra's algorithm and analyse its time complexity.
- 8. To implement Bellman Ford algorithm and analyse its time complexity.
- 9. To implement naïve String Matching algorithm, Rabin Karp algorithm and Knuth Morris Pratt algorithm and analyse its time complexity.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### SOFTWARE ENGINEERING LAB

Paper Code: ETCS-353	L	T/P	С
Paper: Software Engineering Lab	0	2	1

#### **Tool Required: Rational Rose Enterprise Edition**

#### List of Experiments:

- 1. Write down the problem statement for a suggested system of relevance.
- 2. Do requirement analysis and develop Software Requirement Specification Sheet (SRS) for suggested system.
- 3. To perform the function oriented diagram: Data Flow Diagram (DFD) and Structured chart.
- 4. To perform the user's view analysis for the suggested system: Use case diagram.
- 5. To draw the structural view diagram for the system: Class diagram, object diagram.
- 6. To draw the behavioral view diagram : State-chart diagram, Activity diagram
- 7. To perform the behavioral view diagram for the suggested system : Sequence diagram, Collaboration diagram
- 8. To perform the implementation view diagram: Component diagram for the system.
- 9. To perform the environmental view diagram: Deployment diagram for the system.
- 10. To perform various testing using the testing tool unit testing, integration testing for a sample code of the suggested system.
- 11. 10 Perform Estimation of effort using FP Estimation for chosen system.
- 12. 11 To Prepare time line chart/Gantt Chart/PERT Chart for selected software project.

#### Text Books:

- 1. K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International, 2005
- 2. Pankaj Jalote, "An Integrated Approach to Software Engineering", Second Edition, Springer.

#### NOTE:- At least 8 Experiments out of the list must be done in the semester.

## GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### JAVA PROGRAMMING LAB

#### Paper Code: ETCS-357 Paper: Java Programming Lab

#### L T/P C 0 2 1

#### **List of Experiments:**

- 1. Create a java program to implement stack and queue concept.
- 2. Write a java package to show dynamic polymorphism and interfaces.
- 3. Write a java program to show multithreaded producer and consumer application.
- 4. Create a customized exception and also make use of all the 5 exception keywords.
- 5. Convert the content of a given file into the uppercase content of the same file.
- 6. Develop an analog clock using applet.
- 7. Develop a scientific calculator using swings.
- 8. Create an editor like MS-word using swings.
- 9. Create a servlet that uses Cookies to store the number of times a user has visited your servlet.
- 10. Create a simple java bean having bound and constrained properties.



#### **COMMUNICATION SYSTEMS LAB**

Paper Code: ETIT-357	L	T/P	С
Paper: Communication Systems Lab	0	2	1

#### List of Experiments:

- 1. Generation of DSB-SC AM signal using balanced modulator.
- 2. Practical study of amplitude demodulation by linear diode detector
- 3. Generation of SSB AM signal.
- 4. Practical study of envelop detector for demodulation of AM signal and observe diagonal peak clipping effect.
- 5. To generate FM signal using voltage controlled oscillator.
- 6. To generate a FM Signal using Varactor & reactance modulation.
- 7. Detection of FM Signal using PLL & foster seelay method.
- 8. Practical study of Super heterodyne AM receiver and measurement of receiver parameters viz.sensitivity, selectivity & fidelity.
- 9. Practical study of Pre-emphasis and De-emphasis in FM.
- 10. Generation of Phase modulated and demodulated signal.

Simulations study of some of the above experiments using P-spice or Multisim softwares

NOTE: - At least 8 Experiments out of the list must be done in the semester

## GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### COMMUNICATION SKILLS FOR PROFESSIONALS LAB

Paper Code: ETHS-351	L	T/P	С
Paper: Communication Skills for Professionals Lab	0	2	1

**Objective:** To develop communication competence in prospective engineers so that they are able to communicate information as well as their thoughts and ideas with clarity and precision. These activities will enhance students' communication skills with a focus on improving their oral communication both in formal and informal situations. They will develop confidence in facing interviews and participating in group discussions which have become an integral part of placement procedures of most business organisations today.

#### Lab Activities to be conducted:

- 1. **Listening and Comprehension Activities** Listening to selected lectures, seminars, news (BBC, CNN, etc.). Writing a brief summary or answering questions on the material listened to.
- 2. **Reading Activities** -- Reading different types of texts for different purposes with focus on the sound structure and intonation patterns of English. Emphasis on correct pronunciation.
- 3. **Conversation Activities**-- Effective Conversation Skills; Formal/Informal Conversation; Addressing higher officials, colleagues, subordinates, a public gathering; Participating in a video conference.
- 4. **Making an Oral Presentation**–Planning and preparing a model presentation; Organizing the presentation to suit the audience and context; Connecting with the audience during presentation; Projecting a positive image while speaking; Emphasis on effective body language.
- 5. Making a Power Point Presentation -- Structure and format; Covering elements of an effective presentation; Body language dynamics.
- 6. Making a Speech -- Basics of public speaking; Preparing for a speech; Features of a good speech; Speaking with a microphone. Famous speeches may be played as model speeches for learning the art of public speaking. Some suggested speeches: Barack Obama, John F Kennedy, Nelson Mandela, Mahatma Gandhi, Jawahar Lal Nehru, Atal Bihari Vajpayee, Subhash Chandra Bose, Winston Churchill, Martin Luther King Jr.
- 7. **Participating in a Group Discussion** -- Structure and dynamics of a GD; Techniques of effective participation in group discussion; Preparing for group discussion; Accepting others' views / ideas; Arguing against others' views or ideas, etc.
- Participating in Mock Interviews -- Job Interviews: purpose and process; How to prepare for an interview; Language and style to be used in an interview; Types of interview questions and how to answer them.

#### Suggested Lab Activities:

- 1. Interview through telephone/video-conferencing
- 2. Extempore, Story Telling, Poetry Recitation
- 3. Mock Situations and Role Play; Enacting a short skit
- 4. Debate (Developing an Argument), News Reading and Anchoring.

#### Reference Books:

- 1. Patnaik, Priyadarshi. Group Discussion and Interview Skills: With VCD. Cambridge University Press India (Foundation Books), 2012 edition.
- 2. Kaul, Asha. Business Communication. PHI Learning: 2009.
- 3. Hartman and Lemay. Presentation Success: A Step-by-Step Approach. Thomson Learning, 2000.

**Note:** The Communication Skills Lab should be equipped with computers, microphones, an internet connection, overhead projector, screen, sound system, audio/video recording facilities, and seating arrangement for GDs and mock interviews. The student activities may be recorded and students may replay them to analyse and improve their pronunciation, tone, expressions, body language, etc.

Traditional language lab softwares are not mandatory and may be used by students to practice and enhance their language competence. Such softwares are usually elementary in nature and are mostly based on British/American English (pronunciation, accent and expression). They should preferably be in Indian English.

#### **COMPILER DESIGN**

Paper Code: ETCS-302	L	T/P	С
Paper: Compiler Design	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This course aims to teach students the principles involved in compiler design. It will cover all the basic components of a compiler, its optimizations and machine code generation. Students will be able to design different types of compiler tools to meet the requirements of the realistic constraints of compilers.

#### UNIT- I

Brief overview of the compilation process, structure of compiler & its different phases, lexical analyzer, cross compiler, Bootstrapping, quick & dirty compiler, Shift-reduce parsing, operator- precedence parsing, topdown parsing, predictive parsing ,LL(1) and LL(k) grammar, bottom up parsing, SLR, LR(0), LALR parsing techniques.

#### UNIT- II 🔎

Design and implementation of a lexical analyzer and parsing using automated compiler construction tools(eg. Lex, YACC, PLY), Syntax-directed translation schemes, implementation of syntax directed translations, intermediate code, postfix notation, three address code, quadruples, and triples, translation of assignment statements, Boolean expressions, control statements, Semantic Analysis, Type Systems, Type Expressions, Type Checker, Type Conversion

#### [T2][R1][R3][R4][R5][No. of Hrs. 12]

[T1][T2][R1][No. of Hrs. 12]

#### UNIT-III

Symbol table, data structures and implementation of symbol tables, representing scope information.

Run Time Storage Administration, implementation of a simple stack allocation scheme, storage allocation in block structured languages and non block structured languages, Error, Lexical-phase errors, syntacticphase errors, semantic errors.

#### UNIT-IV

The principle sources of optimization, loop optimization, the DAG representation of basic blocks, value number and algebraic laws, global dataflow analysis, Object programs, problems in code generation, a machine model, a single code generator, register allocation and assignment, code generation from DAGs, peephole optimization.

#### [T1][T2] [No. of Hrs. 10]

[T1][T2]][R2][No. of Hrs. 10]

#### Text Books:

- Alfred V. Aho & J.D. Ullman, "Compiler Principles , Techniques& Tools", Pearson [T1]
- Kenneth C. Louden, "Compiler Design", Cengage Publication [T2]

#### **Reference Books:**

- Kakde O.G., "Complier Design", Laxmi Publication [R1]
- [R2] Trembley and Sorenson, "Theory and Practice of Compiler Writing", McGraw Hill
- Vinu V. DAS, "Compiler Design Using FLEX and YACC, PHI [R3]
- Jhon R. Levine, Tony Mason and Doug Brown, "Lex &Yacc", O'Reilly.pdf [R4]
- Andrew W. Appel, Maia Ginsburg, "Modern Compiler Implementation in C", Cambridge University [R5] Press

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### Scheme and Syllabi for B. Tech-IT, 1<sup>st</sup> year (Common to all branches) w.e.f batch 2014-15 and (2<sup>nd</sup>, 3<sup>nd</sup> & 4<sup>th</sup> years) w.e.f batch 2013-14

approved in the 22<sup>nd</sup> BOS of USET on 30<sup>th</sup> June, 2014 and approved in the 37<sup>th</sup> AC Sub Committee Meeting held on 10<sup>th</sup> July, 2014.

#### **MAXIMUM MARKS: 75**

#### **OPERATING SYSTEMS**

Paper Code: ETCS-304	L	T/P	С
Paper: Operating Systems	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** The goal of this course is to provide an introduction to the internal operation of modern operating systems. The course will cover processes and threads, mutual exclusion, CPU scheduling, deadlock, memory management, and file systems.

#### UNIT I

Introduction: What is an Operating System, Simple Batch Systems, Multiprogrammed Batches systems, Time-Sharing Systems, Personal-computer systems, Parallel systems, Distributed Systems, Real-Time Systems, OS – A Resource Manager.

**Memory Organization & Management:** Memory Organization, Memory Hierarchy, Memory Management Strategies, Contiguous versus non- Contiguous memory allocation, Partition Management Techniques, Logical versus Physical Address space, swapping, Paging, Segmentation, Segmentation with Paging

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Thrashing, Demand Segmentation, and Overlay Concepts.

[T1] [T2][R2][R3] [No. of hrs. 10]

#### UNIT II

**Processes:** Introduction, Process states, process management, Interrupts, Interprocess Communication **Threads:** Introduction, Thread states, Thread Operation, Threading Models.

Processor Scheduling: Scheduling levels, pre emptive vs no pre emptive scheduling, priorities, scheduling objective, scheduling criteria, scheduling algorithms, demand scheduling, real time scheduling.

**Process Synchronization:** Mutual exclusion, software solution to Mutual exclusion problem, hardware solution to Mutual exclusion problem, semaphores, Critical section problems. Case study on Dining philosopher problem, Barber shop problem etc.

#### UNIT III

**Deadlocks:** examples of deadlock, resource concepts, necessary conditions for deadlock, deadlock solution, deadlock prevention, deadlock avoidance with Bankers algorithms, deadlock detection, deadlock recovery. **Device Management:** Disk Scheduling Strategies, Rotational Optimization, System Consideration, Caching and Buffering

#### [T1][T2][R1] [No. of hrs. 10]

[T1][T2][[R3] [No. of hrs. 10]

#### UNIT IV

File System: Introduction, File Organization, Logical File System, Physical File System, File Allocation strategy, Free Space Management, File Access Control, Data Access Techniques, Data Integrity Protection, Case study on file system viz FAT32, NTFS, Ext2/Ext3 etc.

#### [T1] [T2][R4][R5] [No. of hrs. 10]

#### **Text Books:**

- [T1] Deitel & Dietel, "Operating System", Pearson, 3<sup>rd</sup> Ed., 2011
- [T2] Silbersachatz and Galvin, "Operating System Concepts", Pearson, 5<sup>th</sup> Ed., 2001
- [T3] Madnick & Donovan, "Operating System", TMH,1<sup>st</sup> Ed., 2001

- [R1] Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
- [R2] Godbole, "Operating Systems", Tata McGraw Hill, 3<sup>rd</sup> edition, 2014
- [R3] Chauhan, "Principles of Operating Systems", Oxford Uni. Press, 2014
- [R4] Dhamdhere, "Operating Systems", Tata McGraw Hill, 3<sup>rd</sup> edition, 2012
- [R5] Loomis, "Data Management & File Structure", PHI, 2<sup>nd</sup> Ed.

#### DATA COMMUNICATION & NETWORKS

Paper Code: ETEC-310	L	T/P	С
Paper: Data Communication & Networks	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objectives: The objective of the paper is to provide an introduction to the fundamental concepts on data communication and the design, deployment, and management of computer networks.

#### UNIT- I

**Data Communications :** Components, protocols and standards, Network and Protocol Architecture, Reference Model ISO-OSI, TCP/IP-Overview ,topology, transmission mode, digital signals, digital to digital encoding, digital data transmission, DTE-DCE interface, interface standards, modems, cable modem, transmission mediaguided and unguided, transmission impairment, Performance, wavelength and Shannon capacity. Review of Error Detection and Correction codes.

**Switching:** Circuit switching (space-division, time division and space-time division), packet switching (virtual circuit and Datagram approach), message switching.

#### UNIT- II

**Data Link Layer:** Design issues, Data Link Control and Protocols: Flow and Error Control, Stop-and-wait ARQ. Sliding window protocol, Go-Back-N ARQ, Selective Repeat ARQ, HDLC, Point-to –Point Access: PPP Point –to- Point Protocol, PPP Stack,

**Medium Access Sub layer:** Channel allocation problem, Controlled Access, Channelization, multiple access protocols, IEEE standard 802.3 & 802.11 for LANS and WLAN, high-speed LANs, Token ring, Token Bus, FDDI based LAN, Network Devices-repeaters, hubs, switches bridges.

#### [T1, T2,R1][No. of Hours: 11]

[T1, T2, R1, R4] [No. of Hours: 11]

#### UNIT- III

**Network Layer:** Design issues, Routing algorithms, Congestion control algorithms, Host to Host Delivery: Internetworking, addressing and routing, IP addressing (class full & Classless), Subnet, Network Layer Protocols: ARP, IPV4, ICMP, IPV6 ad ICMPV6.

[T1, T2,R1][No. of Hours: 11]

[T2, T1, R1, R4][No. of Hours: 11]

#### UNIT- IV

**Transport Layer**: Process to Process Delivery: UDP; TCP, congestion control and Quality of service. **Application Layer**: Client Server Model, Socket Interface, Domain Name System (DNS): Electronic Mail (SMTP), file transfer (FTP), HTTP and WWW.

#### Text Books:

- [T1] A. S. Tannenbum, D. Wetherall, "Computer Networks", Prentice Hall, Pearson, 5<sup>th</sup> Ed
- [T2] Behrouz A. Forouzan, "Data Communications and Networking", Tata McGraw-Hill, 4<sup>th</sup> Ed

- [R1] Fred Halsall, "Computer Networks", Addison Wesley Pub. Co. 1996.
- [R2] Larry L, Peterson and Bruce S. Davie, "Computer Networks: A system Approach", Elsevier, 4<sup>th</sup> Ed
- [R3] Tomasi, "Introduction To Data Communications & Networking", Pearson 7<sup>th</sup> impression 2011
- [R4] William Stallings, "Data and Computer Communications", Prentice Hall, Imprint of Pearson, 9 Ed.
- [R5] Zheng, "Network for Computer Scientists & Engineers", Oxford University Press
- [R6] Data Communications and Networking: White, Cengage Learning

#### WEB ENGINEERING

Paper Code: ETCS-308	L	T/P	С
Paper: Web Engineering	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This paper gives understanding of web designing to the students.

#### UNIT - I

History of the Internet, Basic internet protocols, World Wide Web (W3C), HTTP: Hypertext Transfer Protocol. Markup languages-XHTML: Introduction to HTML, basics of XTHML, HTML elements, HTML tags, lists, tables, frames, forms, defining XHTML's abstract syntax, defining HTML documents.

**CSS style sheets:** Introduction, CSS core syntax, text properties, CSS box model, normal flow box layout, other properties like list, tables, DHTML, XML, XML documents & vocabulary, XML versions & declarations, Introduction to WML.

#### UNIT – II 🦾

Client Side Programming: JAVA Scripts, basic syntax, variables & data-types, literals, functions, objects, arrays, built-in objects, JAVA Script form programming, Intrinsic event handling, modifying element style, document trees,

Server side programming – Java Servlets: Servlet architecture, life cycle, parameter data, sessions, cookies, servlets capabilities, servlets & concurrency. Introduction to JSP, JSP Tags, JSP life cycle, custom tags.

#### UNIT - III

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 10]

[T1,T2][No. of hrs. 12]

Security Threats, Security risks of a site, Web attacks and their prevention, Web security model, Session management, authentication, HTTPS and certificates, Application vulnerabilities and defenses.

Client-side security, Cookies security policy, HTTP security extensions, Plugins, extensions, and web apps, Web user tracking.

Server-side security tools, Web Application Firewalls (WAFs) and Fuzzers.

#### UNIT – IV

Introduction to Web 2.0 and Web 3.0, Concepts and Issues, Latest Trends in Web Technologies. Web Security concerns. Applications of Web Engineering Technologies in distributed systems etc. Case studies using different tools.

#### Text Books:

[T1] Web Technologies: A Computer Science Perspective, Jackson, Pearson Education India, 2007.[T2] Web Engineering: A Practitioner's Approach by Roger S Pressman, David Lowe, TMH, 2008.

#### **Reference Books:**

[R1] Achyut Godbole, Atul Kahate, "Web Technologies", McGraw-Hill Education, Third Edition.

[R2] Uttam K Roy, "Web Technologies", Oxford University Press, 2012.

[R3] Chris Bates, "Web Programming", Wiley

[R4] Web Engineering by Gertel Keppel, Birgit Proll, Siegfried Reich, Werner R., John Wiley.

[R5] Thinking on the Web: Berner's LEE, Godel and Turing, John Wiley & Sons Inc.

[T1,T2][No. of hrs. 10]

#### ARTIFICIAL INTELLIGENCE

Paper Code: ETCS-310	L	T/P	С
Paper: Artificial Intelligence	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objective:** To learn the basics of designing intelligent agents that can solve general purpose problems, represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences

#### UNIT-I

Introduction: Introduction to intelligent agents **Problem solving:** Problem formulation, uninformed search strategies, heuristics, informed search strategies, constraint satisfaction Solving problems by search, iterative deepening [T1,T2][No. of hrs. 12]

#### UNIT-II

Logical Reasoning : Logical agents , propositional logic, inferences ,first-order logic, inferences in first order logic, forward chaining, backward chaining, unification , resolution [T1.T2][No. of hrs. 10]

#### UNIT-III

Game Playing: Scope of AI -Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques- search knowledge, abstraction

[T1,T2][No. of hrs. 12]

[T1,T2][No. of hrs. 10]

#### UNIT-IV

Learning from observations: Inductive learning, learning decision trees, computational learning theory, Explanation based learning

Applications: Environmental Science, Robotics, Aerospace, Medical Sciences etc.

#### Text Book:

- [T1] Rich and Knight, "Artificial Intelligence", Tata McGraw Hill, 1992
- [T2] S. Russel and P. Norvig, "Artificial Intelligence A Modern Approach", Second Edition, Pearson Edu.

#### **Reference Books:**

- [R1] KM Fu, "Neural Networks in Computer Intelligence", McGraw Hill
- [R2] Russel and Norvig, "Artificial Intelligence: A modern approach", Pearson Education

# INDRAPRASTHA UNIVERSITY

#### MICROPROCESSORS AND MICROCONTROLLERS

Paper Code: ETEE-310	L	T/P	С
Paper: Microprocessors and Microcontrollers	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

[T1][No. of hrs. 10]

[T2][No. of hrs. :12]

[T1][No. of hrs. :12]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to facilitate the student with the knowledge of microprocessor systems and microcontroller.

#### UNIT- I

Introduction to Microprocessor Systems: Architecture and PIN diagram of 8085, Timing Diagram, memory organization, Addressing modes, Interrupts. Assembly Language Programming.

#### UNIT- II

**8086 Microprocessor:** 8086 Architecture, difference between 8085 and 8086 architecture, generation of physical address, PIN diagram of 8086, Minimum Mode and Maximum mode, Bus cycle, Memory Organization, Memory Interfacing, Addressing Modes, Assembler Directives, Instruction set of 8086, Assembly Language Programming, Hardware and Software Interrupts.

#### UNIT- III

**Interfacing of 8086 with 8255, 8254/ 8253, 8251, 8259:** Introduction, Generation of I/O Ports, Programmable Peripheral Interface (PPI)-Intel 8255, Sample-and-Hold Circuit and Multiplexer, Keyboard and Display Interface, Keyboard and Display Controller (8279), Programmable Interval timers (Intel 8253/8254), USART (8251), PIC (8259), DAC, ADC, LCD, Stepper Motor.

UNIT-IV

**Overview of Microcontroller 8051:** Introduction to 8051 Micro-controller, Architecture, Memory organization, Special function registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer's model of 8051, Operand types, Operand addressing, Data transfer instructions, Arithmetic instructions, Logic instructions, Control transfer instructions, Timer & Counter Programming, Interrupt Programming.

[T3][No. of hrs. 11]

#### Text Books:

- [T1] Muhammad Ali Mazidi, "Microprocessors and Microcontrollers", Pearson, 2006
- [T2] Douglas V Hall, "Microprocessors and Interfacing, Programming and Hardware" Tata McGraw Hill, 2006
- [T3] Ramesh Gaonkar, "MicroProcessor Architecture, Programming and Applications with the 8085", PHI

- [R1] Muhammad Ali Mazidi, Janice Gillispie Mazidi, Rolin D. MCKinlay "The 8051 Microcontroller and Embedded Systems", 2<sup>nd</sup> Edition, Pearson Education 2008.
- [R2] Kenneth J. Ayala, "The 8086 Microprocessor: Programming & Interfacing The PC", Delmar Publishers, 2007.
- [R3] A K Ray, K M Bhurchandi, "Advanced Microprocessors and Peripherals", Tata McGraw Hill, 2007.
- [R4] Vaneet Singh, Gurmeet Singh, "Microprocessor and Interfacing", Satya Prakashan, 2007.

#### **OPERATING SYSTEMS (LINUX PROGRAMMING AND ADMINISTRATION) LAB**

Paper Code: ETCS-352	L	T/P	С
Paper: Operating Systems (Linux Programming and Administration) Lab	0	2	1

#### **List of Experiments:**

- 1. Write a program to implement CPU scheduling for first come first serve.
- 2. Write a program to implement CPU scheduling for shortest job first.
- 3. Write a program to perform priority scheduling.
- 4. Write a program to implement CPU scheduling for Round Robin.
- 5. Write a program for page replacement policy using a) LRU b) FIFO c) Optimal.
- 6. Write a program to implement first fit, best fit and worst fit algorithm for memory management.
- 7. Write a program to implement reader/writer problem using semaphore.
- 8. Write a program to implement Banker's algorithm for deadlock avoidance.

## NOTE:- At least 8 Experiments out of the list must be done in the semester.



#### **DATA COMMUNICATION & NETWORKS LAB**

Paper Code: ETEC-358	L	T/P	С
Paper: Data Communication & Networks Lab	0	2	1

#### List of Experiments:

- 1. PC to PC Communication
- 2. Parallel Communication using 8 bit parallel cable & Serial communication using RS 232C
- 3. Ethernet LAN protocol
- 4. To create scenario and study the performance of CSMA/CD protocol through Simulation
- 5. To create scenario and study the performance of token bus and token ring protocols through simulation
- 6. To create scenario and study the performance of network with CSMA / CA protocol and compare with
- 7. CSMA/CD protocols.
- 8. Implementation and study of stop and wait protocol
- 9. Implementation and study of Go back-N and selective repeat protocols
- 10. Implementation of distance vector routing algorithm
- 11. Implementation of Link state routing algorithm.

\*All Practical can be conducted using C-Language and LAN Emulator.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

# GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### WEB ENGINEERING LAB

Paper Code: ETCS-356	L	T/P	С
Paper: Web Engineering Lab	0	2	1

Web Engineering Lab experiment based on syllabus of (ETCS-308).



### MICROPROCESSORS AND MICROCONTROLLERS LAB

Paper Code: ETEE-358	L	T/P	С
Paper: Microprocessors and Microcontrollers Lab	0	2	1

#### List of Experiments:

- 1. Write a program to add and subtract two 16-bit numbers with/ without carry using 8086.
- 2. Write a program to multiply two 8 bit numbers by repetitive addition method using 8086.
- 3. Write a Program to generate Fibonacci series.
- 4. Write a Program to generate Factorial of a number.
- 5. Write a Program to read 16 bit Data from a port and display the same in another port.
- 6. Write a Program to generate a square wave using 8254.
- 7. Write a Program to generate a square wave of 10 kHz using Timer 1 in mode 1(using 8051).
- 8. Write a Program to transfer data from external ROM to internal (using 8051).
- 9. Design a Minor project using 8086 Micro processor (Ex: Traffic light controller/temperature controller etc)
- 10. Design a Minor project using 8051 Micro controller

#### NOTE: - At least 8 Experiments out of the list must be done in the semester.



#### ADVANCED COMPUTER NETWORKS

Paper Code: ETIT-401	L	T/P	С
Paper: Advanced Computer Networks	3	1	4

INSTRUCTIONS TO PAPER SETTERS:MAXIMUM MARKS: 751. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks
Objective: To understand different network protocols with emphasis on TCP/IP protocol suite.
UNIT-I Network Layer: ARP,RARP,ICMP,IPv4 Routing Principles, Routing and overview, DVR and LSR, the IGRP and EIGRP, BGP, Routing Information Protocol (RIP), OSPF (IPv4 / IPv6). Multicasting in IP Environments-Broadcasting, Multicasting, IGMP and Multicast Listener Discovery (MLD). The Distance Vector Multicast Routing Protocol (DVMRP), Multicast OSPF (MOSPF), Protocol Independent
Multicast (PIM). [T1][No. of Hours 10]
<b>Transport Layer:</b> Transport layer overview, UDP, TCP (Flow Control, Error Control, and Connection Establishment), TCP Protocol: TCP Tahoe, TCP Reno.
[R1, R3][No. of Hours 10] UNIT-III Optical Networking: Introduction to Optical networking, its benefits and drawbacks, SONET layered architecture, frame format, SONET network configuration, its advantages and benefits. Quality of Service: Introducing QoS, Queue Analysis, QoS Mechanisms, Queue Management algorithms, Resource Reservation, Diffserv and Interv.
UNIT-IV [T2] [No. of Hours 10]
Overview of latest concepts: TCP/IP Applications: VoIP, NFS, Telnet ,FTP,SMTP, SNMP, Finger, Whois and WWW, IP v6 and Next Generation Networks, xAAS(PAAS,SAAS,HAAS) and Cloud Computing, Big data, Elements of Social Network.
[R2][No. of Hours 12]
Text Books:[T1]Douglas E. Comer, "Internet networking with TCP/IP", Pearson. TCP/IP, Vol. 2[T2]B. A. Forouzan, "TCP/IP Protocol Suite", TMH, 2nd Ed., 2004.Reference Books:

- TCP/IP Illustrated, Volume 1 (The Protocols) by W. Richard Stevens, Pearson Education. [R1]
- U. Black, "Computer Networks-Protocols, Standards and Interfaces", PHI, 1996. [R2]
- [R3] W. Stallings, "Computer Communication Networks", PHI, 1999.

#### CRYPTOGRAPHY & NETWORK SECURITY

Paper Code: ETIT-403	L	T/P	С
Paper: Cryptography & Network Security	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: Syllabus should be proposed so as to be covered in 42 to 45 lectures (assuming 14 or 15 weeks session). Syllabus should be evenly divided into 4 Units only.

#### UNIT-I:

Basic Cryptographic Techniques, Computational Complexity, Finite Fields, Number Theory, DES and AES, Public Key Cryptosystems, Traffic Confidentiality, Cryptanalysis, Intractable (Hard) Problems, Hash Functions, OSI Security Architecture Privacy of Data.

#### UNIT- II:

Linear Cryptanalysis, Differential Cryptanalysis, DES, Triple DES, Message Authentication and Digital Signatures, Attacks on Protocols, Elliptic Curve Architecture and Cryptography, Public Key Cryptography and RSA, , Evaluation criteria for AES, Key Management, Authentication requirements Digital forensics including digital evidence handling: Media forensics, Cyber forensics, Software forensics, Mobile forensics.

#### [T1, T2][No. of Hrs: 11]

[T1, T2][No. of Hrs: 11]

UNIT-III:

Buffer Flow attack, Distributed Denial of service attack, Weak authentication, Design of Substitution Boxes (S-Boxes), Hash Functions, Security of Hash Functions, Secure Hash Algorithm, Authentication applications, Kerberos, IP security, Pretty Good Privacy (PGP), Web Security Light weight cryptography for mobile devices, Side channel attacks.

#### UNIT- IV:

[T1, T2][No. of Hrs: 11]

[T1, T2][No. of Hrs: 11]

System security, Security Standards, Intruders, and Viruses, Firewalls, Malicious software, Intrusion Detection System, Intrusion Prevention System, Trusted Systems, Virus Counter measures, Authentication Strategies.

#### Text Book:

- [T1] William Stallings, "Cryptography And Network Security Principles and Practices", Prentice Hall of India, Third Edition, 2003.
- [T2] Wade Trappe, Lawrence C Washington, "Introduction to Cryptography with coding theory", 2nd ed, Pearson, 2007.

- [R1] R.Rajaram, "Network Security and Cryptography" SciTech Publication, First Edition, 2013.
- [R2] Atul Kahate, "Cryptography and Network Security", Tata McGraw-Hill, 2003
- [R3] Bruce Schneier, "Applied Cryptography", John Wiley & Sons Inc, 2001.
- [R4] http://www.iiitd.edu.in/~gauravg/

#### WIRELESS COMMUNICATION

Paper Code: ETEC-405	L	T/P	С
Paper: Wireless Communication	3	0	3

#### **INSTRUCTIONS TO PAPER SETTER:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the course is to introduce various wireless networks, mobile networks and their basic architecture starting from 2G through to 3G and 4G.

#### UNIT – L

**Introduction To Wireless Communication Systems:** Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

Introduction to Wireless Channels and Diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications

#### UNIT - II

2G Networks: Second generation, digital, wireless systems; GSM, IS 136 (D-AMPS), IS-95 CDMA. Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling, mobile management, voice signal processing and coding. Spread Spectrum Systems-Cellular code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

#### UNIT - III

2.5G Mobile Data Networks: Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes, EDGE, Wireless LANs, (IEEE 802.11), Mobile IP.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

#### UNIT – IV

Wireless Local Loop (WLL): Introduction to WLL architecture, WLL technologies. Wireless personal area networks (WPAN): Blue tooth, IEEE 802.15, architecture, protocol stack. Wi-Max, introduction to Mobile Adhoc Networks.

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

#### Text Books:

- Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001. [T1]
- [T2] Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2<sup>nd</sup> Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.

#### Reference Books:

- T.L.Singhal "Wireless Communication", Tata McGraw Hill Publication. [R1]
- Jochen Schiller, "Mobile communications," Pearson Education Pvt. Ltd., 2002. [R2]
- Yi -Bing Lin & Imrich Chlamatac, "Wireless and Mobile Networks Architecture," John Wiley & Sons, [R3] 2001.
- [R4] Lee, W.C.Y., "Mobile Cellular Telecommunication", 2nd Edition, McGraw Hill, 1998.
- [R5] Smith & Collins, "3G Wireless Networks," TMH, 2007
- Schiller, Jochen, "Mobile Communications", 2<sup>nd</sup> Edition, Addison Wesley [R6]

#### [T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

[T1,T2][No. of Hrs. 11]

# [T1,T2][No. of Hrs. 11]

#### EMBEDDED SYSTEMS

Paper Code: ETEC-401	L	T/P	С
Paper: Embedded Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to enable a student to design an embedded system for specific tasks.

#### UNIT- I

**Overview of Embedded Systems**: Characteristics of Embedded Systems. Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 micro controllers.

PIC Microcontrollers: Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals. [T1][No. of hrs. 12]

#### UNIT- II

ARM Processors: Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture.

Bus structure: Time multiplexing, serial, parallel communication bus structure. Bus arbitration, DMA, PCI, AMBA, I2C and SPI Buses.

[T2][No. of hrs. 12]

#### UNIT- III

Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System.

[T3][No. of hrs. 10]

#### UNIT-IV

**RTOS:** Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RT-Linux introduction, RTOS kernel, Real-Time Scheduling. [T3][No. of hrs. 10]

#### Text Book:

- [T1] Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002
- [T2] ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss, Dominic Symes, Chris Wright, Morgan Kaufman Publication, 2004.
- [T3] Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

#### **References Books:**

- [R1] The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
- [R2] Embedded System Design, Marwedel, Peter, Kluwer Publishers, 2004.

# UNIVERSITY

#### **OPTOELECTRONICS AND OPTICAL COMMUNICATION**

Paper Code: ETEC-403	L	T/P	С
Paper: Optoelectronics and Optical Communication	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: The objective of this paper is to introduce the student about Optical Fiber, Wave propagation, Detectors and its structures and functions.

#### UNIT - I

Introduction: Optical Fiber: Structures, Wave guiding and Fabrication – Nature of light, Basic optical laws and Definition, Optical fiber modes and Configuration, Mode theory for circular waveguides, Single mode fibers, Graded index fiber, Fiber materials, Fabrication and mechanical properties, Fiber optic cables, Basic Optical Communication System, Advantage of Optical Communication System . [T1, T2][No. of Hrs.10]

#### UNIT – II

Attenuation in Optical Fibers: Introduction, Absorption, Scattering, Very Low Loss Materials, All Plastic & Polymer-Clad-Silica Fibers.

**Wave Propagation:** Wave propagation in Step-Index & Graded Index Fiber, Overall Fiber Dispersion-Single Mode Fibers, Multimode Fibers, Dispersion-Shifted Fiber, Dispersion, Flattened Fiber, Polarization.

#### [T1, T2][No. of Hrs.11]

#### UNIT – III

**Source & Detectors:** Design & LED's for Optical Communication, Semiconductor Lasers for Optical Fiber Communication System and their types, Semiconductor Photodiode Detectors, Avalanche Photodiode Detector & Photo multiplier Tubes. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling. Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers .

#### UNIT – IV

**Optical Fiber Communication Systems:** Data Communication Networks – Network Topologies, Mac Protocols, Analog System. Advanced Multiplexing Strategies – Optical TDM, Sub carrier Multiplexing, WDM Network. Architectures: SONET/SDH. Optical Transport Network, Optical Access Network, Optical Premise Network. **Applications**-Military Applications, Civil, Consumer & Industrial Applications.

#### [T1, T2][No. of Hrs.12]

[T1, T2][No. of Hrs.11]

#### Text Books:

- [T1] J. Gowar, "Optical Communication System", IEEE Press 2<sup>nd</sup> Edition.
- [T2] R.P.Khare, "Fiber Optics and Opto Electronics" Oxford Publication

- [R1] Optical Information Processing F. T. S. Yu Wiley, New York, 1983
- [R2] G. P. Agrawal, Fiber optic Communication Systems, John Wiley & sons, New York, 1992
- [R3] A. Ghatak, K. Thyagarajan, "An Introduction to Fiber Optics", Cambridge University Press
- [R4] J. H. Franz & V. K. Jain, "Optical Communication Components & Systems", Narosa Publish, 2013
- [R5] John M. Senior, "Optical Fiber Communications", Pearson, 3rd Edition, 2010.

Paper Code: ETIT-407	L	T/P	С
Paper: Cloud Computing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: To enable students to understand the basic concepts of Cloud Computing and to apply these concepts for designing, evaluating, simulations and comparing various applications in Cloud Computing.

#### UNIT I

#### Introduction to Cloud Computing

Overview of Parallel Computing, Grid Computing, Distributed Computing and its Variants (eg. MANETs, Peer to Peer, Cloud), Introduction to Autonomic Computing, Evolution of Cloud Computing and it's vision, Issues and Challenges in Cloud Computing, Applications of Cloud Computing.

#### UNIT II

#### **Cloud Computing Architecture**

**Cloud Computing Architectures:** features of Clouds: components, types, technologies, Service Models (Services: IaaS, PaaS, SaaS), Deployment Models (Public Cloud, Private Cloud, Hybrid Cloud, Community Cloud) various cloud management platforms and tools.

[T1, T2][No. of Hours: 12]

#### UNIT III

#### Virtualization of Clouds

**Virtualization:** Introduction, Evolution, Virtualized Environment characteristics, Server Virtualization, VM Provisioning and Manageability, VM Migration Services, VM Provisioning in the Cloud Context, and Future Research Directions. Cloud Security Mechanisms (Encryption, PKI, SSO, IAM), Service Management in Cloud Computing(SLA, Billing & Accounting etc).

[T1, T2][No. of Hours: 12]

[T1, T2][No. of Hours: 11]

#### UNIT IV

#### **Advanced Cloud Applications**

Specialized Cloud Architecture: Direct I/O Access, Load Balanced Virtual Switches, Multipath Resource Access, Federated Clouds, Basics of Cloud Mobility, Enterprise cloud computing: Data, Processes, Components, Architectures, applications, Enterprise Software(ERP, SCM, CRM)

Case Studies on Open Source and Commercial available tools and platforms (Microsoft Azure, Google AppEngine, Amazon Web services, Hadoop, Eucalyptus, Cloud SIM etc).

#### Text Books:

- [T1] Rajkumar Buyya, Christian Vecchiola, and Thamarai Selvi, Mastering Cloud Computing, Tata McGraw Hill, New Delhi, India, 2013.
- [T2] Thomas Erl, Zaigam Mahmood, Ricardo Puttini, Cloud Computing Concepts, Technology & Architecture, 1<sup>st</sup> Reprint, Pearson India, 2013 (T2)
- [T3] Kumar Saurabh, Cloud Computing, 2<sup>nd</sup> Edition, Wiley, 2013 (T3)
- [T4] Gautam Shroff, "Enterprise Cloud Computing", Cambridge University Press.

#### **Reference Books:**

- [R1] Barrie Sosinsky, Cloud Computing Bible, Wiley
- [R2] A. Srinivasan and J. Suresh, Cloud computing a pratical approach for learning and Implementation, Pearson India 1<sup>st</sup> edition
- [R3] Michael Miller, Cloud Computing, Pearson, 2008.
- [R4] Mukesh Singhal, Niranjan G.Shivaratri, TMH Edition. (Must be included for the basics of distributed systems basics from which all distributed systems have been originated).

## [T1, T2][No. of Hours: 10]

#### **DISTRIBUTED DATABASES**

Paper Code: ETIT-409	L	T/P	С
Paper: Distributed Databases	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this paper is to facilitate the student with principles and foundations of Distributed databases.

#### UNIT I

Architecture of distributed systems: network operating system, distributed operating systems, Distributed database systems. (a) Federated database systems, (b) multi database systems, and (c) Client/Server systems, Distributed DBMS architecture.

**Distributed database design:** Top down design- Designing issues, Fragmentation, Allocation, Data dictionary, Bottom up design- Schema Matching, Schema Integration, Schema Mapping, Data Cleaning

Data and Access Control: views in centralised and distributed DBMS, Data security, Semantic Integrity Control. [T1, R1][No. of Hours: 10]

#### UNIT II

**Query Processing:** Characterization of query processors, Layers of query processing, Query Decomposition: Normalization, Analysis, Elimination of redundancy,

**Data Localization:** Reduction of primary horizontal fragmentation, Reduction of vertical fragmentation, reduction of derived fragmentation, hybrid fragmentation.

Optimization of Distributed Query: Join ordering, Semi join based algorithms, optimization

#### UNIT III

**Transaction Management:** Properties of transactions, Types of transactions- flat transactions, nested transactions, workflow.

**Distributed Concurrency Control:** Serializability theory, Locking based concurrency control Algorithm, Timstamp based algorithms,

Deadlock Management: Prevention, Avoidance, Detection and Resolution

#### [T1, T2][No. of Hours: 10]

[T1, R2][No. of Hours: 11]

[T1, T2][No. of Hours: 11]

#### UNIT IV

**Distributed DBMS Reliability:** Local Reliability protocol, Distributed Reliability protocol- two phase commit protocol, three phase commit protocol.

**Parallel Database System:** System architecture, Parallel query processing, Load Balancing, Database Clusters. Web Data Management: Web Search-crawling, indexing ranking, Web Querying, Distributed XML Processing.

#### Text Books:

- [T1] Principles of Distributed Database Systems. Ozsu and Valduriez. Prentice Hall.
- [T2] Distributed Database Principles and Systems. Ceri and Pelagatti. McGraw Hill.

- [R1] Distributed Systems: Concept and Design. Coulouris, Dollimore, and Kindberg. AW.
- [R2] Recovery Mechanisms in Database Systems. Kumar and Hsu, Prentice Hall.
- [R3] Concurrency Control and Recovery in Database Systems. Bernstein, Hadzilacos and Goodman, AW

#### SEMANTIC WEB TECHNOLOGIES

Paper Code: ETIT-411	L	T/P	С
Paper: Semantic Web Technologies	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This is the aim behind the Semantic Web, which is also being referred to as Web 3.0 and which is heavily embedded in the Artificial Intelligence area. Its long-term goal is that of enhancing the human and machine interaction by representing the data in an understandable way for the machine.

#### UNIT-I

Introduction: Why Semantics-Data integration across the web, Traditional data modelling methods, semantic relationships, metadata, Building models, Calculating with knowledge, Exchanging information, Semantic web technology.

#### UNIT-II

**RDF Resource description language:** Simple Ontology's in RDF and RDF schema- Introduction, syntax for RDF, advanced features, Simple ontology's in RDF schemas.

**RDF Formal semantics:** Why semantics, Model theoretic semantic for RDF(S), Semantic reasoning with deduction rules, the semantic limits of RDF(S).

#### UNIT-III

Web Ontology Languages (OWL): OWL syntax and intuitive semantics, owl species, Description logics, Model theoretic semantics of owl, Automated Reasoning with OWL.

[T1, T2][No. of Hours: 10]

[T1, T2][No. of Hours: 12]

[T1, T2][No. of Hours: 12]

[T1, T2][No. of Hours: 10]

#### UNIT-IV

**Rules and Queries:** Ontology and Rules-What is Rule, Data log as a first order rule language, Combining Rules with OWL-DL, Rule interchange format RIF.

Query Language: SPARQL-Query language for RDF, Conjunctive queries for OWL-DL.

#### Text Books:

- [T1] Foundation Of Semantic Web Technology:-Pascal Hitzler, Marcus Krotzsch, Sebastion Rudolph.by Chapman and Hall Book(CRC Press).
- [T2] Programming The Semantic Web:-Toby Segaran, Colin Evans, Jamie Taylor by O'Reilly Media Publication.

- [R1] A Semantic Web Primer MIT Press.
- [R2] Knowledge Representation: Logical, Philosophical, and Computational Foundations, John Sowa,(ISBN-13:978-0534949655
- [R3] Foundations of Semantic Web Technologies, Pascal Hitzler, Markus Krotzsch, Sebastian Rudolph (ISBN:978-1-4200-9059-5).
- [R4] Agency and the Semantic Web, Christopher Walton, ISBN-13: 978-0199292486.
- [R5] Artificial Intelligence: A Modern Approach, 3rd Edition, Stuart Russell, Peter Norvig (ISBN-13:978-0-13-604259-4).

#### SOFTWARE TESTING

Paper Code: ETIT-413	L	T/P	С
Paper: Software Testing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the knowledge of software testing, types of testing and testing tools.

#### UNIT I

Introduction: What is software testing and why it is so hard?, Error, Fault, Failure, Incident, Test Cases, Testing Process, Limitations of Testing, No absolute proof of correctness, Overview of Graph Theory. [T1, T2][No. of Hours: 10]

#### UNIT II

Functional Testing: Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing, Cause Effect Graphing Technique.

Structural Testing: Path testing, DD-Paths, Cyclomatic Complexity, Graph Metrics, Data Flow Testing, Mutation testing. [T1, T2][No. of Hours: 11]

#### UNIT III

#### Reducing the number of test cases:

Prioritization guidelines, Priority category, Scheme, Risk Analysis, Regression Testing, Slice based testing Testing Activities: Unit Testing, Levels of Testing, Integration Testing, System Testing, Debugging, Domain Testing.

[T1, T2][No. of Hours: 11]

[T1, T2][No. of Hours: 10]

#### UNIT IV

Object Oriented Testing: Issues in Object Oriented Testing, Class Testing, GUI Testing, Object Oriented Integration and System Testing.

Testing Tools: Static Testing Tools, Dynamic Testing Tools, Characteristics of Modern Tools.

#### Text Books:

- William Perry, "Effective Methods for Software Testing", John Wiley & Sons, New York, 1995. [T1]
- [T2] Cem Kaner, Jack Falk, Nguyen Quoc, "Testing Computer Software", Second Edition, Van Nostrand Reinhold, New York, 1993.
- [T3] Boris Beizer, "Software Testing Techniques", Second Volume, Second Edition, Van Nostrand Reinhold, New York, 1990.
- [T4] Louise Tamres, "Software Testing", Pearson Education Asia, 200

- [R1] Roger S. Pressman, "Software Engineering - A Practitioner's Approach", Fifth Edition, McGraw-Hill International Edition, New Delhi, 2001.
- [R2] Boris Beizer, "Black-Box Testing - Techniques for Functional Testing of Software and Systems", John Wiley & Sons Inc., New York, 1995.
- K.K. Aggarwal & Yogesh Singh, "Software Engineering", New Age International Publishers, New [R3] Delhi, 2003.
- Marc Roper, "Software Testing", McGraw-Hill Book Co., London, 1994. [R4]
- Gordon Schulmeyer, "Zero Defect Software", McGraw-Hill, New York, 1990. [R5]
- Watts Humphrey, "Managing the Software Process", Addison Wesley Pub. Co. Inc., Massachusetts, [R6] 1989.
- [R7] Boris Beizer, "Software System Testing and Quality Assurance", Van Nostrand Reinhold, New York, 1984.
- [R8] Glenford Myers, "The Art of Software Testing", John Wiley & Sons Inc., New York, 1979.

#### DIGITAL SIGNAL PROCESSING

Paper Code: ETIT-415	L	T/P	С
Paper: Digital Signal Processing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

**Objectives:** The aim of this course is to provide in depth knowledge of various digital signal processing techniques and design of digital filters, learn the concept of DFT FFT algorithms, and design of digital filters using different approximations, DSP processor and architecture. The prerequisites of this subject are basic knowledge of signal and systems.

#### UNIT-I:

Frequency Domain Sampling: The Discrete Fourier Transform, Properties of the DFT, Linear filtering methods based of the DFT.

Efficient computation of the DFT: Principal Of FFT, Fast Fourier Transform Algorithms, Applications of FFT Algorithms, A linear filtering approach to computation of the DFT.

Application of DFT, Design of Notch filter

#### UNIT-II:

**Design & Structure of IIR filters from analog filters:** Impulse Invariance; Bilinear transformation and its use in design of Butterworth and Chebyshev IIR Filters; Frequency transformation in Digital Domain, Direct, Cascade, Parallel & transposed structure

**Design & structure of FIR filters:** Symmetric and anti-symmetric FIR filters; Design of Linear Phase FIR filters using windows, Frequency Sampling Method of FIR design, Direct, Cascade, Frequency Sampling, transposed structure

[T1,T2] [No. of Hours: 11]

[T2,T1][No. of Hours: 11]

#### UNIT-III:

#### Implementation of Discrete Time Systems:

Lattice structures, Lattice and Lattice-Ladder Structures, Schur - Cohn stability Test for IIR filters; Discrete Hilbert Transform.

#### Linear predictive Coding:

Lattice filter design, Levension Darwin Technique, Schur Algorithm

#### UNIT-IV:

Quantization Errors in Digital Signal Processing: Representation of numbers, Quantization of filter coefficients, Round-off Effects in digital filters.

**Multirate Digital Signal Processing**: Decimation, Interpolation, Sampling rate conversion by a rational factor; Frequency domain characterization of Interpolator and Decimator; Polyphase decomposition.

#### **Text Books:**

- [T1] Oppenheim & Schafer, Digital Signal Processing, PHI-latest edition.
- [T2] Proakis and Manolakis, Digital Signal Processing, PHI Publication

#### **Reference Books:**

- [R1] S. K. Mitra, Digital Signal Processing, TMH edition 2006
- [R2] Johny. R. Johnson, Introduction to Digital Signal Processing, PHI-latest edition
- [R3] R.Babu ,Digital Signal Processing , SciTech Publication.

[T1,T2] [No. of Hours: 10]

# [T1, T2][No. of Hours: 10]

#### <u>.NET AND C# PROGRAMMING</u>

Paper Code: ETIT-419	L	T/P	С
Paper: .NET and C# Programming	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This course provides a solid foundation in the C# programming language, and covering the fundamental skills that are required to design and develop object- oriented applications for the web and Microsoft Windows by using Microsoft Visual C# .NET and the Microsoft Visual Studio .NET development environment.

#### UNIT I

**MS.NET Framework Introduction:** Framework Components, Framework Versions, Types of Applications which can be developed, Base Class Library, Namespaces, MSIL / Metadata and PE files, The Common Language Runtime (CLR), Managed Code, MS.NET Memory Management / Garbage Collection, Common Type System (CTS), Common Language Specification (CLS), Types of JIT Compilers, Security Manager, control application development

Language basics: Why Datatypes, Global, Stack and Heap Memory, Reference Type and Value Type, Datatypes & Variables Declaration, Implicit and Explicit Casting, Checked and Unchecked Blocks – Overflow Checks, Casting between other datatypes, Boxing and Unboxing, Enum and Constant, Operators, Control Statements, Working with Arrays and methods.

[T1, T2] [No. of Hours: 11]

[T1, T2] [No. of Hours: 10]

[T1, T2] [No. of Hours: 11]

[T1, T2] [No. of Hours: 12]

#### UNIT II

**Introduction to Object Oriented Features:** What is an Object, state of an Object, Lifecycle of an Object, relationship between Class and Object, define Application using Objects, Principles of Object Orientation, Encapsulation, Inheritance, Polymorphism, Encapsulation is binding of State and Behaviour together, Inheritance is based on "is a" relationship, Understanding Polymorphism with Examples.

Constructor & Destructor, Working with "static" Members, Constructor in Inheritance, Type Casting of Reference Types, Static and Dynamic Binding and Virtual Methods, Abstract Class Object as Parent of all classes, Interface, Syntax for Implementation of Interface, Explicit Implementation of Interface members, Types of Inheritance, exceptional handling.

Working with Collections and Generics: IList and IDictionary, typesafety issue with ArrayList and Hashtable classes, IEnumerable and IEnumerator, Sorting Items in the collection using IComparable, custom generic classes, Generic Collection Classes.

Operator Overloading, Partial Classes, Importance of Attributes, working with components/assemblies, data stream and files: text stream, binary stream, working with file system, Serialization & Deserialization, multithreading.

#### UNIT IV

UNIT III

**WinForms:** Introduction, Controls, Menus and Context Menus, Menu Strip, Toolbar Strip, Graphics and GDI, SDI and MDI Applications, Dialog box, Form Inheritance, Developing Custom, Composite and Extended Controls, Data Access using ADO.NET, Data Access using ADO.NET- dataset, XML, debugging and tracing, Delegates & Events: Delegate Declaration, Sample Application, Chat Application using Delegates, += and -= Operator (Events), Chat Application using Delegates and Events, General Syntax for Delegates and Events.

#### Text Books:

- [T1] Stephen Walther," ASP.NET 3.5 Unleashed or ASP.NET 4.5 Unleashed," Pearsons Publication,
- [T2] George Shepherd, "Microsoft ASP.NET 3.5 Step by Step", PHI learning Publication Eastern Economy
- [T3] Chris Love, Marco Bellinaso,"ASP.NET 3.5 Website Programming Problem Design Solution," Wrox publication 2012

- George Shepherd, "Microsoft ASP.NET 4.0 Step by Step", PHI learning Publication Eastern Economy Imar Spaanjaars," Beginning ASP.NET 3.5 In C# and VB," Wiley / Wrox publication, 2009 [R1]
- [R2]
- Bill Evjen, Scott Hanselman, Devin Rader, "Professional ASP.NET 3.5 in C# and VB," Wiley [R3] publication, 2008
- Matthew MacDonald, "The Complete Reference: ASP.NET", Tata McGraw Hill, 2002. [R4]
- Jason N. Gaylord et al, "Professional ASP.NET 4.5 in C# and VB," wrox publication, 2013 [R5]



#### ENTERPRISE COMPUTING IN JAVA

Paper Code: ETIT-421	
Paper: Enterprise Computing in JAVA	

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#### **INSTRUCTIONS TO PAPER SETTERS:**

**MAXIMUM MARKS: 75** 

T/P

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: In this course student will learn about J2EE technology and will be able to develop dynamic websites. This course will explain how Enterprise JavaBeans (EJBs) contain the application's business logic and business data.

#### UNIT I

Introduction to J2EE and building J2EE applications, MVC architecture, Introduction to servlets and its life cycle, problems with cgi-perl interface, generic and http servlet, servlet configuration, various session tracking techniques, servlet context, servlet configuration, servlet collaboration. [T1, T2] [No. of Hours: 10]

#### UNIT II

JSP Basics and Architecture: JSP directives, Scripting elements, standard actions, implicit objects, JSP design strategies.

Struts: Introduction of Struts and its architecture, advantages and application of Struts. [T1, T2] [No. of Hours: 12]

#### UNIT III

EJB Fundamentals: Motivation for EJB, EJB Echo system, J2EE technologies, Enterprise beans and types, distributed objects and middleware, developing EJB components, remote local and home interface, bean class and deployment descriptor.

[T1, T2] [No. of Hours: 10]

[T1, T2] [No. of Hours: 10]

#### UNIT IV

Introducing session beans: Session beans life time, statefull and Stateless session beans, lifecycle of session beans.

Introducing Entity beans: Persistence concepts, features of entity beans, entity context, Introduction to JMS & Message driven beans.

#### Text Books:

- Ed Roman, Scott W Ambler, Tyler Jewell, "Mastering Enterprise Java Beans", Wiley, 2<sup>nd</sup> Ed., 2005. [T1]
- [T2] Govind Sesadri, "Enterprise Java Computing: Application and Architectures", Cambridge University Publications, 1999.

#### Reference Books:

- Ted Neward, "Effective Enterprise Java", Eddison -Wesley, 2004. [R1]
- Jim Farley, William Crawford, "Java Enterprise in a Nutshell", O'Reilly and Associates, 3rd Ed. [R2]
- [R3]
- Austin Sincock, "Enterprise Java for SAP", A Press Publications. Joe Wigglesworth and McMilan Paula, "Java Programming: Advanced Topic", Thomson, 3<sup>rd</sup> Ed., [R4] 2003.
- Subrahamanyam Allamaraju, Cedric Buest, "Professional Java Server Programming, J2EE, Apress, 1.3 [R5] Ed., 2005.
- Ivan Bayross and Sharanam Shah, "Java Server Programming", Shroff. [R6]
- John Hunt and Chris Loftus, "Guide to J2EE: Enterprise Java" Springer Verlag Publications. [R7]
- Govind Seshadri, "Enterprise Java Computing: Application and Architectures", Cambridge University [R8] Press. 1999.

С

## Pre-requisites: Core java

#### SYSTEM AND NETWORK ADMINISTRATION

Paper Code: ETIT-423	L	T/P	С
Paper: System and Network Administration	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

[T1, T2] [No. of Hours: 11]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: This course is intended for B.Tech students, who wish to improve skills through hands-on experience in System Administration and Network Administration.

#### System Administration:

UNIT- I

System Hardware: PC and Server Hardware Architecture, Operating System Administration: UNIX, Windows, MAC OS.

Centralization and Decentralization: Centralized Authentication, Active Directories; LDAP;

Storage: RAID, Storage Area Network (SAN), Direct Attached Storage (DAS), Network Attached Storage (NAS); Data Integrity Backup and Recovery.
[11, T2] [No. of Hours: 11]

UNIT- II 📂

Lab Management: System Configuration, Cloning, Monitoring and Administering them; workstations, server, Data centers Data Center Management: Administering, Surveillance, Access Control,

Special Topics: High Performance Computing, Virtualization and Cloud Computing. [T1, T2] [No. of Hours: 11]

#### Network Administration:

UNIT- III

Network administrator (definition and functions), Network Planning, Routine system maintenance Computer Networks: OSI & TCP/IP Model, clean architecture;

Switching & Routing: Layer 2 & Layer 3 switching; Routing; VLAN; Cisco L2 and L3 Switch Configuration; DHCP Configuration; IPv6, Wireless LAN: 802.11 a/b/g/n/ac WiFi; Access Point and Wireless Router configuration. [T1, T2] [No. of Hours: 11]

#### UNIT-IV

Internet Architecture: ISP Architecture; DNS Resolution; Content Mirroring, Internet Applications: DNS, Web, Mail, Proxy, NTP;

Perimeter Security: Firewall, UTM,

**Network Security:** LAN and WLAN Security issues; IP Spoofing; Dictionary Attack; DoS and DDoS Attack; Rogue/Misconfigured/External APs; Network Troubleshooting: ping, traceroute, nslookup, dig, tcpdump; Network Monitoring: SNMP; MRTG.

#### Text Books:

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- [T1] Thomas A Limoli, Christina J. Hogan, Strata R. Chalup "Theory and Practise of System and Network administration "Addison-Wesley Professional; 2 edition 2007
- [T2] Subramaniam Mani, Subramanian "Network Management: Principles And Practice" Pearson Education India, 2006

- [R1] Evi Nemeth, Garth Snyder, Trent R. Hein, Ben Whaley "UNIX and Linux System Administration Handbook" (4th Edition), 2010
- [R2] Craig Hunt, "TCP/IP Network Administration" "O'Reilly Media, Inc.", 2002
- [R3] Bill McCarty Learning Red Hat Linux "O'Reilly Media, Inc.", 2003

#### **GRID COMPUTING**

Paper Code: ETIT-425	L	T/P	С
Paper: Grid Computing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enable students to understand the basic concepts of Grid computing with performance issues, Web services, monitoring, optimization, sec<mark>urity and resource manag</mark>ement.

#### UNIT I

**Fundamentals:** Overview of Distributed Systems and it's variants like grid computing, cloud computing, Cluster Computing etc. Introduction to Grid Computing, it's components(Functional View, A Physical View, Service View), key issues and benefits, Characterization and Architecture of Grid, Grid - Types, Topologies, Components, Layers. Grid Computing Standards and Applications.

#### UNIT II

Web Services and Grid Monitoring: OGSA and WSRF: Overview, Services, Schema and architecture. Grid Monitoring Systems: Overview, architecture, GridICE, JAMM, MDS and Other monitoring Systems (Ganglia and GridMon), Grid portals.

## [T1, T2] [No. of Hours: 11]

## 

Grid Security and Resource Management:

Grid Security: A Brief Security Primer, PKI, X509 Certificates, Grid Security

Grid Scheduling and Resource Management: Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

[T1, T2] [No. of Hours: 11]

[T1, T2] [No. of Hours: 11]

#### UNIT IV

#### Data Management and Grid Middleware-

Data Management: Categories and Origins of Structured Data, Data Management, Challenges, Database integration with grid, Architectural Approaches-Collective Data Management Services, Federation Services . Grid Middleware: List of globally available Middlewares, Globus Toolkit.

[T1, T2] [No. of Hours: 11]

#### **Text Books:**

- [T1] Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons.
- [T2] Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson 2004.
- [T3] Ian Foster & Carl Kesselman, The Grid 2 Blueprint for a New Computing Infrastructure, Morgan Kaufman – 2004.

- [R1] C.S. R. Prabhu,"Grid and Cluster Computing', PHI 2014
- [R2] Barry Wilkinson, "Grid Computing", CRC Press.
- [R3] Joel M. Crichlow, "Distributed Systems Computing over Networks", PHI, 2014.
- [R4] RajKumar Buyya, "High Performance Cluster Computing Volume I Architectures and Systems", Pearson, 2013.

#### ADVANCED DATABASE ADMINISTRATION

Paper Code: ETIT-427	L	T/P	С
Paper: Advanced Database Administration	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: The objective of the paper is to facilitate the student with the advancements in the Database Administration that are required for the student to become a DBA.* 

#### UNIT-I

Creating a Database – Database configuring Assistant (DBCA), Password management, Using DBCA to delete a database.

Managing the database instance – Management framework, starting and stopping database control, Initialising parameter files, starting up and shutting down database instance.

Managing Database storage structure – Storage structure, How table data is stored? Tablespaces and data files, Space Management in Tablespaces, Tablespace management. [T1][T2][No. of Hrs. 11]

### UNIT-II

**Database user security** – Creating a user, Authenticating users, Unlocking a user account and resetting the password, Privileges and role, System privileges, object privileges.

**Managing Schema Objects** – Table types, Action with tables, creating views, sequences, What is partition and why use it? Creating a Partition, Partitioning method, Index organised tables and heap tables, creating index-organised tables, cluster, cluster types, sorted hash cluster.

Managing data and concurrency – Manipulating with data through SQL, function procedure, packages, Triggers, locking concepts, detecting and resolving lock conflicts.

#### [T1][T2][No. of Hrs. 11]

[T1][T2][No. of Hrs. 11]

#### UNIT-III

Managing undo Data – Monitoring Undo, Administering Undo, Configuring Undo Retention, Sizing Undo tablespace.

Implementing database security – database transparent encryption (TDE), TDE Process, Implementing TDE. Performance management - troubleshooting, tuning. [T1][T2][No. of Hrs. 10]

#### UNIT-IV

**Performing Backup and Recovery** – Configuring Recovery Manager, using Recovery manager, Recovering from noncritical Losses, recovery from loss of control file, data file and redo file.

**Performing flashback** – Flashback database , Flashback database Architecture, Configuring flashback Database using enterprise manager, Monitoring Flashback database

Moving data- General Architecture, Loading data with SQL \*loader, Data pump, Data pump export and import.

#### Text Books:

[T1] Sam R. Alapati "Expert Oracle Database 11G Administration "Dreamtech Press.

[T2] Darl Kuhn "Pro Oracle Database 11g Administration", Apress

- [R1] Ken Simmons, Sylvester, Carstarphen" Pro SQL Server 2012 Administration", Dreamtech Press
- [R2] Sheeri K Cabral, Keith Murphy," MySQL Administrator's Bible" John Wiley & Sons
- [R3] Steve Fogel, Paul Lane, "Oracle Database Administrator's Guide, 10g" Oracle
- [R4] Craig S. Mullins, "Database Administration", Addison-Wesley

#### PROBABILISTIC GRAPHICAL MODELS

Paper Code: ETIT-429	L	T/P	С
Paper: Probabilistic Graphical Models	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

[T1, T2, R2][No. of Hrs. 10]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student probabilistic graphical models, parameter learning, convexity and Bayesian networks.

#### UNIT-I

Bayesian network, Examples (HMM, diagnostic system, etc.), Separation and independence, Markov properties and minimalism, Markov network, Examples (Boltzmann machine, Markov random field, etc.), Cliques and potentials, Markov properties

#### UNIT-II

Exact inference, Complexity, Bucket elimination, Junction tree, Belief propagation (message passing), Application to HMM, Sum- and Max-product algorithms. [T1, R1][No. of Hrs. 11]

#### UNIT-III

Parameter learning, Exponential family, Bayesian learning, Expectation-Maximization (EM) [T1, T2][No. of Hrs. 10]

#### UNIT-IV

Approximate inference, Convexity, Mean field approach, Structured variational method, Loopy belief propagation, Characterization of solution spaces, Sampling methods.

#### Text Books:

- [T1] Bayesian Networks and Beyond by Daphne Koller and Nir Friedman
- [T2] An Introduction to Probabilistic Graphical Models by Michael I. Jordan

#### **Reference Books:**

- [R1] Probabilistic Networks and Expert Systems by Cowell, Dawid, Lauritzen, and Spiegelhalter, Springer 1999.
- [R2] Learning in Graphical Models by M. Jordan (editor), MIT Press, 1999.

# GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### SOCIOLOGY AND ELEMENTS OF INDIAN HISTORY FOR ENGINEERS

Paper Code: ETHS-419	L	T/P	С
Paper: Sociology and Elements of Indian History for Engineers	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

#### UNIT I

*Module 1A*: Introduction to Elements of Indian History: What is History? History Sources-Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.

[3 Lectures] Module 1B: Introduction to sociological concepts-structure, system, organization, social institution, Culture social stratification (caste, class, gender, power). State & civil society.

> [7 Lectures] [T1][No. of Hrs. 10]

#### UNIT II

*Module 2A:* Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.

[3 Lectures]

*Module 2B:* Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim. [7 Lectures]

#### UNIT III

Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence. [3 Lectures]

Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[9 Lectures] [T1][No. of Hrs. 12]

[T1][No. of Hrs. 10]

#### UNIT IV

*Module 4A:* Issues & concerns in post-colonial India (upto 1991); Issues & concerns in post-colonial India 2<sup>nd</sup> phase (LPG decade post 1991).

[3 Lectures]

*Module 4B:* Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.

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[10 Lectures] [T1][No. of Hrs. 13]

[T1] Desai, A.R. (2005), Social Background of Indian Nationalism, Popular Prakashan.

[T2] Giddens, A (2009), Sociology, Polity, 6<sup>th</sup> Edition

#### **Reference Books:**

Text Books:

- [R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan
- [R2] Haralambos M, RM Heald, M Holborn, (2000), Sociology, Collins

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#### ADVANCED COMPUTER NETWORKS LAB

Paper Code: ETIT-453	L	T/P	С
Paper: Advanced Computer Network Lab	0	2	1

#### List of Experiments:

- 1. Configuration and logging to a CISCO Router and introduction to the basic user Interfaces. Introduction to the basic router configuration and basic commands.
- 2. Configuration of IP addressing for a given scenario for a given set of topologies.
- Configure a DHCP Server to serve contiguous IP addresses to a pool of four IP devices with a default gateway and a default DNS address. Integrate the DHCP server with a BOOTP demon to automatically serve Windows and Linux OS Binaries based on client MAC address.
- 4. Configure, implement and debug the following: Use open source tools for debugging and diagnostics.
  - a. ARP/RARP protocols
  - b. RIP routing protocols
  - c. BGP routing
  - d. OSPF routing protocols
  - e. Static routes (check using netstat)
- 5. Configure DNS: Make a caching DNS client, and a DNS Proxy; implement reverse DNS and forward DNS, using TCP dump/Wireshark characterise traffic when the DNS server is up and when it is down.
- 6. Configure FTP Server on a Linux/Windows machine using a FTP client/SFTP client characterise file transfer rate for a cluster of small files 100k each and a video file of 700mb.Use a TFTP client and repeat the experiment.
- 7. Configure a mail server for IMAP/POP protocols and write a simple SMTP client in C/C++/Java client to send and receive mails.
- Implement Open NMS+ SNMPD for checking Device status of devices in community MIB of a linux PC. Using yellow pages and NIS/NFS protocols implement Network Attached Storage Controller (NAS).

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Extend this to serve a windows client using SMB. Characterise the NAS traffic using wireshark.

NOTE: At least 8 Experiments out of the list must be done in the semester.

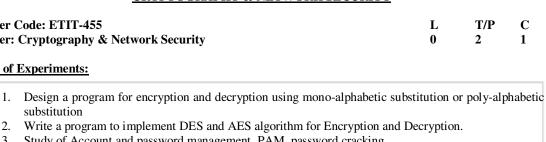
### **CRYPTOGRAPHY & NETWORK SECURITY**

Paper Code: ETIT-455	
Paper: Cryptography & Network Security	

#### **List of Experiments:**

- substitution
- 2.
- 3. Study of Account and password management. PAM, password cracking.
- 4. To configure common services like IIS, Apache, Open SSH, WU-FTP.
- 5. Study of Security analysis tools: Nessus, Microsoft baseline security analyzer.
- 6. Study of Security configuration tools: Bastille, Microsoft IIS lockdown tool.
- 7. To identify organization's Firewall IP address.
- 8. To determine organization's Firewall Access Control.

NOTE: At least 8 Experiments out of the list must be done in the semester.



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#### WIRELESS COMMUNICATION LAB

Paper Code: ETEC-463	L	T/P	С
Paper: Wireless Communication Lab	0	2	1

#### List of Experiments:

- 1. Eight experiments suggested on kits for GSM, CDMA and any possible experiments covering the subjects.
- 2. Setting up wireless network with and without infrastructure support.
- 3. Configuring Access Point with bridging mode (Point to Point and Point to Multi Point).
- 4. Configuring Routing between wired and wireless Networks.
- 5. Configuring Security in wireless network with and without infrastructure support.

#### NOTE: At least 8 Experiments from the syllabus must be done in the semester.



#### EMBEDDED SYSTEMS LAB

Paper Code: ETIT-459(ELECTIVE)	L	T/P	С
Paper: Embedded Systems Lab	0	2	1

#### **List of Experiments:**

- 1. Introduction to microcontroller and interfacing modules.
- 2. To interface the seven segment display with microcontroller 8051
- 3. To create a series of moving lights using PIC on LEDs.
- 4. To interface the stepper motor with microcontroller.
- 5. To display character 'A' on 8\*8 LED Matrix.
- 6. Write an ALP to add 16 bits using ARM 7 Processor
- 7. Write an ALP for multiplying two 32 bit numbers using ARM Processor
- 8. Write an ALP to multiply two matrices using ARM processor

NOTE:- At least 8 Experiments out of the list must be done in the semester.

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#### SYSTEM AND NETWORK ADMINISTRATION LAB

Paper Code: ETIT-459(ELECTIVE)	L	T/P	С
Paper: System and Network Administration Lab	0	2	1

#### **List of Experiments:**

#### System Administration:

- 1. To install two or more operating systems on a computer.
- 2. Installation of Red Hat Linux using Graphical mode.
- 3. Installation of Red Hat Linux using command prompt
- 4. Creating a user in Linux server and assigning rights
  - i. Configuring and Troubleshooting of /etc/inittab.
  - ii. Configuring and Troubleshooting of /etc/passwd
- 5. Configuring and Troubleshooting of /etc/grub.conf

#### **Network Administration:**

#### Linux TCP/IP Network Configuration

Practical Examples of Nmap Commands for Linux System/Network Administrators

The Nmap aka Network Mapper is an open source and a very versatile tool for Linux system/network administrators. Nmap is used for exploring networks, perform security scans, network audit and finding open ports on remote machine. It scans for Live hosts, Operating systems, packet filters and open ports running on remote hosts.

- 1. Scan a System with Hostname and IP Address
- 2. Scan Multiple Hosts
- 3. Scan a whole Subnet
- 4. Scan Multiple Servers using last octet of IP address
- 5. Enable OS Detection with Nmap
- 6. Scan a Host to Detect Firewall
- 7. Scan a Host to check its protected by Firewall
- 8. Scan Ports Consecutively
- 9. Print Host interfaces and Routes
- 10. Scan a TCP Port
- 11. Scan a UDP Port

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#### DIGITAL SIGNAL PROCESSING LAB

Paper Code: ETIT-459(ELECTIVE)	L	T/P	С
Paper: Digital Signal Processing Lab	0	2	1

#### **List of Experiments:**

#### Software Experiments:

- 1. Generation of basic signals sine, cosine, ramp, step, impulse and exponential in continuous and discrete domains using user defined functions.
- 2. Write a MATLAB program to find convolution (linear/circular) and correlation of two discrete signals.
- 3. Perform linear convolution using circular convolution and vice versa.
- 4. Write a MATLAB program to
  - i. Find 8 point DFT, its magnitude and phase plot and inverse DFT.
  - ii. Find 16 point DFT, its magnitude and phase plot and inverse DFT.
- 5. Perform the following properties of DFT
  - i. Circular shift of a sequence.
  - ii. Circular fold of a sequence.
- 6. Write a MATLAB Program to design FIR Low pass filter using
  - i. Rectangular window
  - ii. Hanning window
  - iii. Hamming window
  - iv. Bartlett window
- 7. Write a MATLAB program to
  - i. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Butterworth Approximation.
  - ii. Implement a Low pass / High pass / Band pass / Band stop IIR Filter using Chebyshev Approximation.

#### Hardware Experiments using Texas Instruments Kits-DSK 6713:

- 8. Introduction to Code composer Studio.
- 9. Write a program to generate a sine wave and see the output on CRO
- 10. Write a Program to Generate ECHO to give audio file.
- 11. Write a program to demonstrate Band Stop filter by FIR.

#### Additional Experiments:

12. Write a program to generate a cos wave and see the output on CRO

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- 13. Write a program to blink the LED
- 14. Write a program to display a string on LCD.

#### NOTE:- At least 8 Experiments out of the list must be done in the semester.

#### **MOBILE COMPUTING**

Paper Code: ETIT-402	L	T/P	С
Paper: Mobile Computing	3	1	4

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: Should have studied papers such as Communication systems, Data communications and networking and wireless networks. To learn the basic concepts, aware of the GSM, SMS, GPRS Architecture. To have an exposure about wireless protocols –Wireless LAN, Bluetooth, WAP, Zig Bee issues. To Know the Network, Transport Functionalities of Mobile communication. To understand the concepts of Adhoc and wireless sensor networks. Introduce Mobile Application Development environment.

#### UNIT-I

**Mobile Physical Layer:** Review of generation of mobile services, overview of wireless telephony, cellular concept, GSM: air-interface, channel structure, location management: HLR-VLR, hierarchical, handoffs, channel allocation in cellular systems, CDMA, GPRS.

**Mobile Computing Architecture:** Issues in mobile computing, three tier architecture for mobile computing, design considerations, Mobile file systems, Mobile databases. WAP: Architecture, protocol stack, Data gram protocol, Wireless transport layer security, Wireless transaction protocol, wireless session protocol, application environment, and applications.

#### UNIT-II

#### [T1] [T2][T3] [No. of Hrs. 12]

**Mobile Data Link Layer:** Wireless LAN over view, IEEE 802.11, Motivation for a specialized MAC, Near & far terminals, Multiple access techniques for wireless LANs such as collision avoidance, polling, Inhibit sense, spread spectrum, CDMA, LAN system architecture, protocol architecture, physical layer MAC layer and management, Hiper LAN.

**Blue Tooth:** IEEE 802.15 Blue tooth User scenarios, physical, MAC layer and link management.

Local Area Wireless systems: WPABX, IrDA, ZigBee, RFID, WiMax.

### UNIT-III

[T1] [T2][T3] [No. of Hrs. 11]

[T1] [T2][T3] [No. of Hrs. 11]

**MOBILE IP Network Layer:** IP and Mobile IP Network Layer- Packet delivery and Handover Management-Location Management- Registration- Tunnelling and Encapsulation-Route Optimization- Dynamic Host Configuration Protocol, Ad Hoc networks, localization, MAC issues, Routing protocols, global state routing (GSR), Destination sequenced distance vector routing (DSDV), Dynamic source routing (DSR), Ad Hoc on demand distance vector routing (AODV), VoIP –IPSec.

Mobile Transport Layer: Traditional TCP/IP, Transport Layer Protocols-Indirect, Snooping, Mobile TCP.

[T1] [T2][T3] [No. of Hrs. 11]

#### UNIT-IV

**Support for Mobility:** Data bases, data hoarding, Data dissemination, UA Prof and Caching, Service discovery, Data management issues, data replication for mobile computers, adaptive clustering for mobile wireless networks, Mobile devices and File systems, Data Synchronization, Sync ML.

Introduction to Wireless Devices and Operating systems: Palm OS, Windows CE, Symbion OS, Android, Mobile Agents. Introduction to Mobile application languages and tool kits.

#### **Course Outcomes:**

1. Gain the knowledge about various types of Wireless Data Networks and Wireless Voice Networks. 2. Understand the architectures, the challenges and the Solutions of Wireless Communication.

3. Realize the role of Wireless Protocols in shaping the future Internet.

#### **Text Books:**

- [T1] J. Schiller, "Mobile Communications", 2<sup>nd</sup> edition, Pearson, 2011.
- [T2] Raj Kamal "Mobile Computing" Oxford Higher Education, Second Edition, 2012.
- [T3] Dharam prakash Agrawal and Qing-An Zeng, "Introduction to Wireless and Mobile Systems" 3<sup>rd</sup> edition, Cengage learning 2013.

#### Reference Books:

- [R1] Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal "Mobile Computing", Tata McGraw Hill Pub ,Aug – 2010
- [R2] Pei Zheng, Larry L. Peterson, Bruce S. Davie, Adrian Farrell "Wireless Networking Complete" Morgan Kaufmann Series in Networking, 2009 (introduction, WLAN MAC)
- [R3] Vijay K Garg "Wireless Communications & Networking" Morgan Kaufmann Series, 2010
- [R4] M. V. D. Heijden, M. Taylor, Understanding WAP, Artech House.
- [R5] Charles Perkins, Mobile IP, Addison Wesley.
- [R6] Charles Perkins, Ad hoc Networks, Addison Wesley.
- [R7] Uwe Hansmann, Lothar Merk, Martin S. Nicklous, Thomas Stober, "Principles of Mobile Computing", Springer.
- [R8] Evaggelia Pitoura and George Samarus, "Data Management for Mobile Computing", Kluwer Academic Press, 1998

Laboratory session: The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc., Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

TooL Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

- [R1] Donn Felker, "Android Application Development For Dummies", Wiley, 2010
- [R2] Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. to Programmer Series.
- [R3] Ed Burnette, 'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers, 2012
- [R4] Jerome(J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University press, 2005.
- [R6] R.Riggs, A. Taivalsaari, M.VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74627-1, Addision Wesley, 2001.

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#### ADHOC AND SENSOR NETWORKS

Paper Code: ETEC-406	L	T/P	С
Paper: Ad Hoc and Sensor Networks	3	0	3

#### **INSTRUCTIONS TO PAPER SETTER:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The prerequisites are data communication networks, wireless communication and networks. The objective of the paper is to introduce infrastructure less wireless networking.

#### UNIT I

#### Ad Hoc Wireless Networks:

Introduction. Issues in Ad Hoc Wireless Networks. Ad Hoc Wireless Internet.

#### MAC Protocols for Ad Hoc Wireless Networks:

Introduction, Issues in Designing a MAC Protocol for Ad Hoc Wireless Networks. Design Goals of a MAC Protocol for Ad Hoc Wireless Networks. Classifications of MAC Protocols. Contention-Based Protocols. Contention-Based Protocols with Reservation Mechanisms. Contention-Based MAC Protocols with Scheduling Mechanisms, MAC Protocols in Directional Antennas, Other MAC Protocols

#### UNIT II

## Routing Protocols for Ad Hoc Wireless Networks:

Introduction to Routing algorithm, Issues in Designing a Routing Protocol for Ad Hoc Wireless Networks. Classifications of Routing Protocols. Table-Driven Routing Protocols. On-Demand Routing Protocols. Hybrid Routing Protocols. Routing Protocols with Efficient Flooding Mechanisms. Hierarchical Routing Protocols. Power-Aware Routing Protocols.

#### **Transport Layer and Security Protocols for Ad Hoc Wireless Networks:**

Introduction. Issues in Designing a Transport Layer Protocol for Ad Hoc Wireless Networks. Design Goals of a Transport Layer Protocol for Ad Hoc Wireless Networks. Classification of Transport Layer Solutions. TCP Over Ad Hoc Wireless Networks. Other Transport Layer Protocols for Ad Hoc Wireless Networks. Security in Ad Hoc Wireless Networks. Network Security Requirements. Issues and Challenges in Security Provisioning. Network Security Attacks. Key Management. Secure Routing in Ad Hoc Wireless Networks.

[T1, T2][No. of Hrs. 12]

#### UNIT III

#### Wireless Sensor Networks:

Introduction. Sensor Network Architecture. Data Dissemination. Data Gathering. MAC Protocols for Sensor Networks. Location Discovery. Quality of a Sensor Network. Evolving Standards. Other Issues.

#### Hybrid wireless Networks:

Introduction. Next-Generation Hybrid Wireless Architectures. Routing in Hybrid Wireless Networks. Pricing in Multi-Hop Wireless Networks. Power Control Schemes in Hybrid Wireless Networks. Load Balancing in Hybrid Wireless Networks.

[T1, T2][No. of Hrs. 11]

#### UNIT IV

#### Wireless Geolocation Systems:

Introduction. What is wireless Geolocation? Wireless Geolocation System Architecture. Technologies for Wireless Geolocation. Geolocation Standards for E-911 Services. Performance Measures for Geolocation Systems. Questions. Problems.

#### **Recent Advances in Wireless Networks:**

Introduction. Ultra-Wide-Band Radio Communication. Wireless Fidelity Systems. Optical Wireless Networks. The Multimode 802.11 -IEEE 802.11a/b/g. The Meghadoot Architecture, introduction to vehicular sensor networks.

[T1, T2] [No. of Hrs. 11]

[T1, T2][No. of Hrs. 11]

#### **Text Books:**

- [T1] Siva Ram Murthy, C. and Manoj, B. S., Adhoc Wireless Networks Architectures and Protocols, Prentice Hall, PTR, (2004) 2nd ed.
- [T2] Perkins, Charles E., Ad hoc Networking, Addison Wesley, (2000) 3rd ed.

- [R1] Toh, C. K., Ad hoc Mobile Wireless Networks Protocols and Systems, Prentice Hall, PTR, (2001) 3rd Edition.
- [R2] Pahlavan, Kaveh., Krishnamoorthy, Prashant., Principles of Wireless Networks, A united approach -Pearson Education, (2002) 2nd ed.
- [R3] Wang X. and Poor H.V., Wireless Communication Systems, Pearson education, (2004) 3rd ed.
- [R4] Schiller Jochen., Mobile Communications, Person Education 2003, 2nd ed.
- [R5] Carlos De Morais Cordeiro and Dharam P Agrawal, "Adhoc and Sensor Networks- Theory & Applications", 2<sup>nd</sup> Ed, Cambridge Univ Press India Ltd



#### HUMAN VALUES & PROFESSIONAL ETHICS - II

Paper Code: ETHS-402	L	T/P	С
Paper : Human Values & Professional Ethics-II	1	0	1

### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

3. Two internal sessional test of 10 marks each and one project report\* carrying 5 marks.

#### Objectives:

- 1. The main object of this paper is to inculcate the skills of ethical decision making and then to apply these skills to the real and current challenges of the engineering profession.
- 2. To enable student to understand the need and importance of value-education and education for Human Rights.
- 3. To acquaint students to the National and International values for Global development

#### UNIT I - Appraisal of Human Values and Professional Ethics:

Review of Universal Human Values: Truth, Love, Peace, Right conduct, Non violence, Justice and Responsibility. Living in harmony with 'SELF', Family, Society and Nature. Indian pluralism - the way of life of Islam, Buddhism, Christianity, Jainism, Sikhism and Hinduism, Greek - Roman and Chinese cultural values. Sensitization of Impact of Modern Education and Media on Values:

a) Impact of Science and Technology

b) Effects of Printed Media and Television on Values

c) Effects of computer aided media on Values (Internet, e-mail, Chat etc.)

d) Role of teacher in the preservation of tradition and culture.

e) Role of family, tradition & community prayers in value development.

Review of Professional Ethics: Accountability, Collegiality, Royalty, Responsibility and Ethics Living, Engineer as a role model for civil society, Living in harmony with 'NATURE', Four orders of living, their intercorrectness, Holistic technology (eco-friendly and sustainable technology).

### [T1][T2][R1][R5][R4][No. of Hrs. 03]

## **UNIT II – Engineers responsibility for safety:**

Safety and Risks, Risk and Cost, Risk benefit analysis, testing methods for safety. Engineer's Responsibility for Safety Social and Value dimensions of Technology - Technology Pessimism - The Perils of Technological Optimism - The

Promise of Technology – Computer Technology Privacy

Some Case Studies: Case Studies, BHOPAL Gas Tragedy, Nuclear Power Plant Disasters, Space Shuttle Challenger, Three Mile Island Accident, etc.

#### UNIT III – Global Issues:

Globalization and MNCs: International Trade, Issues.

Case Studies: Kelleg's, Satyam, Infosys Foundation, TATA Group of Companies

**Business Ethics**: Corporate Governance, Finance and Accounting, IPR.

Corporate Social Responsibility (CSR): Definition, Concept, ISO, CSR.

Environmental Ethics: Sustainable Development, Eco-System, Ozone depletion, Pollution.

Computer Ethics: Cyber Crimes, Data Stealing, Hacking, Embezzlement.

#### UNIT IV - Engineers Responsibilities and Rights and Ethical Codes:

Collegiality and loyalty, Conflict of interests, confidentiality, occupational crimes, professional rights, responsibilities. To boost industrial production with excellent quality and efficiency, To enhance national economy, To boost team spirit, Work Culture and feeling of job satisfaction, National integration, Examples of some illustrious professionals.

Need for Ethical Codes, Study of some sample codes such as institution of Electrical and Electronics Engineers, Computer Society of India etc., Ethical Audit,

**Development and implementation of Codes:** Oath to be taken by Engineering graduates and its importance\*\*, [T1] [T2] [R4][R2][No. of Hrs. 05]

# [T2] [R4] [R2][No. of Hrs. 03]

[T1] [T2] [R4][No. of Hrs. 05]

#### **Text Books:**

- [T1] Professional Ethics, R. Subramanian, Oxford University Press.
- [T2] Professional Ethics & Human Values: Prof. D.R. Kiran, TATA Mc Graw Hill Education.

#### **References Books:**

- [R1] Human Values and Professional Ethics: R. R. Gaur, R. Sangal and G. P. Bagaria, Eecel Books (2010, New Delhi). Also, the Teachers" Manual by the same author
- [R2] Fundamentals of Ethics, Edmond G. Seebauer & Robert L. Barry, Oxford University Press
- [R3] Values Education: The paradigm shift, by Sri Satya Sai International Center for Human Values, New Delhi.
- [R4] Professional Ethics and Human Values M.Govindrajan, S.Natarajan and V.S. Senthil Kumar, PHI Learning Pvt. Ltd. Delhi
- [R5] A Textbook on Professional Ethics and Human Values R.S. Naagarazan New Age International (P) Limited, Publishers New Delhi.
- [R6] Human Values & Professional Ethics- S B Gogate- Vikas publishing house PVT LTD New Delhi.
- [R7] Mike Martin and Roland Schinzinger, "Ethics in Engineering" McGraw Hill
- [R8] Charles E Harris, Micheal J Rabins, "Engineering Ethics, Cengage Learning
- [R9] PSR Murthy, "Indian Culture Values and Professional Ethics", BS Publications
- [R10] Caroline Whitback< Ethics in Engineering Practice and Research, Cambridgs University Press
- [R11] Charles D Fleddermann, "Engineering Ethics", Prentice Hall.
- [R12] George Reynolds, "Ethics in Information Technology", Cengage Learning
- [R13] C, Sheshadri; The Source book of Value Education, NCERT
- [R14] M. Shery; Bhartiya Sanskriti, Agra (Dayalbagh)

\*Any topic related to the experience of the B.Tech student in the assimilation and implementation of human values and professional ethics during the past three years of his/her studies in the institute OR A rigorous ethical analysis of a recent case of violation of professional ethics particularly related to engineering profession.

\*\*All students are required to take OATH in writing prior to submission of major project and the record of the same is to be maintained at the college level and/or, this oath may be administered by the head of the institutions during the graduation ceremonies. The draft for the same is available along with the scheme and syllabus.

GURU GOBIND SINGH INDRAPRASTHA UNIVERSITY

#### **BIG DATA ANALYTICS**

Paper Code: ETIT-406	L	T/P	С
Paper: Big Data Analytics	3	0	3

#### INSTRUCTIONS TO PAPER SETTERS:

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about knowledge of Data Management, Big Data stacks and Data analysis.

#### UNIT-I

**Big Data Introduction:** The Evolution of Data Management, Defining Big Data, Traditional and advanced analytics. Distributed Computing, need of distributed computing for big data, economics of computing, latency problem.

Examining Big Data Types, Structured Data, sources of big structured data, role of relational databases in big data, Unstructured Data, sources of unstructured data, role of a CMS in big data management.

#### UNIT-II

**Big Data Stack:** Redundant Physical Infrastructure, Security Infrastructure, Operational Databases. Organizing Data Services and Tools, Analytical Data Warehouses, Big Data Analytics, Big Data Applications. **Virtualization and big data:** Server virtualization, Application virtualization, Network virtualization, Processor and memory virtualization, Data and storage virtualization, Managing Virtualization with the Hypervisor.

[T1][No. of Hrs. 10]

[T1][R1][No. of Hrs. 11]

#### UNIT-III

MapReduce Fundamentals, Putting map and reduce Together, Optimizing MapReduce Tasks. Hadoop, Hadoop Distributed File System (HDFS), Name Nodes, Data nodes, Hadoop MapReduce.

[T1][T2][R1][No. of Hrs. 11]

**MAXIMUM MARKS: 75** 

#### UNIT-IV

**Big Data Analytics:** Basic analytics, Advanced analytics, Operationalized analytics, Monetizing analytics, Text Analytics and Big Data, Social media analytics, Text Analytics Tools for Big Data, Attensity, Clarabridge, OpenText.

**Integrating Data Sources:** Dealing with Real-time Data Streams and Complex Event Processing, Operationalizing Big Data, Applying Big Data within Your Organization, Security and Governance for Big Data Environments.

[T1][No. of Hrs. 11]

### Text Books:

- [T1] Judith S. Hurwitz, Alan F. Nugent, Fern Halper, Marcia A. Kaufman, "Big Data For Dummies", John Wiley & Sons, Inc.(2013)
- [T2] Robert D. Schneider, "Hadoop For Dummies", John Wiley & Sons, Inc. (2012)

#### **Reference Books:**

[R1] Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, by Paul Zikopoulos,McGraw Hill 2012.

UNIVERSIT

#### SOCIAL NETWORK ANALYSIS

Paper Code: ETIT-408	L	T/P	С
Paper: Social Network Analysis	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about knowledge of social network analysis and framework for network analysis.

#### UNIT-I

Social network analysis: network definition, manipulation, calculation, visualization. Graph terminology and definitions. Representing networks: Adjacency matrix and properties. Weighted, directed, bipartite networks. Trees. Some sample networks. [T1, R1][No. of Hrs. 10]

#### UNIT-II

Linear Algebra / Graph Properties: Eigenvectors and eigenvalues. Graph Laplacian. Markov matrices. Paths, walks, cycles. Degree, density, Degree distribution. Diameter, average path length. Average and local clustering. Centrality measures: degree, betweenness, closeness, Katz, Bonacich.

Review of Poisson random graphs, Growing random networks, Preferential attachment, Properties and phase transitions. Degree distributions, Fitting networks to data. Exponential random graph models.

#### [T1][No. of Hrs. 11]

Frameworks for evaluating results in network analysis: autocorrelation, matching techniques, QAP regression, exponential random graphs, and other models. Computational considerations. Lab: Applying ERGM analysis. Graph partitioning. Spectral partitioning. Modularity and modularity maximization. Betweenness clustering, Lab: Calculating and comparing clustering approaches.

[T1][No. of Hrs. 11]

#### UNIT-IV

UNIT-III

Game theory basics: players, moves, payoffs. Nash equilibrium. Efficiency and optimality. Examples. Network formation as a game. Pairwise stability. Positive and negative externalities.

Processes on Networks: Diffusion on networks. SIS and SIR infection models and predictions. Search on networks. Networked adoption games. [T1][No. of Hrs. 10]

Text Books:

[T1] Jackson, M. O. Social and Economic Networks. Princeton U. Press, 2008. ISBN: 978-0-691-14820-5.

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**Reference Books:** [R1] Social Network Analysis (Google eBook), John Scott, SAGE,

Scheme and Syllabi for B. Tech-IT, 1<sup>st</sup> year (Common to all branches) w.e.f batch 2014-15 and (2<sup>nd</sup>, 3<sup>nd</sup> & 4<sup>th</sup> years) w.e.f batch 2013-14 approved in the 22<sup>nd</sup> BOS of USET on 30<sup>th</sup> June, 2014 and approved in the 37<sup>th</sup> AC Sub Committee Meeting held on 10<sup>th</sup> July, 2014.

#### SOFT COMPUTING

Paper Code: ETIT-410	L	T/P	С
Paper: Soft Computing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: To understand the various concepts of neural networks and fuzzy logic.* 

#### UNIT-I

#### Neural Networks:

History, overview of biological Neuro-system, Mathematical Models of Neurons, ANN architecture, Learning rules, Learning Paradigms-Supervised, unsupervised and reinforcement Learning, ANN training Algorithmsperceptions, Training rules, Delta, Back Propagation Algorithm, Multilayer Perceptron Model, Hopfield Networks, Associative Memories, Applications of Artificial Neural Networks.

#### UNIT-II

#### Fuzzy Logic:

Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of Classical Sets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment, Intersections, Unions, Combinations of Operations, Aggregation, Operations.

[T1, T2][No. of Hrs. 11]

[T1, T2][No of Hrs 11]

[T1, T2][No. of Hrs. 11]

#### UNIT-III

#### **Fuzzy Arithmetic:**

Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals & Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations. Fuzzy Logic:

Classical Logic, Multivalued Logics, Fuzzy Propositions, Fuzzy Qualifiers,

#### Uncertainty based Information:

Information & Uncertainty, Nonspecificity of Fuzzy & Crisp Sets, Fuzziness of Fuzzy Sets.

[T1, T2][No. of Hrs. 11]

#### UNIT-IV

#### Introduction of Neuro-Fuzzy Systems:

Architecture of Neuro Fuzzy Networks.

Application of Fuzzy Logic:

Medicine, Economics etc.

#### Genetic Algorithm:

An Overview, GA in problem solving, Implementation of GA

#### Text Books:

- [T1] Hertz J. Krogh, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California, 1991.
- [T2] G.J. Klir & B. Yuan, "Fuzzy Sets & Fuzzy Logic", PHI, 1995.
- [T3] Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
- [T4] F. O. Karray and C. de Silva, "Soft computing and Intelligent System Design", Pearson, 2009.

#### Reference Books:

- [R1] "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
- [R2] Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley, Reading, Mass, (1992).

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#### **BIOINFORMATICS**

Paper Code: ETIT-412	L	T/P	С
Paper: Bio Informatics	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

[T1], [T2][No. of hrs. 10]

[T1][No. of hrs. 12]

[T1] [No. of hrs. 11]

[T1][No. of hrs. 10]

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Bioinformatics using Machine Learning.

#### UNIT- I

**Introduction:** Biological data in digital symbol sequences, genomes, proteins and proteomes, biological sequences, molecular function and structure. Biological Databases: Sequence databases, mapping databases, information retrieval, genomic databases.

Machine Learning Foundations: The probabilistic framework and examples.

#### UNIT- II

Machine Learning Algorithms: Introduction, dynamic programming, gradient descent, EM/GEM algorithms, Markov-Chain Monte Carlo methods, simulated annealing, evolutionary and genetic algorithms, learning algorithms.

Neural Network: Theory and Applications. Hidden Markov Models: Theory and applications

#### UNIT- III

Probabilistic graphical models in bioinformatics: Markov Models and DNA symmetries, gene finders, hybrid models and neural network parameterization of graphical models, single model case, bidirectional recurrent neural networks for protein secondary structure prediction. Probabilistic models of evolution: phylogenetic trees.

UNIT-IV

Stochastic grammars and linguistics: Introduction, formal grammars, Chomsky hierarchy, applications of grammars, learning algorithms, applications of SCFGs. Microarrays and gene expression: Introduction, Probabilistic modelling of array data, clustering, gene regulation.

#### Text Books:

[T1] P.Baldi, S.Brunak, "Bioinformatics : The machine learning approach" 2<sup>nd</sup> Edition, MIT Press.

[T2] A.D.Baxevanis, B.F.F.Quellette "Bioinformatics: A Practical guide to the analysis of genes and proteins" 3<sup>rd</sup> Edition, Wiley-Interscience.

- [R1] TK Attwood & DJ Parry-Smith," Introduction to Bioinformatics", Pearson Education
- [R2] Edward Keedwell and Ajit Narayanan, "Intelligent Bioinformatics" John Wiley & Sons, Ltd.
- [R3] A Tramontano, "Introduction to Bioinformatics", Chapman & Hall/CRC.
- [R4] D.Roy, "Bioinformatics", Narosa Publishing House
- [R5] David Mount, "Bioinformatics: sequence and genome analysis", Cold spring harbour Lab

#### WEB APPLIACTION DEVELPOMENT USING .NET

#### Paper Code: ETIT-414 Paper: Web Application Development Using .NET

# 3 0 3

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#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: This course teaches how to develop business applications using .NET 3.5. It starts with C# and VB.NET languages and then moves on to developing web applications using ASP.NET. It teaches LINQ and AJAX, new extensions to ASP.NET 3.5

#### UNIT I

Introduction to .NET 3.5: Introduction to .NET Framework, Components of .NET - CLR and Class Library, MSIL, CTS etc.

**Introduction to C# 3.0:** Language elements of C#, OOP with C#, Properties and static members, Inheritance, overriding and shadowing, Runtime polymorphism - virtual and abstract methods, Boxing, unboxing, Interfaces and structures, Exception Handling. Introduction to VB.NET 9.0: structure of VB.NET, Control structures, OOP with VB.NET, Properties, Default properties, Inheritance, overriding and shadowing, Interfaces, structures and Exception handling.

#### UNIT II

**Fundamentals of ASP.NET:** server-side scripting, create simple ASP.NET, Server-side event processing, Validation Controls, Working with Rich Controls and Navigation related controls, Master pages and themes, Cookies and their application, Sessions and Applications, Working with GLOBAL.ASAX, Error handling, Debugging and tracing, Page output caching, Data caching.

MS SQL Server: Architecture of SQL Server, Using Query Analyzer, Working with Transact SQL, stored procedures and functions, creating database triggers.

**ADO.NET:** Introduction, SQL Connect, SQL Command, SQL Data Reader object to access SQL Server, connect to Ms Access, and Oracle, Data Set, Data Table etc, Retrieving and manipulating data using Grid View, Details View, List View, Form View and Data List, Calling stored procedures of SQL Server.

### UNIT III

XML: introduction, well-formed XML and valid XML, DOM and SAX, XML Reader and writer, Validating XML with Schema and DTD, Loading data from XML to Database, Writing data from Database to XML, Transforming XML content using XSLT.

Web Services: introduction, role in web applications, Component and protocols - SOAP, WSDL, Proxy class, create web service, Web services accessing database.

Advanced Programming: Operator overloading, Conversion operators, Delegates, Multithreading, Event Handling, Generics, Iterators, Auto properties, Lambda Expressions.

# [T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs. 12]

[T1, T2][No. of Hrs. 12]

#### UNIT IV

LINQ: Language Integrated Query: LINQ to Objects, LINQ to SQL, Object-Relational Mapping, LINQ to XML.

AJAX: What is AJAX, related technologies, Using ASP.NET AJAX – Script Manager, Update Panel, Timer, Update Progress etc., Using ASP.NET AJAX Control Toolkit – Always Visible Control, AutoComplete, Confirm Button, Filtered Text Box etc., Calling Web Services using AJAX.

[T1, T2][No. of Hrs. 10]

#### Text Books:

- [T1] Stephen Walther," ASP.NET 3.5 Unleashed or ASP.NET 4.5 Unleashed," Sams Pearsons Publication,
- [T2] George Shepherd, "Microsoft ASP.NET 3.5 Step by Step", PHI learning Publication Eastern Economy Edition
- [T3] Chris Love, Marco Bellinaso,"ASP.NET 3.5 Website Programming Problem Design Solution," Wrox publication 2012

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- [R1] George Shepherd, "Microsoft ASP.NET 4.0 Step by Step", PHI learning Publication Eastern Economy Edition
- [R2] Imar Spaanjaars," Beginning ASP.NET 3.5 In C# and VB," Wiley / Wrox publication, 2009
- [R3] Bill Evjen, Scott Hanselman, Devin Rader, "Professional ASP.NET 3.5 in C# and VB," wiley publication, 2008
- [R4] Matthew MacDonald, "The Complete Reference: ASP.NET", Tata McGraw Hill, 2002.
- [R5] Jason N. Gaylord at al, "Professional ASP.NET 4.5 in C# and VB," wrox publication, 2013



#### **INSTRUCTIONS TO PAPER SETTERS:**

# **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

VLSI DESIGN

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The prerequisite are analog devices, STLD, Digital system design and micro-electronics. The students are introducing to MOS technology, design rules and some applications.

### UNIT I

Evolution of VLSI, MOS transistor theory, MOS structure, enhancement & depletion transistor, threshold voltage, MOS device design equations, MOSFET scaling and small geometry effects, MOSFET capacitances. NMOS inverter, CMOS inverter, DC characteristics, static load MOS inverter, pull up/pull down ratio, static & dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, body effect, latch up in CMOS.

### UNIT II

Stick diagram and design rules, lambda based design rules, switching characteristics & inter connection effects: rise time, fall time delays, noise margin.

CMOS logic gate design: NAND, NOR, XOR and XNOR gates, Transistor sizing, combinational MOS logic circuits: pass transistor and transmission gate designs, Pseudo NMOS logic.

[T1,T2][No. of Hours: 11]

[T1,T2][No. of Hours: 11]

[T1,T2][No. of Hours: 11]

Sequential MOS logic circuits: SR latch, clocked latch and flip flop circuits, CMOS D latch and edge triggered flip flop, dynamic logic circuits; basic principle, non ideal effects, domino CMOS logic, high performance dynamic CMOS circuits, clocking issues, clock distribution.

#### UNIT IV

UNIT III

VLSI designing methodology, design flow, design Hierarchy, concept of regularity, modularity & locality, VLSI design style, Design quality, computer aided design technology, adder design and multiplier design examples. Low power design concepts using CMOS Technology.

[T1,T2][No. of Hours: 11]

#### Text Books:

- [T1] Basic VLSI Design Pucknell Douglas A., Eshraghian Kamran, PHI Learning Pvt Limited, 2013.
- [T2] N. Weste and D. Harris, "CMOS VLSI Design: A Circuits and Systems Perspective 4th Edition", Pearson Education, India.

#### **Reference Book:**

- [R1] S. M. Kang, Y. Lebiebici, "CMOS digital integrated circuits analysis & design" Tata McGraw Hill, 3<sup>rd</sup> Edition.
- [R2] Digital Integrated Circuit Design- Ken Martin, Oxford University Press
- [R3] The MOS Transistor- Yaniiis Tsividis and Colin Mcandrew, Oxford University Press, 2013
- [R4] J. M. Rabaey, "Digital Integrated Circuits" PHI Learning Pvt Limited, India
- [R5] J. P. Uyemura, "Introduction to VLSI Circuits and Systems", John Wiley & Sons, Inc., New York, NY
- [R6] Neelam Sharma, "Digital Logic Design", Ashirwad Publication 2013-14

С

3

#### INFORMATION THEORY AND CODING

Paper Code: ETIT-416	L	T/P	С
Paper: Information Theory and Coding	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

*Objective: In this course the students will study a number of efficient encoding/decoding strategies which have proven important in practice with a categorization on the notion of decoding.* 

#### UNIT-I

Review of Probability Theory, Random Variables and Random Process. Information Theory Introduction, Uncertainty, Information, and Entropy, Information Rate, Conditional and Joint Entropies. Source Coding Theorem, Data Compaction, Prefix Coding, Kraft McMillan Inequality, Huffman Coding, Lempel Ziv Coding, Discrete Memoryless Channels, Mutual Information, Markov Sources, Channel Capacity.

#### UNIT-II

Channel Coding Theorem, Differential Entropy and Mutual Information for Continuous Ensembles, Information Capacity Theorem and its implications, Information Capacity of a colored noise channel. Discrete Memoryless Channels and Channel Coding Theorem revisited.

[T1, T2, R1, R5][No. of Hrs. 10]

[T1, T2][No. of hrs. 12]

#### UNIT-III

Linear Block codes, Repetition Codes, Syndrome Decoding, Hamming Codes, Dual Code, Cyclic Codes, Maximal Length Codes, CRC Codes, BCH Codes, Reed-Solomon Codes, Golay Codes, Convolutional Codes: Code Tree, Trellis and State Diagram.

[T1, R2, R4][No. of Hrs. 11]

[T1, R2, R3, R5] [No. of Hrs. 11]

#### UNIT-IV

Decoding of Convoltutional Codes: Maximum Likelihood decoding, Viterbi's algorithm, free distance of a convolutional code. Turbo Codes: Turbo Encoder and Decoder, Puncturing, Performance of Turbo Codes. Introduction to Cryptography.

#### Text Books:

- [T1] Simon Haykins, "Communication Systems", 4<sup>th</sup> Edition Wiley, 2001.
- [T2] J G Proakis, "Digital Communications", Mc Graw Hill, 2001.

- [R1] T M Gover, J M Thomos, "Elements of Information Theory", Wiley, 1999.
- [R2] Arijit Saha, Nilotpal Manna, Surajit Mandal, "Information Theory, Coding and Cryptography", Pearson Education, 2013.
- [R3] Schaum's Outlines, Analog and Digital Communications, Second Edition.
- [R4] Amitabha Bhattacharya, "Digital Communication", TMH 2006.
- [R5] J. H. van Lint.. Introduction to Coding Theory, Springer -Verlag.

#### HUMAN COMPUTER INTERACTION

Paper Code: ETCS-404	L	T/P	С
Paper: Human Computer Interaction	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To introduce the students about the interaction between and computer and human being.

#### UNIT I

Introduction: The Human, The Computer, The interaction, Paradigms, Usability of Interactive Systems, Guidelines, Principles and Theories.

**Design Process:** Interaction design basics, HCI in the software process, Design rules, Implementation support, Evaluation techniques, Universal design, User Support.

#### UNIT II

**Models and Theories:** Cognitive models, Socio-organizational issues and stakeholder requirements, Communication and collaboration models, Task analysis, Dialogue notations and design, Models of the system, Modelling rich interaction.

#### UNIT III

Interaction Styles: Direct Manipulation and Virtual Environments, Menu Selection, Form Filling and Dialog Boxes, Command and Natural Languages, Interaction Devices, Collaboration and Social Media Participation. [T1, T2][No. of Hrs. 10]

# UNIT IV

**Design Issues:** Quality of Service, Balancing Function and Fashion, User Documentation and Online Help, Information Search, Information Visualization.

**Outside the Box:** Group ware, Ubiquitous computing and augmented realities, Hypertext, Multimedia and the World Wide Web.

[T1, T2][No. of Hrs. 11]

[T1, T2][No. of Hrs. 10]

[T1, T2][No. of Hrs. 11]

#### **Text Books:**

- [T1] Alan Dix, Janet Finlay, "Human Computer Interaction", ISBN: 9788131717035 Pearson Education, 2004.
- [T2] Ben Shneiderman, "Designing the User Interface-Strategies for Effective Human Computer Interaction", ISBN:9788131732557, Pearson Education, 2010

- [R1] Usability Engineering: Scenario-Based Development of Human-Computer Interaction, by Rosson, M. and Carroll, J. (2002)
- [R2] The Essentials of Interaction Design, by Cooper, et al., Wiley Publishing(2007)
- [R3] Usability Engineering, by Nielsen, J. Morgan Kaufmann, San Francisco, 1993. ISBN 0-12-518406-9
- [R4] The Resonant Interface: HCI Foundations for Interaction Design, by Heim, S., Addison-Wesley. (2007)
- [R5] Usability engineering: scenario-based development of human-computer interaction, By Rosson, M.B & Carroll, J.M., Morgan Kaufman.(2002).

#### **DIGITAL IMAGE PROCESSING**

Paper Code: ETIT-418	L	T/P	С
Paper: Digital Image Processing	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The aim of this course is to provide digital image processing fundamentals, hardware and software, digitization, encoding, segmentation, feature extraction etc. It will enhance the ability of students to apply tools in image restoration, enhancement and compression and to apply the techniques in both the spatial and frequency domains. It will enhance the ability of students to identify the quality characteristics of medical images, differences between computer vision and image processing and help in studying the remote sensing images of the environmental studies.

### UNIT-I:

**Introduction and Digital Image Fundamentals:** The origins of Digital Image Processing, Examples of Fields that Use Digital Image Processing, Fundamentals Steps in Image Processing, Elements of Digital Image Processing Systems, Image Sampling and Quantization, Some basic relationships like Neighbors, Connectivity, Distance Measures between pixels, Linear and Non Linear Operations.

**Image Enhancement in the Spatial Domain:** Some basic Gray Level Transformations, Histogram Processing, Enhancement Using Arithmetic and Logic operations, Basics of Spatial Filters, Smoothening and Sharpening Spatial Filters, Combining Spatial Enhancement Methods.

[T1, T2][No. of Hrs: 10]

#### UNIT-II:

Filtering in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters.

**Image Restoration:** A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric Transformations.

#### UNIT-III:

**Image Compression**: fundamentals of compression, coding redundancy, Lossy and lossless compression, Spatial and temporal redundancy, Image compression models. Some basic compression methods **Image Segmentation**: Detection of Discontinuities, Edge linking and boundary detection, Region Oriented Segmentation, Motion based segmentation.

#### UNIT- IV:

**Representation and Description:** Representation, Boundary Descriptors, Regional Descriptors, Use of Principal Components for Description, Introduction to Morphology, Some basic Morphological Algorithms. **Object Recognition:** Patterns and Pattern Classes, Decision-Theoretic Methods, Structural Methods.

#### Text Books:

[T1] Rafael C. Gonzalez & Richard E. Woods, "Digital Image Processing", 3<sup>Rd</sup> edition, Pearson, 2002.

[T2] A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

#### **Reference Books:**

[R1] Bernd Jahne, "Digital Image Processing", 5<sup>th</sup> Ed., Springer, 2002.

[R2] William K Pratt, "Digital Image Processing: Piks Inside", John Wiley & Sons, 2001.

# [T1, T2][No. of Hrs. 12]

[T1, T2][No. of Hrs. 12]

### [T1, T2][No. of Hrs: 10]

#### NEXT GENERATION NETWORKS

Paper Code: ETIT-420	L	T/P	С
Paper: Next Generation Networks	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The objective of this paper is to introduce the students about the advanced and next generation networks and wireless access and transportation technologies.

#### UNIT I

#### Converged Services for Next Generation Networks

GSM/UMTS Network protocols: SS7 and 94tandardi basics, Supplementary Services: UMTS procedures. Intelligent Network: IN principles, CAMEL, Services: what are the challenges?, Integration, deployment issues. Next Generation Networks: IMS: the convergence. NGN architecture, NGN control architectures and protocols, Multi-access to the services: 3G, WiFi, DSL, Cable. TISPAN, SIP, Service architectures, Transition of networks (PSTN, IP-based) to NGN, Ipv6-based NGN, MEGACO, H.248, P2P systems, P2P SIP, Social Networks: Web-NGN convergence, Telco 2.0, IPTV, RCS. UMTS 94tandardized94on at 3GPP: Standardisation process and principles in ETSI and 3GPP, Functionalities 94tandardized in UMTS from Release 99 to Release 9. Latest 3GPP updates: what happened in 2010?

[T1, T2][No. of Hrs. 12]

#### UNIT II

#### Wireless Access and Transport Technologies

RAN architecture : Radio Access Network Architecture for GSM, GPRS and UMTS, network devices, interfaces and protocols, QoS definition and management in GPRS and UMTS, Access methods and radio resource management in mobile networks, mainly for: TDMA systems, CDMA systems and OFDMA systems. Scheduling issues for GPRS, UMTS and WiMAX : downlink, uplink Physical to logical channel mapping : for GSM, for UMTS Procedure and protocol used for resource allocation, PDP Context and TBF allocation.

[T1][No. of Hrs. 12]

#### UNIT III

#### WPAN, WLAN, WMAN and Broadcast technologies

WLAN, WPAN, WMAN, DVB-H: Introduction ,WiFi: Standards, performance, usage and applications, new evolutions ,WiMAX, DVB-H :Usage and standard, Security :Basics, architectures, algorithms, Bluetooth: Standard, performance, usage and applications , Zigbee, UWB: Standards and usage, Service discovery in wireless Networks (jxta, UPnP,...) , Security in Wireless Networks: PANs, LANs and cellular Wireless Networks Simulation (tools and methods)

#### UNIT IV

#### **Optimization: Theory and Network applications**

Graph algorithms, linear programming basics, Introduction to Integer programming, Traffic engineering, Network topology calculus, Network optimal routing and dimensioning, Frequency assignment, Pricing, Game theory.

#### Text Books:

- [T1] Next Generation Network Services: Technologies & Strategies by Neill Wilkinson, Publication, 2002 ISBN-10: 0471486671 | ISBN-13: 978-0471486671 | Edition: 1.
- [T2] Next Generation Networks: Perspectives and Potentials by Jingming Li Salina, Pascal Salina, Publisher:John Wiley & Sons, 2008, ISBN:0470724471, 9780470724477.

#### **Reference book:**

- [R1] Next-Generation Network Services: By Robert Wood, Published Nov 1, 2005 by Cisco Press. Part of the Networking Technology series
- [R2] Best Practices for Implementing Next Generation Networks (NGN) in the Asia and Pacific Region, International Telecommunication Union, Telecommunication Development Bureau, June 2012.

# [T1][No. of Hrs. 10]

#### [T2][No. of Hrs. 10]

95

#### GPS AND GIS

Paper Code: ETIT-422	L	T/P	С
Paper: GPS and GIS	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objectives: To study the fundamentals and scope of Global Information System and Global Positioning System.

#### UNIT- I

**Global Information System (GIS):** Introduction, scope and benefits of GIS; application areas of GIS; functional components and elements of GIS; geographic objects: scale, accuracy and resolution.

GIS Cartography and Maps: Digital cartography: selection, classification and simplification; exaggeration and symbolization for cartographic abstraction; Types of Maps; map elements: projection, direction, scale and co-ordinates; Geodatabases; GIS map outputs; Topographic mapping. [T1,T2][No. of Hrs: 11]

#### UNIT- II

Geographic Data: Spatial and attribute data; vector and raster models; points, lines, polygon features; computed and associated attributes; grids, cells and image data; linking spatial and attributed data.

Geoprocessing: Geographic co-ordinate system: latitudes and longitudes; Geoids Spheroids ellipsoids and datum's; projections and transformations.

#### UNIT- III

Global Positioning System (GPS): Introduction; GPS components: systems, scales and codes; error and accuracy of GPS observation; Differential GPS.

Fundamentals of Satellite Orbits: Orbital Mechanics, Constellation Design

Remote Sensing (RS): Introduction; application of RS; electromagnetic radiation; spectral signatures; aerial/satellite image characteristics: spatial, spectral, radiometric and temporal. [T1,T2][No. of Hrs: 11]

#### UNIT- IV

**Statistics:** Spatial statistics; independent and dependent variables; continuous data: sampling, correlation, regression, frequency and descriptive analysis; discrete data.

Interpolation: Characteristic interpolators; deterministic interpolators; evaluating interpolators.

[T1,T2][No. of Hrs: 10]

[T1,T2][No. of Hrs: 10]

#### Text Books:

#### Note: There is no single textbook for this course. Suggested Readings:

- [T1] Burrough, P.A. and R.A. McDonnell, Principles of Geographic Information System, Oxford University Press, Oxford.
- [T2] Chang, K.T., Introduction to Geographic Information System, Tata Mc Graw-Hill, New Delhi.
- [T3] Heywood, I. et. al., An Introduction to Geographic Infomation Systems, Pearson Education, Delhi.
- [T4] Clarke, K., Analytical and Computer Cartography. 2<sup>nd</sup> Ed., Upper Saddle River.
- [T5] Garmin Corporation., GPS Guide for Beginners available at: http://www.garmin.com/manuals/gps4beg.pdf.
- [T6] LLiffe, J.C., Datum and Map Projections for remote Sensing, GIS and Surveying. New York : CRC Press.
- [T7] Curran, Paul J., Principles of Remote Sensing, Longman, London & New York.
- [T8] Lillesand, T. and R. Kiefer, Remote Sensing and Image Interpretation, Wiley, New York.

MAXIMUM MARKS: 75

#### SATELLITE COMMUNICATION

Paper Code: ETEC-404	L	T/P	С
Paper: Satellite Communication	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To study the most relevant aspects of satellite communication with emphasis on the most recent application & developments. It covers orbital mechanics, launching techniques, satellite link design, earth & space segment, error control coding and different multiple access techniques.

#### UNIT- I

**Principles of Satellite Communication:** Evolution & growth of communication satellite, Satellite frequency allocation & Band spectrum, Advantages of satellite communication, Active & Passive satellite, Applications of satellite communication. Synchronous satellite, Satellite Launch.

Satellite Orbits: Introduction, Kepler's Laws, Newton's law, orbital parameters, orbital perturbations, station keeping, geo stationary and non Geo-stationary orbits, LEO, MEO, Look Angle Determination- Limits of visibility –eclipse-Sub satellite point –Sun transit outage. [T1, T2, R1][No. of Hrs. 11]

#### UNIT- II

#### Satellite Link Design

Basic transmission, System noise temperature, G/T ratio, design of down links, uplink design, design of specified C/N, Atmospheric Absorption, Rain induced attenuation.

Space Segment: Power Supply, Altitude Control, Station Keeping, Thermal Control, TT&C sub system, Transponders, Antenna Sub system.

Earth Segment: Subsystem of earth station, Transmit-Receive Earth Station, different types of earth stations, frequency coordination. [T1, T2, R1][No. of Hrs. 11]

#### UNIT- III

Multiple Access Techniques: FDMA, FDMA down link analysis. TDMA, Satellite-switched TDMA, code division multiple access, DAMA, On board signal processing for FDMA/TDM Operation.

**Error Control for Digital Satellite Links:** Error detection and correction for digital satellite links, error control coding, Convolutional codes, satellite links concatenated coding and interleaving, Automatic Repeat Request (ARQ).

#### [T1, T2, R2][No. of Hrs. 10]

[T1, R2, R3][No. of Hrs. 10]

#### UNIT- IV

**Interconnection of Satellite Networks:** Interconnection with ISDN, Interconnection of television networks. **Satellite Applications:** Satellite mobile services, VSAT, GPS, Radarsat, INMARSAT, Satellite navigational system. Direct broadcast satellites (DBS)- Direct to home Broadcast (DTH), Worldspace services, Business TV(BTV)

#### **Text Books:**

- [T1] Dennis Roddy, "Satellite Communication", McGraw Hill International.
- [T2] T. Pratt, "Satellite Communication", John Willy and Sons (Asia) Pvt. Ltd.

- [R1] T. Ha, "Digital Satellite Communication", McGraw Hill.
- [R2] Bruce R. Elbert, "The Satellite Communication Applications Handbook", Artech House Boston.
- [R3] Mark R. Chartrend, "Satellite Communication" Cengage Learning
- [R4] Handbook of Satellite Communication, Wiley.

#### E-COMMERCE AND M-COMMERCE

Paper Code: ETIT-428	L	T/P	С
Paper: E-Commerce and M-Commerce	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### MAXIMUM MARKS: 75

- 1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
- 2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to impart knowledge about the fundamentals and advancements in the fields of Electronic Commerce (E-Commerce) and Mobile Commerce (M-Commerce) with the aim of enabling the students to explore the possibilities of practical applications and research aspects in the field of integrating business with Information Technology.

#### UNIT I

Introduction and Concepts: Networks and commercial transactions – Internet and other novelties; networks and electronic transactions today, Model for commercial transactions; Internet environment – internet advantage, worlds wide web and other internet sales venues; Online commerce solutions.

Security Technologies: Insecurity Internet; A brief introduction to Cryptography; Public key solution; Key distribution and certification; prominent cryptographic applications.

Electronic Payment Methods: Updating traditional transactions; secure online transaction models; Online commercial environments; digital currencies and payment systems; Offline secure processing; private data networks.

#### UNIT II

# [T1] [T2] [R1] [R4] [No. of Hrs. 10]

Protocols for Public Transport of Private Information: Security protocols; secure protocols; Secure hypertext transfer protocols; Secure sockets layers; Integrating security protocols into the web; Non technical provide. Electronic Commerce Providers: On-line Commerce options: Company profiles.

Electronic Payment Systems: Digital payment systems; First virtual internet payment system; cyber cash model. On-line Commerce Environments: Servers and commercial environments; Netscape product line; Netscape commerce server; Microsoft internet explorer and servers; open market.

Digital Currencies: Optional process of Digicash, Ecash Trail; Using Ecash; Smart cards, Electronic Data Interchange; Its basics; EDI versus Internet and EDI over Internet.

Strategies, Techniques and Tools: Internet Strategies: Internet Techniques, Shopping techniques and online selling techniques; Internet tools.

#### UNIT III

# [T1] [R5] [No. of Hrs. 11]

Supply chain management: Introduction, What is supply chain management? Focus on the value chain, Option for restructuring the supply chain, Using e-business to restructure the supply chain, Supply chain management implementation.

E-procurement: Introduction, What is e-procurement?, Drivers of e-procurement, Focus on estimating eprocurement cost savings, Risks and impacts of e-procurement, Implementing e-procurement, Focus on electronics B2B marketplaces, The future of e-procurement? Customer relationship management: Introduction, What is e-CRM?, conversion marketing, the online buying process, customer acquisition management, focus on marketing communications for customer acquisition, customer retention management focus on excelling in e-commerce service quality, customer extension Analysis and design: Introduction, process modeling, Data modeling, Design for e-business, Focus on user –centered site design, Focus on security design for e-business.

Implementation and maintenance: Introduction, Alternatives for acquiring e-business systems, Development of web-based content and services, focus on developing dynamic web content, testing, Changeover, Content management and maintenance, Focus on measuring and improving performance of e- business systems.

[T2] [R2] [R3] [No. of Hrs. 10]

#### UNIT IV

Introduction to M-commerce: Emerging applications, different players in m-commerce, M-commerce life cycle Mobile financial services, mobile entertainment services, and proactive service management.

Management of mobile commerce services, Content development and distribution to hand-held devices, content caching, pricing of mobile commerce services; emerging issues in mobile commerce: The role of emerging wireless LANs and 3G/4G wireless networks, personalized content management, implementation challenges in m-commerce, futuristic m-commerce services.

#### Text Books:

Ravi Kalakota, Andrew B. Whinston, "Frontiers of E-Commerce", 1st Edition, Sept. 1996, Addison [T1] Wesley Longman

Dave Chaffey, "E-Business and E-Commerce Management", 3<sup>rd</sup> Edition, 2009, Pearson Education. [T2]

#### **References Books:**

- Henry Chan, Raymod Lee and etl., "E-Commerce Fundamental and Applications", 1<sup>st</sup> Edition, Nov. [R1] 2001.Wilev
- Brian Mennecke and Troy Strader, "Mobile Commerce: Technology, Theory and Applications", Idea [R2] Group, 2003.
- Nansi Shi, "Mobile Commerce Applications", IGI Global, 2004. [R3]
- [R4]
- [R5]
- Gary P. Schneider, "Electronic Commerce", Tenth Edition, May 2012, CENGAGE Learning India K. K. Bajaj, D. Nag "E-Commerce", 2<sup>nd</sup> Edition, Sept. 2005, McGraw Hill Education. P. T. Joseph, "E-Commerce an Indian Perspective", 4<sup>th</sup> Edition, July 2013, PHI Publication. [R6]
- Bhaskar Bharat, "Electronic Commerce Technology and Application", 4<sup>th</sup> Edition, May 2013, [R7] McGraw Hill Education.



[T2] [R1] [R4] [No. of Hrs. 10]

#### **DISTRIBUTED SYSTEMS**

Paper Code: ETIT-430	L	T/P	С
Paper: Distributed Systems	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

#### **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand networking, operating systems and various issues.

#### UNIT-I

#### Fundamentals of Distributed Computing:

Architectural models for distributed and mobile computing systems, Basic concepts in distributed computing. Distributed Operating Systems:

Overview, network operating systems, Distributed file systems, Middleware, client/server model for computing. [T1, T2][No. of Hours 12]

# UNIT-II

**Communication:** 

Layered protocols, RPC, RMI, Remote objects. Basic Algorithms in Message Passing Systems, Leader Election in Rings, and Mutual Exclusion in Shared Memory, Message Passing, PVM and MPI.

#### **Process Concepts:**

Threads, Clients and Servers, Code migration, Agent based systems, Distributed objects, CORBA, Distributed COM.

[T1 [No. of Hours 10]

# UNIT-III

#### Synchronization:

Clock synchronization, Logical clocks, Election algorithms, Mutual exclusion, Distributed transactions, Naming concepts, Security in distributed systems

#### **Distributed Databases:**

Distributed Data Storage, Fragmentation & Replication, Transparency, Distributed Query Processing and Optimization, Distributed Transaction Modeling and concurrency Control, Distributed Deadlock, Commit Protocols.

[T2][No. of Hours 11]

# UNIT-IV

# Processing:

Basic Concepts: Introduction to processing, processing terminology, Design of algorithms, Design of Parallel Databases, Parallel Query Evaluation.

#### Text Books:

- [T1] Tannenbaum, A, Maarten Van Steen. Distributed Systems, Principles and Paradigm, Prentice Hall India, 2002
- [T2] Elmarsi, Navathe, Somayajulu, Gupta, "Fundamentals of Database Systems", 4<sup>th</sup> Edition, Pearson Education, 2007

#### Reference Books:

- [R1] Tanenbaum, A, "Modern Operating Systems", 2nd Edition, Prentice Hall India, 2001.
- [R2] Singhal and Shivaratri, "Advanced Concepts in Operating Systems", McGraw Hill, 1994
- [R3] Attiya, Welch, "Distributed Computing", Wiley India, 2006
- [R4] Coulouris, Dollimore and Kindberg, "Distributed Systems", Pearson, 2009.

# [T1, T2][No. of Hours 11]

#### SELECTED TOPICS OF RECENT TRENDS IN INFORMATION TECHNOLOGY

Paper Code: ETIT-432	L	T/P	С
Paper: Selected Topics of Recent Trends in IT	3	0	3

#### **INSTRUCTIONS TO PAPER SETTERS:**

MAXIMUM MARKS: 75

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To understand data warehousing and its types, design and concepts of Big Data.

#### UNIT I Data Warehousing

Introduction to Data Warehousing: Evolution of Data Warehousing, Data Warehousing concepts, Benefits of Data Warehousing, Comparison of OLTP and Data Warehousing, Problems of Data Warehousing.

Data Warehousing Architecture: Operational Data and Data store, Load Manager, Warehouse Manager, Query Manager, Detailed Data, Lightly and Highly summarized Data, Archive/Backup Data, Meta-Data, architecture model, 2-tier, 3-tier and 4-tier data warehouse, end user Access tools.

#### UNIT II Data Warehousing Tools and Technology

Tools and Technologies: Extraction, cleaning and Transformation tools, Data Warehouse DBMS, Data Warehouse Meta-Data, Administration and management tolls, operational vs. information systems. OLAP & DSS support in data warehouse.

Distributed Data Warehouse: Types of Distributed Data Warehouses, Nature of development Efforts, Distributed Data Warehouse Development, Building the Warehouse on multiple levels.

#### UNIT III Types of Data Warehouses & Data Warehouse Design

Host based, single stage, LAN based, Multistage, stationary distributed & virtual data-warehouses.

Data warehousing Design: Designing Data warehouse Database, Database Design Methodology for Data Warehouses, Data Warehousing design Using Oracle, OLAP and data mining: Online Analytical processing, Data mining.

#### UNIT IV Introduction to Big Data

Big Data: Definitions, characteristics, Challenges of Conventional Systems, Web Data, Evolution Of Analytic Scalability, Analytic Processes and Tools - Analysis vs Reporting, Modern Data Analytic Tools, Statistical Concepts: Sampling Distributions, Re-Sampling, Statistical Inference, Prediction Error.

# [T2][R3][R4][No. of Hours 12]

#### **Text Books**

- [T1] Paul Raj Poonia, "Fundamentals of Data Warehousing", John Wiley & Sons, 2003.
- [T2] Adam Jorgensen, James Rowland-Jones, John Welch, Dan Clark, Christopher Prices, Brian Mitchell "Microsoft Big Data Solutions" Wley India.

#### **Reference Books**

- W. H. Inmon, "Building the operational data store", 2<sup>nd</sup> Ed., John Wiley, 1999. [R1]
- Kamber and Han, "Data Mining Concepts and Techniques", Hartcourt India P. Ltd., 2001 [R2]
- [R3] Paul Zikopoulos, Dirk deRoos, Krishnan Parasuraman, Thomas Deutsch, James Giles, David Corrigan, Harness the Power of Big Data The IBM Big Data Platform, Tata McGraw Hill Publications, 2012
- [R4] Zikopoulos, Paul, Chris Eaton, Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data, Tata McGraw Hill Publications, 2011

[T1][No. of Hours 10]

#### [R1][R2][No. of Hours 12]

[T1][R1][No. of Hours 10]

#### MOBILE COMPUTING LAB

Paper Code: ETIT-452	L	T/P	С
Paper: Mobile Computing Lab	0	2	1

#### List of Experiments:

The student is advised to learn any of the following languages and use any one tool kit for generating mobile applications, such as game, Clock, calendar, Convertor, phone book, Text Editor etc.,

Language support: XHTML-MP, WML, WML Script.

Mobile application languages- XML, Voice XML, Java, J2ME, Java Card

Tool Kits: WAP Developer tool kit and application environment, Android Mobile Applications Development Tool kit.

For MANETS, use of NS2/NS3 is recommended for two experiments.

#### Reference Books:

- [R1] Donn Felker, "Android Application Development for Dummies", Wiley, 2010
- [R2] Reto Meier, "Professional Android 2 Application Development", Wrox's Prog. To Programmer Series.
- [R3] Ed Burnette, 'Hello, Android: Introducing Google's Mobile Development Platform' third edition' Pragmatic Programmers, 2012
- [R4] Jerome (J.F) DiMarzio "Android A programmer's Guide" Tata McGraw-Hill 2010 Edition.
- [R5] Reza B'Far, "Mobile computing principles: Designing and Developing Mobile Applications with UML and XML", Cambridge University press, 2005.
- [R6] R.Riggs, A. Taivalsaari, M.VandenBrink, "Programming Wireless Devices with Java2 Platform, Micro Edition", ISBN: 0-201-74627-1, Addison Wesley, 2001.

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NOTE:- At least 8 Experiments out of the list must be done in the semester.

# ADHOC AND SENSOR NETWORKS LAB

Paper Code: ETEC-458	L	T/P	С
Paper: Ad Hoc and Sensor Networks Lab	0	2	1

Ad Hoc and Sensor Networks Lab Experiments based on syllabus ETEC-406.



Paper Code: ETIT-458(ELECTIVE-II)	L	T/P	С
Paper: GPS and GIS Lab	0	2	1

Softwa	res for GPS:
a.	openGTS
b.	GPSTk
	res for GIS:
a.	QGIS
	GRASS GIS
c.	GeoTools
d.	ArcView GIS
<u>List of</u>	Experiments
	First Set of Experiments:
	1. Using Handheld GPS for location & recording points
	2. Recording point positions and data
	3. Importing Juno Data into ArcMap
	4. Set up a work area with basemap data
	5. Entering data into Excel and Adding as Events to ArcMap
	6. Using Pathfinder to download saved file from the GPS
	7. Execute ArcMap
	8. Loading an orthophoto into the Juno
<u>Second</u>	Set of Experiments:
	1. Introduction to Mapping, Triangulation & Navigation using ArcView GIS
	<ol> <li>GPS/GIS Data Conversion and Map Construction</li> </ol>
	3. GPS Data Gathering
	4. DGPS Post Processing and GIS Data Transfer
	5. ArcView processing and map presentation
NOTE	- At least 8 Experiments out of the list must be done in the semester.
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#### NEXT GENERATION NETWORKS LAB

Paper Code: ETIT-458(ELECTIVE-II)	L	T/P	С
Paper: Next Generation Networks Lab	0	2	1

#### **List of Experiments:**

- 1. Overview of IP Address
- 2. Design Ethernet Cables : Cross Cable, Straight Cable, Rollover Cable
- 3. Demonstrate to connect two computer without connecting devices
- 4. Demonstrate to connect two computer with connecting devices
- 5. Demonstrate to establish client-server connection with using of windows server 2008
- 6. Use of policies in Windows Server 2008
- 7. Overview of Router
- 8. Demonstrate the use of router to make a connection
- 9. Introduction to Network Address Translation
- 10. Overview of different interfaces in router
- 11. Implement IP Subnetting in IPV4
- 12. Implement IP routing using RIP
- 13. Implement IP routing using IGRP
- 14. Implement IP routing using EIGRP
- 15. Implement IP routing using OSPF
- 16. Configuration of VLAN
- 17. Configuration of VTP
- 18. Managing traffic with Standard IP Access List 19. Managing traffic with Extended IP Access List
- 20. Overview of MPLS

NOTE:- At least 8 Experiments out of the list must be done in the semester.

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