SCHEME OF EXAMINATION

&

DETAILED SYLLABUS

for

BACHELOR OF TECHNOLOGY
(Electronics & Communication Engineering)

GURU GOBIND SINGH
INDRAPRASTHA UNIVERSITY
KASHMERE GATE, DELHI

BACHELOR OF TECHNOLOGY
(B.TECH.) DEGREE COURSE (Common to all branches)

FIRST SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETMA 101	Applied Mathematics – I	3	1	4
ETPH 103	Applied Physics – I	2	1	3
ETCH 105	Applied Chemistry – I	2	1	3
ETME 107	Manufacturing Process	2	0	2
ETCS 109	Introduction to Computers and Auto CAD	2	1	3
ETEL 111	Communication Skills – I	2	1	3
ETEL 113*	Impact of Science & Technology on Society	1	0	1
PRACTICAL/VIVA VOCE				
ETPH 151	Applied Physics Lab. – I	-	2	1
ETCH 153	Applied Chemistry Lab. – I	-	2	1
ETCS 155	Introduction to Auto CAD Office Automation and Web Design	-	3	2
ETME 157	Workshop Practice	-	3	2
ETME 159	Engineering Graphics Lab.	-	2	1
	TOTAL	**14**	**17**	**26**

ETEL-113* is NUES

BACHELOR OF TECHNOLOGY
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SECOND SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETMA 102	Applied Mathematics – II	3	1	4
ETPH 104	Applied Physics – II	2	1	3
ETCH 106	Applied Chemistry – II	2	1	3
ETCS 108	Introduction to Programming	2	1	3
ETME 110	Engineering Mechanics	2	1	3
ETEC 112	Electrical Science	2	1	3
ETEL 114	Communication Skills – II	2	1	3
PRACTICAL/VIVA VOCE				
ETPH 152	Applied Physics Lab. – II	-	2	1
ETCH 154	Applied Chemistry Lab. – II	-	2	1
ETCS 156	C Programming Lab.	-	2	1
ETME 158	Engineering Mechanics Lab.	-	3	2
ETEC 160	Electrical Science Lab.	-	2	1
	TOTAL	**15**	**18**	**28**

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THIRD SEMESTER EXAMINATION

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETMA 201	Applied Mathematics – III	3	1	4
ETEC 203	Signal & Systems	3	1	4
ETEC 205	Circuits and Systems	3	1	4
ETEC 207	Analog Electronics – I	3	1	4
ETIT 209	Object Oriented Programming using C++	3	1	4
ETCS 211	Data Structures	3	1	4
PRACTICAL/VIVA VOCE				
ETEC 251	*Analog Electronics – I Lab.	0	2	1
ETEC 253	*Circuits & Systems Lab.	0	2	1
ETIT 255	Object Oriented Programming using C++ Lab.	0	2	1
ETCS 257	Data Structure Lab.	0	2	1
	TOTAL	**18**	**14**	**28**

* Some lab experiments must be performed using any circuit simulation software e.g. PSPICE.

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Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETCS 202	Software Engineering	3	1	4
ETEC 204	Analog Electronics – II	3	1	4
ETEC 206	Digital Circuits & System – I	3	1	4
ETEC 208	Communication Systems & Circuits – I	3	1	4
ETEC 210	Electromagnetic Fields & Transmission Lines	3	1	4
ETCS 212	Operating Systems	3	1	4
PRACTICAL/VIVA VOCE				
ETCS 252	Software Engineering Lab.	0	2	1
ETEC 254	*Analog Electronics – II Lab.	0	2	1
ETEC 256	*Digital Circuits & System – I Lab.	0	2	1
ETEC 258	Communication Systems & Circuits – I Lab.	0	2	1
	TOTAL	**18**	**14**	**28**

* Some lab experiments must be performed using any circuit simulation software e.g. PSPICE.

NOTE: 4-6 weeks training will be held after fourth semester. However, Viva-Voce will be conducted in the fifth semester.

BACHELOR OF TECHNOLOGY
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FIFTH SEMESTER

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETEC 301	Digital Circuits & Systems – II	3	1	4
ETEC 303	Control Engineering	3	1	4
ETCS 305	Computer Architecture	3	1	4
ETEC 307	Communication System & Circuits – II	3	1	4
ETCS 309	Database Management Systems	3	1	4
ETMS 311	Organizational Behaviour	3	1	4
PRACTICAL/VIVA VOCE				
ETEC 351	Digital Circuits & Systems – II Lab.	0	2	1
ETEC 353	*Control Engineering Lab.	0	2	1
ETEC 355	Communication System & Circuits – II Lab.	0	2	1
ETCS 357	Database Management Systems Lab.	0	2	1
ETEC 359	#^Practical Training	0	0	1
	TOTAL	**18**	**14**	**29**

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^Practical training was conducted after fourth semester. However, Viva-Voce for evaluation of Practical Training will be conducted in this semester.

* Some lab experiments must be performed using any simulation software e.g. MATLAB.

BACHELOR OF TECHNOLOGY
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SIXTH SEMESTER

Code No.	Paper	L	T/P	Credits

THEORY PAPERS

ETEC 302	Microwave Engineering	3	1	4
ETEC 304	Microprocessor Systems - I	3	1	4
ETIT 306	Computer Networks.	3	1	4
ETEC 308	VLSI Design	3	1	4
ETEC 310	Telecommunication Networks	3	1	4
ETEC 312	Digital Signal Processing and its applications	3	1	4
PRACTICAL/VIVA VOCE				
ETEC 352	Microwave Engineering Lab	0	2	1
ETEC 354	Microprocessor Systems - I Lab	0	2	1
ETEC 356	VLSI Design Lab	0	2	1
ETEC 358	Telecommunication Networks Lab	0	2	1
ETEC 360	Digital Signal Processing & Its Applications Lab	0	2	1
	TOTAL	**18**	**16**	**29**

NOTE: 4-6 weeks training will be held after sixth semester. However, Viva-Voce will be conducted in the seventh semester.

BACHELOR OF TECHNOLOGY
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SEVENTH SEMESTER

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETEC 401	Microprocessor Systems - II	3	1	4
ETEC 403	Optical Communication	3	1	4
ELECTIVE PAPERS (Choose any two)				
ETIT 405	Network Technology	3	1	4
ETEC 407	Mobile Computing	3	1	4
ETEC 409	Advanced VLSI Design	3	1	4
ETEC 411	Digital Image Processing	3	1	4
ETEC 413	Power Electronics	3	1	4
ETEC 415	Advanced Computer Architecture	3	1	4
ETCS 417	Computer Graphics & Multimedia	3	1	4
ETEC 419	Project	-	-	4
PRACTICAL/VIVA VOCE				
ETEC 451	Microprocessor Systems – II Lab	0	2	1
ETEC 453	Optical Communication Lab	0	2	1
ETEC 455	Practicals (based on Electives)	0	2	1
ETEC 457	#Seminar	0	2	1
ETEC 459	*Minor Project	0	8	4
ETEC 461	#^Practical Training	0	0	1
	TOTAL	**12**	**20**	**25**

NON UNIVERSITY EXAMINATION SYSTEM

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

^Practical training was conducted after sixth semester. However, Viva-Voce for evaluation of Practical Training will be conducted in this semester.

BACHELOR OF TECHNOLOGY
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EIGHTH SEMESTER

Code No.	Paper	L	T/P	Credits
THEORY PAPERS				
ETIT 402	Mobile Communication	3	1	4
ETEC 404	Embedded System	3	1	4
ELECTIVE PAPERS (Choose any one)				
ETEC 406	Consumer Electronics	3	1	4
ETCS 408	Artificaial Intelligence	3	1	4
ETEC 410	**Instrumentation**	3	1	4
ETIT 412	Network Security	3	1	4
ETIT 414	Bio Medical Electronics	3	1	4
ETEC 416	Integrated Circuit Technology	3	1	4
ETEC 418	Introduction to NanoTechnology	3	1	4
PRACTICAL/VIVA VOCE				
ETEC 452	Embedded System Lab.	0	2	1
ETEC 454	Practicals (based on Electives)	0	2	1
ETEC 456	*Major Project	0	14	7
	TOTAL	**09**	**21**	**21**

*The student will submit a synopsis a the beginning of the semester for approved from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.

Note:
1. The total no. of credits of the Programme B. Tech. (ECE) = 214

2. Each student shall be required to appear for examination in all courses. However, for the award of the degree a student shall be required to earn minimum of 200 Credits.

Paper Code: ETMA-101

Paper: Applied Mathematics – I

	L	T	C
	3	1	4

UNIT - I

COMPLEX NUMBERS AND INFINITE SERIES: De Moivre's theorem and roots of complex numbers. Euler's theorem, Logarithmic Functions, Circular, Hyperbolic Functions and their Inverses. Convergence and Divergence of Infinite series, Comparison test d'Alembert's ratio test. Higher ratio test, Cauchy's root test. Alternating series, Lebnitz test, Absolute and conditioinal convergence.

[No. of Hrs. 10]

UNIT II

CALCULUS OF ONE VARIABLE: Successive differentiation. Leibnitz theorem (without proof) McLaurin's and Taylor's expansion of functions, errors and approximation.

Asymptotes of Cartesian curves. Curveture of curves in Cartesian, parametric and polar coordinates, Tracing of curves in Cartesian, parametric and polar coordinates (like conics, astroid, hypocycloid, Folium of Descartes, Cycloid, Circle, Cardiode, Lemniscate of Bernoulli, equiangular spiral). Reduction Formulae for evaluating

Finding area under the curves, Length of the curves, volume and surface of solids of revolution.

[No. of Hrs. 15]

UNIT III

LINEAR ALGEBRA – MATERICES: Rank of matrix, Linear transformations, Hermitian and skeew – Hermitian forms, Inverse of matrix by elementary operations. Consistency of linear simultaneous equations, Diagonalisation of a matrix, Eigen values and eigen vectors. Caley – Hamilton theorem (without proof). **[No. of Hrs. 09]**

UNIT IV

ORDINARY DIFFERENTIAL EQUATIONS: First order differential equations – exact and reducible to exact form. Linear differential equations of higher order with constant coefficients. Solution of simultaneous differential equations.

Variation of parameters, Solution of homogeneous differential equations – Canchy and Legendre forms. **[No. of Hrs. 10]**

TEXT BOOKS:
1.   Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons. (Latest edition).
2.   Jain, R. K. and Iyengar, S. R. K., "Advanced Engineering Mathematics", Narosa, 2003 (2nd Ed.).

REFERENCE BOOKS:
1.   Mitin, V. V.; Polis, M. P. and Romanov, D. A., "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
2.   Wylie, R., "Advanced Engineering Mathematics", McGraw-Hill, 1995.
3.   "Advanced Engineering Mathematics", Dr. A. B. Mathur, V. P. Jaggi (Khanna publications)

Paper Code: ETPH – 103   **L   T   C**

Paper: APPLIED PHYSICS – I   2   1   3

UNIT - I

Interference of Light: Interference due to division of wavefront and division of amplitude, Young's double slit expt., Interference, Principle of Superposition, Theory of Biprism, Interference from parallel thin films, wedge shaped film`s, Newton rings, Michelson interferometer.

Diffraction: Fresnel Diffraction, Diffraction at a straight edge, Fraunhoffer diffraction due to N slits, Diffraction grating, absent spectra, dispersive power of Grating, resolving power of prism and grating.

[No. of Hrs. 8]

UNIT – II

Polarization: Introduction, production of plane polarized light by different methods, Brewster and Malus Laws. Double refraction, Quarter & half wave plate, Nicol prism, specific rotation, Laurent's half shade polarimeter.

Optical Instruments : Ramdson & Huygen Eye pieces, Electron microscope. **[No. of Hrs. 8]**

UNIT - III

Laser: Introduction, temporal and spatial coherence, principle of Laser, stimulated and spontaneous emission, Einstein's Coefficients, He-Ne Laser, Ruby Laser, Application of Lasers.

Fibre Optics: Introduction, numerical aperture, step index and graded index fibres, attenuation & dispersion mechanism in optical fibers (Qualitative only), application of optical fibres, optical communication (block diagram only) **[No. of Hrs. 8]**

UNIT - IV

Mechanics: Central and non-central forces, Inverse square force, SHM, Damped, undamped and forced Oscillations.

Special theory of Relativity: Frame of reference, Michelson-Morley experiment, basic postulates of special relativity, Lorentz transformations (space – time coordinates & velocity only), mass energy relation. **[No. of Hrs. 8]**

TEXT BOOKS:
1. A. Ghatak, "Optics"
2. N. Subrahmanyam and Brij Lal, "Optics"

REFERENCE BOOKS:
1. Jenkins and White, "Fundamentals of Optics"
2. C. Kittle, "Mechanics", Berkeley Physics Course, Vol.- I.
3. A. Beiser, "Concepts of Modern Physics"

Paper Code: ETCH – 105   **L**   **T**   **C**

Paper: Applied Chemistry – I   **2**   **1**   **3**

UNIT - I

Water: Specifications for water, analysis of water – alkalinity, hardness and its determination (EDTA method only). Water for domestic use, Water softening processes – Lime – Soda process, Ion exchange method, boiler feed water, boiler problems-scale, sludge, priming and foaming, caustic embitterment and corrosion, their causes and prevention, removal of silica, removal of dissolved gases, carbonate and phosphate conditioning, colloidal conditioning, calgon treatment, Numerical problems on alkalinity, hardness, Lime-Soda process and Ion exchange method, EDTA method.   **[No. of Hrs: 08]**

UNIT - II

Fuels: Classification, combustion and chemical principles involved in it, calorific value: gross and net calorific values and their determination by bomb calorimeter and Boy's gas calorimeter.

Solid Fuels: Proximate and ultimate analysis of coal and their importance, High and low temperature carbonisation, Coke: Its manufacture by Otto Hoffman oven.

Liquid Fuels: Conversion of coal into liquid fuels (Bergius process and Fisher-Tropsch Process) and mechanism, Petroleum: its chemical composition and fractional distillation, cracking of heavy oil residues – thermal and catalytic cracking, knocking and chemical structure, octane number and cetane number and their significance, power alcohol, Analysis of flue gases by Orsat's apparatus, Numerical on calorific value, combustion, proximate and ultimate analysis of coal, flue gas analysis.

[No. of Hrs: 08]

UNIT - III

Environmental Pollution and Control: Air Pollution: Types of pollutants, source effects, sink and control of primary pollutants – CO, No_x, HC, So_x and particulates, effects of pollutants on man and environment – photochemical smog and acid rain.

Water Pollution: Classification of pollutants, their sources, waste water treatment – domestic and industrial.

Soil Pollution: Composition of soil, classification and effects of soil pollutants and their control.

Solid Waste Pollution: Classification, waste treatment & Disposal methods (Composting, sanitary landfilling, thermal processes, recycling and reuse).

Hazardous Wastes: Classification – radioactive, biomedical and chemical, treatment and disposal – physical, chemical and biological processes. **[No. of Hrs: 08]**

UNIT - IV
Solutions: Ideal and non-ideal solutions, Raoult's Law, Distillation of binary solutions, Henry's Law, Nernst distribution law, Arrhenius theory and special behaviour of strong electrolytes.

Corrosion: Types of corrosion (dry, wet, atmospheric and soil corrosion), theories of corrosion, protective measures against corrosion. **[No. of Hrs: 08]**

TEXT BOOKS:
1. J.C. Kuriacose & J. Rajaram, "Chemistry in Engineering & Technology", Vol I & II, Latest ed.,
2. S.S. Dara, "Environmental Chemistry & Pollution Control", Latest ed.
3. H.D. Gesser, "Applied Chemistry", Latest ed.

Paper Code: ETME 107

Paper: Manufacturing Processes

L	T	C
2	-	0 2

UNIT - I
Casting Processes:

Principles of metal casting: Pattern materials, types and allowance; Study of moulding, sand moulding, tools, moulding materials, classification of moulds, core, elements of gating system, casting defects, description and operation of cupola: special casting processes e.g. die-casting, permanent mould casting, centrifugal casting, investment casting. **[No. of Hrs. 6]**

UNIT - II
Smithy and Forging:

Basic operation e.g. upsetting, fullering, flattening, drawing, swaging: tools and appliances: drop forging, press forging.

Bench Work and Fitting

Fitting, sawing, chipping, thread cutting (die), tapping; Study of hand tools, Marking and marking tools.

[No. of Hrs. 6]

UNIT - III
Metal joining:

Welding principles, classification of welding techniques; Oxyacetylene Gas welding, equipment and field of application, Arc-welding, metal arc, Carbon arc, submerged arc and atomic hydrogen welding, Electric resistance welding: spot, seam, butt, and percussion welding; Flux: composition, properties and function; Electrodes, Types of joints and edge preparation, Brazing and soldering. **[No. of Hrs. 6]**

UNIT – IV
Sheet Metal Work:

Common processes, tools and equipments; metals used for sheets, standard specification for sheets, spinning, bending, embossing and coining. **[No. of Hrs. 5]**

TEXT BOOKS:
1. Manufacturing Process by Raghuvanshi.
1. Manufacturing Technology by P.N.Rao (TMH publications)

REFERENCE BOOK:
1. Workshop Technology by Hazra-Chowdhary
2. Production Engineering by R.K.Jain
3. Workshop Technology by Chapman

Paper Code: ETCS 109   *L*   *T*   *C*

Paper: Introduction to Computer Systems   **2**   **1**   **3**

UNIT - I

Introduction to Computer:

Overview of Computer organization and historical perspective computer applications in various fields of science and management.

Data representation: Number systems, character representation codes, Binary, hex, octal codes and their inter conversions.

Binary arithmetic, Floating-point arithmetic, signed and unsigned numbers.   **[No. of Hrs. 8]**

UNIT - II

Introduction to OS and Office Automation

Concept of computing, Introduction to Operating Systems such as DOS, windows 2000/Xp, UNIX, Client Server Technology, etc. (only brief user level description). Introduction to World Processing, Spread Sheet & Presentation software e.g. MS-Word, MS-Excel, MS-Power Point. **[No. of Hrs. 8]**

UNIT - III

Introduction to Auto CAD

Coordinate System, 2D drafting: lines, circles, arc, polygon, etc., Editing, 3D, Solid modeling, Rendering, Use of Auto CAD for engineering drawing practices.   **[No. of Hrs. 8]**

UNIT - IV

Web Technologies

Introduction to World Wide Web, Search engines, e-mail, news, gopher, Audio & Video Conferencing, Internet Protocols: FTP, telnet, TCP/IP, SMTP, HTTP, Languages used for WEB Technology: HTML, practical examples using DHTML and Static HTML   **[No. of Hrs. 8]**

TEXT BOOKS:

1.   Rajaraman, "Fundamentals of Computers", Prentice Hall of India, 3rd Edition.
2.   Mark Middlebrook, "Autocad 2004 for Dummies", Wiley Dreamtech, 2000.
3.   Vikas Gupta, "Comdex Computer Course Kit", Dreamtech Press, 2004.

REFERENCE BOOKS:

1.   Alexis Leon & Mathews Leon, "Fundamentals of Computer Science & Communication Engineering", Leon Techworld, 1998.

2.   Omura, "Mastering Autocad 2000 for Mechanical Eng ineers" BPB Publications, 2nd Edition, 1998.

3.   A.S. Tanenbaum, " Computer Networks", Pearson Education India Ltd., 3rd Edition, 2002.

Paper Code: ETEL-111   **L**   **T**   **C**

Paper: Communication Skills – I   **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.

UNIT - I

Remedial Grammar: Errors of Accidence and syntax with reference to Parts of Speech; Agreement of Subject and Verb; Tense and Concord; Conditional Clauses; Use of connectives in Complex and Compound sentences; Question tags and short responses.   **[No. of Hrs: 06]**

UNIT - II

Vocabulary and Usage: Word Formations (by adding suffixes and prefixes); Technical Word Formation; Synonyms, Antonyms, Homophones, and Homonyms; One Word Substitution; Misappropriations; Indianisms; Redundant Words; Phrasal Verb Idioms.   **[No. of Hrs: 06]**

UNIT - III
Technical Writing:

(A)   Scientific Attitude and Impersonal Style; Plain Statements, Definitions; Description and Explanations (of objects, instruments, Processes, Scientific Principles, etc.)

Summarizing and abstracting; Expressing ideas within a restricted word limit; Paragraph Writing (Paragraph division, introduction and the conclusion, Variety in sentences and paragraphs)

Interpretation and use of charts, graphs and tables in technical writing.

Punctuation

(B)   Reading at various speeds (slow, fast, very fast); reading different kinds of texts for different purpose (e.g. for relaxation, for information, for discussion at a later stage, etc.); reading between the lines.

Comprehension   of   Unseen Passages   **[No. of Hrs: 10]**

UNIT - IV

Text: The following prose pieces from ***Best Science Writing : Reading and Insights*** edited by Robert Gannon prescribed text (Hyderabad: University Press (India) Limited, 1991).

1.   Chapter 2: "After 63 years, Why Are They Still Testing Einstein?" by C.P. Gilmore
2.   Chapter 5: "Star Wars : The Leaky Shield" By Carl Sagan
3.   Chapter 10: "Chaos : The Ultimate Asymmetry" by Arthur Fisher
4.   Chapter 11: "Bill Moss, Tentmaker" by Robert Gannon

5.   Chapter 12: "Totality - A Report" by Michael Rogers

[No. of Hrs: 10]

TEXT BOOKS:

1.   Maison, Margaret M. Examine Your English, Hyderabad: Orient Longman, 1980
2.   Sharma, R.S. Technical Writing. Delhi: Radha Publication, 1999
3.   Sudarsanam, R. Understanding Technical English. Delhi: Sterling Publishers Pvt. Ltd., 1992
4.   Gannon, Robert, Edt. Best Science Writing: Readings and Insights. Hyderabad: University Press (India) Limited, 1991.

Paper Code: ETEL-
113   **L**   **T**   **C**
Paper: **Impact**   **of**   **Science**   **&**   **Technology**   **on**
Society   **1**   **0**   **1**

*Non University Examination Scheme (NUES)

There will not be any external examination of the university. The performance of the candidates should continuously be evaluated by an internal committee. The committee may conduct viva-voce at the end for the award of the marks.

Paper   Code: ETPH-151   **L   P   C**
Paper: APPLIED PHYSICS LAB –
I   0   2   1

List of Experiments

(1)   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.

(2)   To determine the moment of inertia of a flywheel about its own axis of rotation.

(3)   To determine the value of acceleration due to gravity using koter's pendulum.

(4)   To determine the frequency of A.C. mains using sonometer and an electromagnet.

(5)   To determine the frequency of electrically maintained turning fork by Melde's method.

(6)   To determine the dispersive power of prism using spectrometer and mercury source.

(7)   To determine the wavelength of sodium light by Newton's Ring.

(8)   To determine the wavelength of sodium light using diffraction grating.

(9)   To determine the refractive index of a prism using spectrometer.

(10)   To determine the specific rotation of cane sugar solution with the help of polarimeter.

(11)   To find the wavelength of He-Ne Laser using transmission diffraction grating.

(12)   To determine the numeral aperture (NA) of a Optical Fibre.

(13)   Compute simulation (simple application of Monte Carlo) e.g. Brownian motion, charging & discharging of capacitor.

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

Paper Code: ETCH –
153   **L**   **P**   **C**
Paper: Applied Chemistry Lab –
I   **0**   **2**   **1**

List of Experiments

1.   To determine the percentage composition of a mixture of Sodium hydroxide and Sodium Chloride.

2.   To determine the amount of Sodium Carbonate in the given mixture of Sodium Carbonate and Sodium Bicarbonate.

3.   Determine the amount of Oxalic Acid and Sulphuric Acid/Hydrochloric Acid in one litre of solution given standard Sodium Hydroxide and Potassium Permanganate.

4.   To determine the Carbonate, Bicarbonate and Chloride contents in irrigation water.

5.   To determine the no. of water molecules of crystallization in Mohr's salt provided standard dichromate solution using internal indicator.

6.   Determine the amount of Cu in the copper ore solution provided hypo solution.

7.   Iodometric Titration of $K_2Cr_2O_7$ v/s $Na_2S_2O_3$ to determine the percentage purity of $K_2Cr_2O_7$ sample.

8.   Argentometric titration one each of Vohlard's method and of Mohr's method.

9.   Complexometric Titrations.

10.   Detrmination of dissolved Oxygen in given sample if water.

TEXT BOOKS:
   1. Vogel's Textbook of Quantitative Chemical Analysis (Latest ed.), Revised by G.H. Jeffery, J. Bassett, J. Mendham & R.C. Denney
   2. Applied Chemistry: Theory and Practice (Latest ed.), By O.P. Vermani & A.K. Narula

Paper Code: ETCS 155   **L   P   C**

Paper: Introduction to AutoCAD, Office Automation and Web Design   0   3   2

List of Experiments

1.   Use Microsoft-Word to perform the following:
   a)   Send out invitation letter to several people using mail merge facility.
   b)   Create tabular data in word and insert graph to represent data.
   c)   Create a Macro and use it in an application.

2.   Use Microsoft-Excel to perform the following:
   a)   Create a Macro and use it in an application
   b)   Enter the name and marks of 10 students and perform various mathematical functions on it.
   c)   Enter first quarter performance of five companies and create a pie chart showing there shareholders in the market.

3.   Use Microsoft Power-Point to perform the following
   a)   Create a slide show on any subject of your choice using minimum five slides.
   b)   Create slideshow in operating sound.
   c)   Create an animation using group, ungroup, order, textbox image insert etc.

4.   Use HTML to design a Home page for IGIT using all the features of HTML like buttons, frames, marquee check boxes etc..

5.   Use AutoCAD to do the following:
   a)   Use of Drawing & Editing Properties: Modify Object Properties and a know how of layers, colors and prototype drawing.
   b)   Draw line (Poly line, multi line, linear line), polygon, ellipse, circle, arc, rectangle and use cross hatching, regions, boundary, spline, donut, fillet and extent commands.
   c)   Dimensioning commands, styles, control scale factors, drawing set-up, grip editing objects snaps, utility commands.
   d)   Projection of points, lines and solids,
   e)   Section of Solids
   f)   Development and Intersection of Surface
   g)   Isomeric Projections

Create a WEB page containing hyperlinks to the pages having information about Science and Technology.

Paper Code: ETME-157   **L**   **P**   **C**

Paper: **Workshop Practice**   **0**   **3**   **2**

UNIT - I

Materials: Spectrography method for finding composition of materials.

Wood Working Shop: Making of various joints, Pattern making.

UNIT - II

Foundary Shop: Bench moulding with single piece pattern and two piece pattern.

Floor moulding – Making of bend pipe mould etc.

Machine moulding – Making of mould using Match-plate pattern.

Core making- Making and baking of dry sand cores for placing in horizontal, vertical and hanging positions in the mould cavity.

Fitting Shop: Learning use of fitting hand tools, marking tools, marking gauge.

Exercises: Jobs made out of MS Flats, making saw – cut filling V-cut taper at the corners, circular cut, fitting square in square, triangle in square.

UNIT - III

Welding Shop: Electric arc welding, Edge preparations, Exercises making of various joints. Bead formation in horizontal, vertical and overhead positions.

Gas Welding: Oxy-Acetylene welding and cutting of ferrous metals.

Soldering: Dip soldering.

Brazing: With Oxy-Acetylene gas.

UNIT - IV

Sheet Metal Shop: Learning use of sheet-metal tools, Exercises: Making jobs out of GI sheet metal. Cylindrical, Conical and Prismatic shapes.

Project Shop: Extrusion of soft metals, Plastic coating of copper wires, Plastic moulding.

Paper Code: ETME-159 **L** **P** **C**

Paper: Engineering Graphics Lab **0** **2** **1**

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.

UNIT - II

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.

UNIT - III

Projection of Solids: Simple cases when solid is placed in different positions, Axis faces and lines lying in the faces of the solid making given angles.
CADD

UNIT - IV
Isometric Projection
Nomography : Basic Concepts and use.

TEXT BOOKS:
1.   Engineering drawing by N.D.Bhatt (Charotar Publications).

REFERENCE BOOKS:
1.   Engineering Drawing by S.C.Sharma & Navin Kumar (Galgotia Publications)
2.   Engineering Drawing by Venugopalan.
3.   Engineering Drawing by P.S.Gill

Paper   **Code:**   **ETMA-102**   **L**   **T**   **C**

Paper: Applied 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 of 12.5 marks.

UNIT - I
CALCULUS OF SEVERAL VARIABLES:
Partial differentiation, ordinary derivatives of first and second order in terms of partial derivaties, Euler's theorem on homogeneous functions, change of variables, Taylor's theorem of two variables and its application to approximate errors. Maxima and Minima of two variables, Langranges method of undermined multipliers and Jacobians. **[No. of Hrs. 12]**

UNIT - II
FUNCTIONS OF COMPLEX VARIABLES:
Derivatives of complex functions, Analytic functions, Cauchy-Riemann equations, Harmonic Conjugates, Conformal mapping, Standard mappings – linear, square, inverse and bilinear. Complex line integral, Cauchy's integral theorem, Cauchy's integral formula, Zeros and Singularities / Taylor series, Laurents series, Calculation of residues. Residue theorem, Evaluation and real integrals. **[No . of Hrs. 12]**

UNIT - III
VECTOR CALCULUS:
Scalar and Vector point functions, Gradient, Divergence, Curl with geometrical physical interpretations, Directional: derivatives, Properties.
Line integrals and application to work done, Green's Lemma, Surface integrals and Volume integrals, Stoke's theorem and Gauss divergence theorem (both without proof). **[No. of Hrs. 10]**

UNIT - IV
LAPLACE TRANSFORMATION:
Existence condition, Laplace transform of standard functions, Properties, Inverse Laplace transform of functions using partial fractions, Convolution and coinvolution theorem. Solving linear differential equations using Laplace transform. Unit step function, Impulse function and Periodic function and their transforms. **[No. of Hrs. 10]**

TEXT BOOKS:
1. E. Kresyzig, "Advanced Engineering Mathematics", John Wiley and Sons. (Latest edition).
2. R. K. Jain and S. R. K. Iyengar, "Advanced Engineering Mathematics", Narosa, 2003 (2nd Ed.).
3. Dr. A. B. Mathur, V. P. Jaggi, "Advanced Engineering Mathematics", Khanna Publishers.

REFERENCE BOOKS:
1. V. V. Mitin, M. P. Polis and D. A. Romanov, "Modern Advanced Mathematics for Engineers", John Wiley and Sons, 2001.
2. R. Wylie, "Advanced Engineering Mathematics", McGraw-Hill, 1995.

Paper Code: ETPH-104

Paper: APPLIED PHYSICS – II

	L	T	C
	2	1	3

UNIT - I
Electromagnetic Theory (EMT)

Motion of Charged Particles in crossed electric & magnetic fields, Velocity Selector & Magnetic focussing, Gauss law, continuity equation, inconsistency in Ampere's Law, Maxwell's equations (differential and integral forms), poynting vector, Poynting Theorem (Statement only), propagation of plane electromagnetic waves in conducting and non-conducting medium.   **[No. of Hrs. 8]**

UNIT - II
Quantum Mechanics & Statistical Physics: De-Broglie Hypothesis, Davisson Germer experiment, wave function and its properties, expectation value, Wave Packet, Uncertainity principle. Schrodinger Equation for free Particle, Time Dependent Schrodinger Equation, Particle in a box (1-D), Single step Barrier, Tunneling effect.

Qualitative Features of Maxwell Bollzman, Bose-Einstein and Fermi-Dirac statistics distribution, functions & their comparison (no derivation)   **[No. of Hrs. 8]**

UNIT - III
Solid State Physics

Formation of energy bands in metals, semiconductors and insulators; intrinsic and extrinsic semiconductors, Fermi energy levels for doped, undoped semiconductors and pn junction; Tunnel diode, Zener diode.

Superconductivity: Meissner Effect, Type I and Type II Superconductors, BCS theory (Qualitative only), London's equation, properties of superconductors & applications.   **[No. of Hrs. 8]**

UNIT - IV
X-Rays: production and properties, Crystalline and Anorphous solids (Brief) Bragg's Law, Applications.

Ultrasonics: Introduction, Production of Ultrasonics (Magentostriction and piezoelectric methods), engineering applications.   **[No. of Hrs. 8]**

TEXT BOOKS:

1.   A. BEISER, "Concept of Modern Physics"
2.   Rajam, "Atomic Physics"
3.   Greiner, "Quantum Physics"
4.   Griffth, "Introduction to Electrodynamics"
REFERENCE BOOKS:
1.   Jordan & Balmain, "Electromagnetic waves and Radiating Systems"
2.   Kittel, "Solid State Physics"
3.   R.L. Singhal, "Solid State Physics"
4.   Schiff, "Quantum Mechanics"

Paper Code: ETCH –
106   **L   T   C**
Paper: Applied Chemistry –
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.

UNIT - I
Chemical Bonding:
Potential Energy curve for H_2 molecule, co-ordinate bond, Werner's theory, effective atomic numbers, isomerism in co-ordinate compounds. Hydrogen bonding, Vander Waal's forces, hybridization including d-orbitals, Valence shell Electron Repulsion Theory (VSEPR). Discussion of structures of IF_3, $SnCl_2$, CO_3^{2-}, Molecular Orbital theory, Linear combination of atomic orbitals (LCAO) method. Structures of simple heteronuclear diatomic molecules such as CO, NO, HF, HCl.   **[No. of Hrs: 08]**

UNIT - II
Gaseous State: Gas laws and Kinetic theory of gases, Distribution of molecular velocities, Mean free path, Real gases – non ideal behaviour, causes of deviation from ideal behaviour, Vander Waal's equation. Liquefaction of gases. Numericals based on above topics.
Thermochemistry: Hess's Law, Heat of a reaction, Effect of temperature on heat of reaction at constant pressure (Kirchoff's eq.), heat of dilution, heat of hydration, heat of neutralization and heat of combustion, Flame temperature.   **[No. of Hrs: 08]**

UNIT - III
Catalysis: Criteria for catalysis : Homogeneous catalysis – acid-base, Enzymatic catalysis, Catalysis by metal salts, Heterogeneous catalysis, concepts of promoters, inhibitors and poisoning, physiosorption, chemisorption, surface area.
The Phase Rule: Definitions of various terms, Gibb's Phase rule, Application of phase rule to one component system – the water system and Sulphur system. Two component system : Lead – Silver, $FeCl_3$ – water, Na_2SO_4 – water.   **[No. of Hrs: 08]**

UNIT - IV
Polymers and Composites: Functionality, Degree of polymerization, concept of molecular weight (number average, weight average & numerical based on them), Linear, branched and cross-linked polymers, Tacticity of polymers, Homo and Copolymers (Classification based on repeat unit), Structure – property relationship of polymers. Industrial applications of important thermoplastic, thermosetting polymers, Elastomers, Natural Polymers.
Conducting Polymers : Properties and applications.

Composites : Classification, Fibre and particle reinforced composites.   **[No. of Hrs: 08]**

TEXT BOOKS:
1.   J.D. Lee, "Inorganic Chemistry", Latest ed.
2.   J.C. Kuriacose & J. Rajaram, "Chemistry in Engineering & Technology, Vol I & II, Latest ed.
3.   Puri, Sharma & Pathania, "Principles of Physical Chemistry", Latest ed.
4.   V.R. Gowarikar, N.V. Viswanathan & Jayadev Sreedha, "Polymer Science", Latest ed.

Paper	Code:			ETCS
108		*L*	*T*	*C*
Paper:	Introduction			to
Programming		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.

UNIT - I

Introduction to Programming: Concept of algorithms, Flow Charts, Data Flow diagrams etc., Introduction to the Editing tools such as vi or MS-VC editors, Concepts of the finite storage, bits bytes, kilo, mega and gigabytes. Concepts of character representation, Number Systems & Binary Arithmetic.

[No. of Hrs. 8]

UNIT - II

Programming using C: The emphasis should be more on programming techniques rather than the language itself. The C Programming language is being chosen mainly because of the availability of the compilers, books and other reference materials.

Example of some simple C program. Concept of variables, program statements and function calls from the library (Printf for example)

C data types, int, char, float etc., C expressions, arithmetic operation, relational and logic operations, C assignment statements, extension of assignment of the operations. C primitive input output using getchar and putchar, exposure to the scanf and printf functions, C Statements, conditional executing using if, else. Optionally switch and break statements may be mentioned. **[No. of Hrs. 8]**

UNIT - III

Iterations and Subprograms: Concept of loops, example of loops in C using for, while and do-while. Optionally continue may be mentioned.

One dimensional arrays and example of iterative programs using arrays, 2-d arrays Use in matrix computations.

Concept of Sub-programming, functions Example of functions. Argument passing mainly for the simple variables.

[No. of Hrs. 8]

UNIT - IV

Pointers and Strings: Pointers, relationship between arrays and pointers Argument passing using pointers Array of pointers. Passing arrays as arguments. Strings and C string library.

Structure and Unions. Defining C structures, passing strings as arguments Programming examples.

[N o. of Hrs. 8]

TEXT BOOKS:

1.   Yashwant Kanetkar, "Let us C", BPB Publications, 2nd Edition, 2001.
2.   Herbert Schildt, "C:The complete reference", Osbourne Mcgraw Hill, 4th Edition, 2002.

REFERENCE BOOKS:

1.   Raja Raman, "Computer Programming in C", Prentice Hall of India, 1995.

2.   Kernighan & Ritchie, "C Programming Language", The (Ansi C Version), PHI, 2nd Edition.

Paper Code: ETME 110　　　　　　　　　　　　　　　**L　　T　　C**

Paper: Engineering Mechanics　　　　　　　　　　　　　　**2　　1　　3**

UNIT - I

Force system: Free body diagram, Eqilibrium equations and applications.

Friction: Static and Kinetic friction, laws of dry friction, co-efficient of friction, angle of friction, angle of repose, cone of friction, friction lock, friction of flat pivot and collared thrust bearings, Belt drive- derivation of equation.

$$T_1/T_2 = e^{\mu\theta} \text{ and }$$
its
application　　　　　　　　　　**[No. of Hrs. 8]**

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.

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.　　　　　　　　　　**[No. of Hrs. 8]**

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.　　　　　　　**[No. of Hrs. 8]**

UNIT - IV

Kinematics of Rigid Bodies: Concept of rigid body, type of rigid body motion, absolute motion, introduction to relative velocity, relative acceleration (Corioli's component excluded) and instantaneous center of velocity, Velocity and acceleration 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.

Shear　　　　　force　　　　　and　　　　　bending　　　　　Moment Diagram.　　　　　　　　　　**[No. of Hrs. 8]**

TEXT BOOKS:
1.   A.K.Tayal, "Engg Mechanics", Umesh Publications
2.   Sadhu Singh, "Engg Mechanics", Khanna Publishers

REFERENCE BOOKS:
1.   Irving H. Shames, "Engg Mechanics", PHI publications
2.   U.C.Jindal, "Engg Mechanics", Galgotia Publications
3.   Beer & Johnston, "Engg Mechanics", TMH

4.   Subramanyam, "Engg Mechanics"

Paper Code: ETEC-112   **L**   **T**   **C**

Paper: **ELECTRICAL SCIENCE**   **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.

UNIT - I
Circuit Analysis

Ohm's Law, KCL, KVL Mesh and Nodal Analysis, Circuit parameters, energy storage aspects, Superposition, Thevenin's, Norton's, Reciprocity, Maximum Power Transfer Theorem, Millman's Theorem, Star-Delta Transformation. Application of theorem to the Analysis of dc circuits.

[No. of Hrs. 8]

UNIT - II
A.C.Circuits

R-L, R-C, R-L-C circuits (series and parallel), Time Constant, Phasor representation, Response of R-L, R-C and R-L-C circuit to soinusoidal input Resonance-series and parallel R-L-C Circuits, Q-factor, Bandwidth.

[No. of Hrs. 7]

UNIT - III
Measuring Instruments

Principles, Construction and application of moving coil, moving iron, dynamometer type, induction type instruments, extension of range of ammeter, voltmeter (shunt and multiplier), Two-wattmeter method, for the measurement of power, Cathol-ray Oscilloscope and Applications.   **[No. of Hrs. 7]**

UNIT - IV
Transformers

Construction and Working principles and phaser diagrams of Single-phase Transformer, Emf equation, Equivalent circuit, Regulation and efficiency, and Auto transformer.

Rotating Machines

Construction and working principles of dc motor and generator and its characteristics Applications of DC machines

Construction and working principles of 3-φ-Induction motor, Torque-speed characteristics,   and   Industrial applications.   **[No. of Hrs. 10]**

TEXT BOOKS:

1. P.C. Sen "Principles of Electric Machines and Power Electronics", Wiley Eastern 2003.
2. Vincent DEL TORO "Electrical Engineering Fundamental's Prentice Hall India", Ed 2002.

Paper Code: ETEL-114   **L   T   C**

Paper: Communication Skills – II   **2   1   3**

UNIT – I

Basic Concepts in Communication: Communication as sharing; context of communication; the speaker/writer and the listener/reader; medium of communication; barriers to communication; accuracy, brevity, clarity and appropriateness in communication.   **[No. of Hrs: 05]**

UNIT - II

Writing Skills: Types of writings (Expository, Descriptive, Analytic, Argumentative, Narrative etc) and their main features. Resumes and CV's and Cover letters. Memos and Notices. Basics of Formal Reports.   **[No. of Hrs: 08]**

UNIT - III

Verbal, Non-Verbal and Listening Skills: Elementary Phonetics (Speech Mechanism, The Description of Speech Sounds, The Phoneme, the syllable; Prosodic Features, Word Accent, Features of Connected Speech); Paralanguage and Body language; and Classroom Presentations, Hearing and Listening; Essentials of Good Listening: Achieving ability to comprehend material delivered at relatively fast speed.   **[No. of Hrs: 08]**

UNIT - IV

Group Discussion: Use of persuasive strategies including some rhetorical devices for emphasizing (for instance; being polite and firm; handling questions and taking in criticism of self; turn-taking strategies and effective intervention; use of body language).   **[No. of Hrs: 09]**

TEXT BOOKS:
1.   R. K. Bansal, and J. B. Harrison, "Spoken English For India: A Manual of Speech and Phonetics", Hyderabad: Orient Longman, 1983.
2.   Lewis, Hedwig. "Body Language: A Guide For Professionals. New Delhi: Response Books", A division of Sage Publication, 2000
3.   Sides, H. Charles, "How to Write & Present Technical Information", Cambridge: CUP, 1999.

4.	Forsyth, Sandy & Lesley Hutchison, "Practical Composition", Edinburgh Oliver & Boyd, 1981

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

L	P	C
0	2	1

List of Experiments

1. To determine the value of e/m of electron by J.J. Thomson method.

2. To determine unknown resistance of a wire by Carey Foster's Bridge.

3. To determine the internal resistance of Leclanche cell using potentiometer.

4. To study the charging and discharging of a capacitor and to find out the time constant.

5. To find the thermal conductivity of a poor conductor by Lee's disk method.

6. To study the thermo emf using thermocouple and resistance using Pt. Resistance thermometer.

7. To determine the velocity of ultrasound waves using an ultrasonic spectrometer in a given liquid (Kerosene Oil)

8. To measure the frequency of a sine-wave voltage obtain from signal generator and to obtain lissajous pattern on the CRO screen by feeding two sine wave voltage from two signal generator.

9. To determine the temp. coefficient of resistance of platinum by Callender & Griffith's Bridge.

10. To study Hall effect.

11. To determine plank's constant.

Note:
Atleast 8 experiments must be carried out.
Proper error – analysis must be carried out with all the experiments.

**Paper Code: ETCH –
154**   **L   P   C**
**Paper: Applied Chemistry Lab –
II**   **0   2   1**

List of Experiments

1. Determine the heat of hydration of $CuSO_4.5H_2O$/$FeSO_4.7H_2O$.

2. Determine the heat of neutralization of strong Acid (say H_2SO_4/HCl) with strong base (NaOH).

3. Determine the heat of neutralization of Weak Acid with strong base.

4. Determine the molecular weight of a substance by Rast Method.

5. Determine the reaction rate constant for 1st order reaction.

6. Determine the surface tension of a liquid using drop weight method.

7. To determine the viscosity of the given liquid (density to be determined).

8. Preparation of a Polymer.

9. To determine the cell constant of a conductivity cell.

10. Titration of strong acid/strong base conduct metrically.

TEXT BOOKS:
1.   B.D. Khosla, A. Gulati & V.C. Garg, "Practical Physical Chemistry", Latest ed
2.   S.K. Bhasin and Sudha Rani, "Laboratory Manual on Engineering Chemistry", Latest ed.

Paper   Code: ETCS
**   156   L   P   C**
Paper: C   Programming
Lab.   0   2   1

List of Experiments

1.   Write a program to produce ASCII equivalent of given number
2.   Write a program to find divisor or factorial of a given number.
3.   Write a program to evaluate the following algebraic expressions after reading necessary   values from the user
        ❖   (ax+b)/(ax-b)
        ❖   2.5 log x-cos 30+ | x^2-y^2|+sqrt (2xy)
        ❖   (x^5+10x^4+8x^3+4x+2
4.   Write a program to find sum of a geometric series
5.   Write a program to cipher a string
6.   Write a program to check whether a given string follows English capitalization rules
7.   Write a program to find sum of the following series
        1+ ½ + 1/3 +_____+1/20
8.   Write a program to search whether a given substring exist in an input string or not and then delete this string from input string.
9.   Write a recursive program for tower of Hanoi problem
10.   The fibonacci sequence of numbers is 1,1,2,3,5,8……. Based on the recurrence relation   F(n)=F(n-1)+F(n-2)for n>2
        Write a recursive program to print the first m Fibonacci number
11.   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)   Trace of a matrix
        e)   Transpose of a matrix
        f)   Check of matrix symmetry
        g)   Product of two matrices.
12.   Write a program that takes two operands and one operator from the user perform the operation and then print the answer
13.   Write a program to print the following outputs:

```
    1                                                   1
  2   2                                               2   2
  3   3   3                                         3   3   3
  4   4   4   4                                   4   4   4 4
  5   5   5   5   5                             5   5   5   5 5
```

14.   Write functions to add, subtract, multiply and divide two complex numbers (x+iy) and (a+ib) Also write the main program.

15. Write a menu driven program for searching an sorting with following options:-

  a) Searching   (1) Linear searching (2) Binary searching
  b) Sorting   (1) Insersection sort (2) Selection sorting

16. Write a program to copy one file to other, use command line arguments.
17. Write a program to mask some bit of a number (using bit operations)
18. An array of record contains information of managers and workers of a company. Print all the data of managers and workers in separate files.

Paper   **Code:**   **ETME**
158   **L**   **P**   **C**
Paper: Engineering Mechanics Lab   **0**   **3**   **2**

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, η 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.

Paper Code: ETEC
160   **L**   **P**   **C**
Paper: Electrical Science
Lab   **0**   **2**   **1**

List of Experiments

1.   Verification of Thevenin's theorem

2.   Verification of Superposition theorem

3.   Phasor Diagram and Power factor of LCR circuit.

4.   Measurement of Power and Power factor in single phase Load using three ammeters/voltmeters.

5.   Calibration of Energy Meter/Wattmeter/Voltmeter/Ammeter

6.   Two wattmeter method of measuring power in three phase circuit (resistive load only)

7.   Load test on Single Phase Transformer, Regulation and Efficiency of Transformer

8.   Short Circuit/Open Circuit tests on Single Phase transformer

9.   Measure the armature and field resistance of a D.C. Machine

10.   Connection and starting of a Three Phase Induction Motor using direct on line or Star Delta Starter.

11.   Starting and Speed Control of a D.C. shunt motor

12.   Resonance

Paper Code: ETMA-201   **L   T   C**

Paper: Applied Mathematics – III   **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.

UNIT – I
Laplace Transformation: Laplace Transformation, Inverse Laplace transformation Convolution Theorem, application to linear differential equations with constant coefficients, Unit step function, impulse functions / periodic
functions.   **[No. of Hrs.: 11]**

UNIT – II
Fourier Series: Fourier Series, Euler's formulae, even and odd functions, having arbitrary periods, half range expansion, Harmonic Analysis.

Fourier Transforms: Fourier transform, Sine and Cosine transforms, Application to differential
equations.
  [No. of Hrs.: 11]

UNIT – III
Special Functions: Beta and Gamma functions, Bessels functions of first kind, Recurrence relations, modified Bessel functions of first kind, Ber and Be functions, Legendre   Polynomial,   Rodrigue's   formula,   orthogonal   expansion   of function.   **[No. of Hrs.: 11]**

UNIT – IV
Partial Differential Equation: Formation of first and second order linear equations, Laplace, Wave and heat conduction equation, initial and boundary value problems.   **[No. of Hrs.: 11]**

TEXT BOOKS:
1.   E. Kresyig, "Advanced Engineering Mathematics", 5th Edition, John Wiley & Sons, 1999.

REFERENCE BOOKS:
1.   B.S. Grewal, "Elementary Engineering Mathematics", 34th Ed., 1998.
2.   H.K. Dass, "Advanced Engineering Mathematics", S. Chand & Company, 9th Revised Edition, 2001.
3.   Shanti Narayan, "Integral Calculus", S. Chand & Company, 1999

4.	Shanti Narayan, "Differential Caluculs", S.Chand & Company, 1998

Paper Code: ETEC-203

L   T   C

Paper: Signals &

Systems   **3   1   4**

Unit – I

Introduction : Basic concepts & Definitions ,Continuous and Discrete – Time
Signals & their Classification , Continuous & Discrete – Time system & their
properties . Basic Signals.
Linear Time – Invariant Systems : Convolution for contininous- time systems
(CTS), convolution for Discreet-time systems (DTS), properties of LTI systems ,
Strate   variable   Description   for   LTI   systems.
Correlation.
[No. of Hours: 11

Unit – II

Fourier Analysis for CTS: Response of LTI systems to Exponential Signals,
Periodic signals,Fourier Series ,Fourier Transform and it's Properites, system
Analysis by fourier Transform.
Fourier Analysis for DTS : Response of LTI system to Exponentials Signals,
Discrete – Time Fourier series , Discrete- time Fourier transform & its
Properties,System Analysis by Fourier Transform.

**[No. of
Hours: 11]**

Unit – III

Time and Frequency Characterization of Signals and Systems: The Magnitude
Phase Representation of the Fourier Transform , Linear and Non – Linear phase ,
phase Delay and Group Delay , Time – Domain properties   of Ideal Frequency
Selective filters , Time- Domain and Frequency – Domain Aspects of Non – Ideal
Filters.
Sampling : The sampling Theorem ,Effect of under sampling , Sampling of Band –
Pass signals.

**[No. of
Hours: 11]**

Unit - IV

Laplace Transform : Definition and Properties , Methods ofInversion ,Application to LTI system Analysis.
Z- Transform : Definitions and Properties, Significance and properties of ROC , Inversion oz Z- Transform , Application to system Analysis ,The Unilateral Z-Transform and it's Properties.

[No. of Hours: 11]

Text Books:
1. Oppenheim, Wilsky, "Signals & System" PHI IInd Edition
2. Proakis, "Digital Signal Processing" PHI – IInd Edition.

Reference Books:
1. S. Haykin, "Signals & System" (Wiley) – 1999
2. S. K. Mitra, "Digital Signal Processing" PHI – IInd Edition.

Paper Code: ETEC-205	**L**	**T**	**C**
Paper: Circuits & Systems – 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 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.

Unit-I
Introduction to continuous and discrete signals, their classification and types, periodic waveforms and signal synthesis, LTI systems and their properties; system modeling in terms of differential equations and transient response of R, L, C circuits for impulse, step, ramp, sinusoidal and exponential signals.

[No. of Hours: 11]

Unit-II
Laplace Transform: Review of properties and applications of Laplace transform of complex waveform and transient response of R, L, C series, parallel, series-parallel circuits for all kinds of excitations.

[No. of Hours: 11]

Unit-III
Graph theory and its applications, two port networks – z, y, ABCD, h, g, inverse ABCD parameters their
interconversion, interconnection of two 2-port networks, concept of transform impedance, Network theorems: Reciprocity, Superposition, Thevenin, Norton,

Millman,   Maximum   Power   Transfer   and
Tellegan   [N
o. of Hours: 11]

Unit IV
Elements of Network Synthesis: Foster's I and II, Cauer's I& II forms, Synthesis of LC, RC, RL
Networks
[No. of Hours: 11]

Text Books:
1.   Valkenburg, " Network analysis" PHI, 2000.
2.   D. R. Choudhary, "Networks and Systems" New Age International, 1999.

Reference Books
1.   Bhise, Chadda, Kulshreshtha, " Engineering network analysis and filter design" Umesh publication, 2000.
2.   Kuo, "Network analysis and synthesis" John Weily and Sons, 2nd Edition.

Paper Code: ETEC-207   L   T   C

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 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.

Unit – I

Semiconductor Diodes and Rectifiers: Introduction, general characteristics, energy levels, extrinsic materials n & p type, ideal diode, basic construction and characteristics, DC & AC resistance, equivalent circuits, drift & diffusion currents, transition & diffusion capacitance, reverse recovery times, temperature effects, diode specifications, different types of diodes (Zener, Varactor, Schottky, Power, Tunnel, Photodiode & LED). Half wave & full wave rectifiers.   **[No. of Hours: 11]**

Unit – II

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

Bias stabilization: Need for stabilization, fixed Bias, emitter bias, self bias, bias stability with respect to variations in I_{co}, V_{BE} & β, Stabilization factors, thermal stability.

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, Darlington pair, Hybrid π-model at high frequencies, Cascaded amplifiers.   **[No. of Hours: 11]**

Unit – III

Multistage Amplifiers: Cascaded amplifiers, Calculation 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, Examples of analysis of feedback Amplifiers   **[No. of Hours: 11]**

Unit – IV

Field Effect Transistor: Introduction, Classification, FET characteristics, Operating point, Biasing, enhancement & Depletion type MOSFETS.

Introduction to UJT SCR, Thyristor- Firing characteristics   **[No. of Hours: 11]**

Text Books

1.   J. Millman and Halkias, "Electronic devices and circuits" TMH, 1999.
2.   Salivahanan, Suresh Kumar, Vallavaraj, "Electronic devices and circuits" TMH, 1999

Reference Book

1.   J. Millman and Halkias, "Integrated Electronics, Analog & Digital Circuits & Systems" TMH – 2000.
2.   Boylestad & Nashelsky, "Electronic Devices & Circuit Theory" PHI – VIth Edition.
3.   Sedra & Smith, "Micro Electronic Circuits" Oxford University Press, 2000
4.   J.B.Gupta, "Electronic Devices & Circuits" S. K. Kataria, IInd Edition.

Code   No.:   ETIT 209   L   T   C
Paper: Object Oriented Programming using C++   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

UNIT – I

Introduction: Introducing Object-Oriented Approach related to other paradigms (functional, data decomposition), Characteristics of Object-Oriented Languages.
Basic terms and ideas: Abstraction, Encapsulation, Information hiding, Inheritance, Polymorphism, Review of C, Difference between C and C++, cin, cout, new, delete operators.   **[No. of Hrs: 11]**

UNIT – II

Classes and Objects: 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, Copy Constructor, Static Class Data, Constant and Classes, C++ garbage collection, dynamic memory allocation.   **[No. of Hrs. 11]**

UNIT – III

Inheritance and Polymorphism: Inheritance, Types of Inheritance, Class hierarchy, derivation – public, private & protected, Aggregation, composition vs classification hierarchies, Polymorphism, Type of Polymorphism – Compile time and runtime, Method polymorphism, Polymorphism by parameter, Operator overloading, Parametric polymorphism, Generic function – template function, function   name   overloading,   Overriding   inheritance methods   **[No. of Hrs: 11]**

UNIT – IV

Files and Exception Handling: Persistant objects, Streams and files, Namespaces, Exception handling, Generic Classes

Standard Template Library: Standard Template Library, Overview of Standard Template Library, Containers, Algorithms, Iterators, Other STL Elements, The Container Classes, General Theory of Operation, Vectors.   **[No. of Hrs: 11]**

TEXT BOOKS:
1.   A.R.Venugopal, Rajkumar, T. Ravishanker "Mastering C++", TMH, 1997.
2.   R. Lafore, "Object Oriented Programming using C++", BPB Publications, 2004.
3.   Schildt Herbert, "C++ Programming", 2nd Edition, Wiley DreamTech.

REFERENCE BOOKS:
1.   D . Parasons, "Object Oriented Programming with C++", BPB Publication, 1999.
2.   Steven C. Lawlor, "The Art of Programming Computer Science with C++", Vikas Publication, 2002.
3.   Yashwant Kanethkar, "Object Oriented Programming using C++", BPB, 2004.

Code   **No.:   ETCS**
211   **L   T   C**
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, 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

UNIT – I

Fundamentals of algorithm analysis: Big 'O' notations, Time and space complexity of algorithms., Elementary data structures and their applications
Arrays: ordered lists, representation of arrays, sparse matrices, linked lists: singly and doubly linked lists, stacks, queues, multiples stacks and queues, Applications: polynomial arithmetic, infix, postfix and prefix arithmetic expression conversion and evaluations.   **[No. of Hrs: 12]**

UNIT – II

Trees: Binary trees: Definition, traversal, threaded binary tree, Counting Binary Tree.
Graphs: Representation, traversal, connected components, shortest path and transitive closure, topological sort, activity network, critical path, path enumeration. Dijkstra's Algorithm, Floyd Warshall's Algorithm, Minimum Spanning Tree Definitions.   **[No. of Hrs: 11]**

UNIT – III

Searching & Sorting: Binary Search Tree, Insertion & Deletion, AVL Trees, Hash function, Hash table, Internal sort: Radixsort, Insertion sort, Exchange sort, Selection sort, Quicksort, Shellsort, Mergesort, Heaport, External sort: K-way mergesort, balanced mergesort, polyphase mergesort

[No. of Hrs: 11]

UNIT – IV

Files: Files, Queries and sequential organization; Cylinder surface indexing, Hashed Indexed, Tree Indexing, B-Trees, Trie Indexing, Sequential file organizational, random file organization, Hashed file organization, Inverted files, cellular partitions.   **[No. of Hrs: 10]**
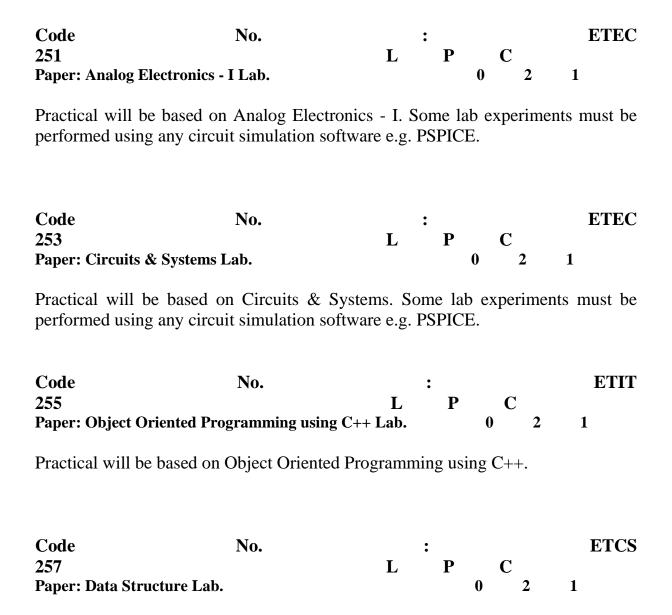
TEXT BOOKS:
1.   E. Horowitz and S. Sahani, "Fundamentals of Data Structures", Galgotia Booksource Pvt. Ltd, 1999.
2.   R. L. Kruse, B. P. Leung, C. L. Tondo, "Data Structures and program design in C", PHI, 2000.

REFERENCES BOOKS:

1.   Schaum's outline series, "Data Structure", TMH, 2002
2.   Y. Langsam et. al., "Data Structures using C and C++", PHI, 1999.
3.   Yashwant Kanetkar, "Data Structure through C", BPB, 2005.

Code No. : ETEC 251

L P C

Paper: Analog Electronics - I Lab. 0 2 1

Practical will be based on Analog Electronics - I. Some lab experiments must be performed using any circuit simulation software e.g. PSPICE.

Code No. : ETEC 253

L P C

Paper: Circuits & Systems Lab. 0 2 1

Practical will be based on Circuits & Systems. Some lab experiments must be performed using any circuit simulation software e.g. PSPICE.

Code No. : ETIT 255

L P C

Paper: Object Oriented Programming using C++ Lab. 0 2 1

Practical will be based on Object Oriented Programming using C++.

Code No. : ETCS 257

L P C

Paper: Data Structure Lab. 0 2 1

Practical will be based on Data Structure.

Code   No.:   ETCS
202   **L   T   C**
Paper: Software Engineering   **3   1   4**

UNIT – I

Introduction: Software Crisis, Software Processes & Characteristics, Software life cycle models, Waterfall, Prototype, Evolutionary and Spiral Models

Software Requirements analysis & specifications: Requirement engineering, requirement elicitation techniques like FAST, QFD & Use case approach, requirements analysis using DFD, Data dictionaries & ER Diagrams, Requirements documentation, Nature of SRS, Characteristics & organization of SRS.

[No. of Hrs.: 11]

UNIT – II

Software Project Planning: Size Estimation like lines of Code & Function Count, Cost Estimation Models, COCOMO, COCOMO-II, Putnam resource allocation model, Risk Management.

Software Design: Cohesion & Coupling, Classification of Cohesiveness & Coupling, Function Oriented Design, Object Oriented Design **[No. of Hrs.: 11]**

UNIT - III

Software Metrics: Software measurements: What & Why, Token Count, Halstead Software Science Measures, Design Metrics, Data Structure Metrics, Information Flow Metrics

Software Reliability: Importance, Hardware Reliability & Software Reliability, Failure and Faults, Reliability Models, Basic Model, Logarithmic Poisson Model, Software Quality Models, CMM & ISO 9001.

[No. of Hrs.: 11]

UNIT - IV

Software Testing: Testing process, Design of test cases, 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, Alpha & Beta Testing, Testing Tools & Standards.

Software Maintenance: Management of Maintenance, Maintenance Process, Maintenance Models, Regression Testing, Reverse Engineering, Software Re-engineering,   Configuration   Management,

Documentation. **[N o. of Hrs.: 11]**

TEXT BOOKS:
1. K. K. Aggarwal & Yogesh Singh, "Software Engineering", 2nd Ed., New Age International, 2005.
2. R. S. Pressman, "Software Engineering – A practitioner's approach", 5th Ed., McGraw Hill Int. Ed., 2001.

REFERENCE BOOKS:
1. Stephen R. Schach, "Classical & Object Oriented Software Engineering", IRWIN, TMH, 1996.
2. James Peter, W. Pedrycz, "Software Engineering: An Engineering Approach", John Wiley & Sons, 2004.
3. I. Sommerville, "Software Engineering", Addison Wesley, 2004
4. K. Chandrasehakhar, "Software Engineering & Quality Assurance", BPB, 2005.

Paper Code: ETEC-204   **L   T   C**

Paper: Analog Electronics – II   **3   1   4**

Unit I

Building Blocks of Analog ICs: Differential amplifier, Op-amp Model, op-amp DC & AC parameters, virtual ground, Inverting and non-inverting amplifiers, differential amp, adders, Voltage to current, current to voltage Converter, Integrators, Differentiators Current mirrors, Active loads, Level shifters and output stages, OTA as integrator, differentiator.   **[No. of Hours: 11]**

Unit – II

Waveform Generations: Sinewave generator (Phase shift Wein bridge, Hartley & Colpitts), Ramp an sawtooth generators, Linearity of waveforms, Astable multi Vibrators, OTA-C Oscillators, Crystal oscillator.   **[No. of Hours: 11]**

Unit – III

Power Amplifiers: Power dissipations in transistors, Harmonic distortion, Amplifiers Classification, (Class-A, Class-B, Class-C, Class-AB) Efficiency, Push-pull and complementary Push-pull amplifiers, Tuned amplifiers.

Linear & Non Linear Wave shaping: Clipping & Clamping Circuits Comparators, log/antilog circuits using Op-amps, precision rectifiers.   **[No. of Hours: 11]**

Unit – IV

Active RC Filters: Idealistic & Realistic response of filters (LP, BP, HP), Butter worth & Chebyshev approximation filter functions All pass, Notch Filter, Operational transconductance amplifier (OTA)-C filters.

Applications of IC Analog Multiplier: IC phase locked loops, IC voltage regulators, IC function generators.

Introduction to current conveyer.   **[No. of Hours: 11]**

Text Books

1.   R. A. Gayakward, "Opams and Linear Integrated Circuit" PHI – 3rd Edition.

2.   D. Roychaudhary, S. B. Jain, "Linear Integrated Circuits" New Age International – 2000.

Reference Books

1.   Sedra Smith, "Microelectronics Circuit" Oxford University Press, 4th Edition.

2.   J. B. Gupta, "Electronic Devices & Circuits" S. K. Kataria – 2nd Edition.

Code   No.:   ETEC
206   L   T   C
Paper: Digital Circuits & System – 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.

UNIT – I
Analog & Digital signals, AND, OR, NOT, NAND, NOR & XOR gates, Boolean
algebra. Standard representation of Logical functions, K-map representation and
simplification of logical functions, Don't care conditions, X-OR & X-NOR
simplification of K-maps. Combinational circuits: Multiplexers, demultiplexers,
Decoders & Encoders, Adders & Subtractor, Code Converters, comparators,
decoder/drivers for display devices   **[No. of
Hrs.: 11]**

UNIT – II
Flip Flops: S-R, J-K, D & T Flip-flops, excitation table of a flip-flop, race around
condition. Sequential circuits: Shift registers, Ripple counter, Design of
Synchronous counters and sequence detectors, 555 Timer and its application as
mono-stable and astable multi-vibrator. Nyquist Sampling Theorem

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

UNIT - III
A/D and D/A converters: Binary-weighted DAC, R-2R Ladder type networks,
Successive-approximation ADC, Linear-ramp ADC, Dual-slope ADC Bipolar-
Transistor Characteristics, RTL and DTL circuits, TTL, ECL and CMOS Logic
families.   **[No. of Hrs.: 11]**

UNIT - IV
Logic Implementations using ROM, PAL & PLA., Semiconductor Memories:
Memory organization & operation, classification and characteristics of memories,
RAM,   ROM   and   content   addressable
memory.
     [No. of Hrs.: 11]

TEXT BOOKS:
1.   R.P. Jain, "Modern Digital Electronics", TMH, 3rd Ed, 2004.
2.   Morris Mano, "Digital Design", PHI, 2nd Ed, 2002.

REFERENCE BOOKS:
1.   R. J. Tocci, "Digital Systems", PHI, 2000
2.   Malvino and Leach, "Digital principles and applications", TMH, 2000.
3.   I. J. Nagrath, "Electronics, Analog & Digital", PHI, 1999.

4.   J. M. Yarbrough, "Digital Logic-Application and Design", PWS Publishing, 1999.
5.   B. S. Nai, " Digital Electronics and Logic Design", PHI, 2000.
6.   Balabanian and Carlson, "Digital Logic Design Principles", Wiley Pub., 2000.

Paper Code: ETEC-208   **L   T   C**

Paper: Communication Systems & Circuits – I   **3   1   4**

Unit – I

Introduction to Electronic Communication systems: Introduction, Electronic communication system, Frequency spectrum of EM waves, Modulation, Bandwidth and information capacity, Transmission

Noise: Internal noise (Thermal, shot , Transit time Miscellaneous); External noise (Atmospheric , Industrial , Extra Terrestrial); Noise calculations; Noise figure; Noise temperature.

[No. of Hours: 11]

Unit – II

Amplitude Modulation systems: Transmission (Principle, spectrum, efficiency, power and current calculation); AM envelop; AM Modulator circuits; AM transmitters; QAM; AM Receivers: Receiver Parameters; (Selectivity, sensitivity, dynamic range, fidelity); TRF Receiver; Superhetrodyne receiver, Low noise Amplifier, Mixer / converter, Noise limiter, Automatic Gain Control circuit
Single sideband communication systems: Single Sideband system, AM SSB full carrier, AM SSB reduced carrier, AM SSB suppressed carrier, AM independent sideband, AM vestigial sideband, Comparison of single sideband transmission to conventional AM, Single sideband generation methods; Single sideband transmitter.   `   **[No. of Hours: 11]**

Unit – III

Angle Modulation system: Mathematical Analysis, Deviation sensitivity, Waveforms, Phase deviation and modulation index, Frequency analysis of angle modulated system, Bandwidth requirement of angle modulated system; Noise and angle modulation, Preemphasis and deemphasis, Generation of FM waves, Demodulation of FM waves, Angle Modulation vs. amplitude modulation.   **[No. of Hours: 11]**

Unit – IV

Pulse Analog Modulation, Nyquist theorem: Practical sampling, PAM, PWM and PPM generation and detection.

Noise in CW modulation: Noise calculation in communication system, Noise in Amplitude modulation system, Noise in Angle modulated system, Narrow band noise. **[No. of Hours: 11]**

Text Books:
1. George Kennedy, "Communication System" TMH – 4th Edition
2. B. P. Lathi, " Modern Digital and Analog Communication System" Oxford University Press – 3rd Edition.

Reference Books:
1. Simon Haykin , "Communication Systems" John Wiley & Sons, Inc 4th Edition.
2. Taub Schilling, "Principles of Communication Systems" TMH, 2nd Edition
3. P. Chakravarti, "Analog Communication Systems" Dhanpatrai & Co.

**Paper Code: ETEC-
210**   **L   T   C**
**Paper: ELECTROMAGNETIC FIELDS AND TRANSMISSION
LINES   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.

Unit I

Mathematical Orientation Circuits and Fields, Vector Analysis, Physical
Interpretation of Gradient, Divergence and Curl, Vector Relations in other Co-
ordinate Systems, Integral, theorems, The Direct Delta, Matrices.
Electrostatics: Fundamental Relations of the electrostatic Field, Gauss's Law, The
potential Functions, Field due to a continuous distribution of charge, Equipotential
surfaces, Divergence Theorem, Poisson's Equation and Laplace's Equation,
Capacitance, Electrostatic Energy, Conditions at a Boundary between Dielectrics,
Dirac Delta Representation for a Point Charge, Dirac Delta Representation for an
infinitesimal
Dipole.   **[No.   of
Hours: 11]**

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 and the Dirac Delta, 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.   **[No. of Hours: 11]**

Unit III
Electromagnetic Waves: Solutions for Free-space conditions, Uniform Plane-
wave Propagation, Uniform Plane Waves. The Wave Equations for a Conduction
Medium, Sinusoidal Time Variations, Conductors and Dielectrics, Polarization,
Direction Cosines, Reflection from different media, Surface Impedance, The
Transmission-line Analogy, Poynting's Theorem   **[No. of
Hours: 11]**

Unit IV
Transmission Lines: Transmission Line equation, characteristic impedance,
propagation constant, attenuation and phase constant, computation of primary and
secondary constants, line distortion, Loading of line, artificial lines, reflection
coefficient, V.S.W.R., reflection loss, efficiency of transmission, U.H.F. Lines-
Smith chart, Quarter wave transformer, single and double stub matching U.H.F.

lines as circuit elements, Equalizers-classification, inverse networks, Lattice and Bridge T attenuator equalizers phase equalizer, Attenuator-Symmetrical and asymmetrical, Bridge T and Ladder attenuator, variable attenuator. **[No. of Hours: 11]**

Text Books
1. E. C. Jordon, K. G. Balman, "Electromagnetic waves & Radiation System" PHI – 2nd Edition.
2. S. P. Seth, "Elements of Electromagnetic Fields" Dhanpat Rai & Sons – 2nd Edition.

Reference Books:
1. William H. Hayt, "Engineering Electromagnetics", TMN – 5th Edition.

Code   **No.:**   **ETCS 212**   **L**   **T**   **C**

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.

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

Memory Management: Background, Logical versus Physical Address space, swapping, Contiguous allocation, Paging, Segmentation, Segmentation with Paging

Virtual Memory: Demand Paging, Page Replacement, Page-replacement Algorithms, Performance of Demand Paging, Allocation of Frames, Thrashing, Other Considerations, Demand Segmentation

[No. of Hrs.: 12]

UNIT – II

Processes: Process Concept, Process Scheduling, Operation on Processes, Cooperating Processes, Interprocess Communication

CPU Scheduling: Basic Concepts, Scheduling Criteria, Scheduling Algorithms, Multiple-Processor Scheduling, Real-Time Scheduling, Algorithm Evaluation

Process Synchronization: Background, The Critical-Section Problem, Synchronization Hardware, Semaphores, Classical Problems of Synchronization, Critical Regions, Monitors, Synchronization in Solaris 2, Atomic Transactions **[No. of Hrs.: 11]**

UNIT – III

Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock, Combined Approach to Deadlock Handling.

Device Management: Techniques for Device Management, Dedicated Devices, Shared Devices, Virtual Devices; Device Characteristics-Hardware Consideration, Input or Output Devices, Storage Devices, Channels and Control Units, Independent Device Operation, Buffering, Multiple Paths, Block Multiplexing, Device Allocation Consideration,

Secondary-Storage Structure: Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Reliability, Stable-Storage Implementation **[No. of Hrs.: 11]**

UNIT – IV

Information Management: Introduction, A Simple File System, General Model of a File System, Symbolic File System, Basic File System, Access Control Verification, Logical File System, Physical File System File-System Interface: File

Concept, Access Methods, Directory Structure, Protection, Consistency Semantics File-System Implementation: File-System Structure, Allocation Methods, Free-Space Management, Directory Implementation, Efficiency and Performance, Recovery.
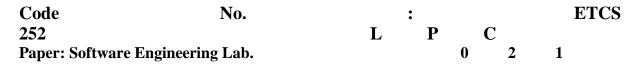
[N o. of Hrs.: 10]

TEXT BOOKS:

1. Silbersachatz and Galvin, "Operating System Concepts", Pearson, 5th Ed., 2001
2. Dr. R. C. Joshi, "Operating Systems", Wiley Dreamtech, 2005.

REFERENCES BOOKS:

1. Tannenbaum, "Operating Systems", PHI, 4th Edition, 2000
2. E. Madnick, J. Donovan, "Operating Systems", Tata McGraw Hill, 2001

Code No. : ETCS 252
L P C
Paper: Software Engineering Lab. 0 2 1

Practical will be based on Software Engineering.

Code No. : ETCS 254
L P C
Paper: Analog Electronics - II Lab. 0 2 1

Practical will be based on Analog Electronics - II. Some lab experiments must be performed using any circuit simulation software e.g. PSPICE.

Code No. : ETEC 256
L P C
Paper: Digital Circuits & Systems - I Lab. 0 2 1

Practical will be based on Digital Circuits & Systems – I. Some lab experiments must be performed using any circuit simulation software e.g. PSPICE.

Code No. : ETCS 258
L P C
Paper: Communication Systems & Circuits – I Lab. 0 2 1

Practical will be based on Communication Systems & Circuits – I.

Code   **No.:**   **ETEC 301**   **L**   **T**   **C**

Paper: Digital Circuits & Systems – 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.

UNIT – I

Concepts of ASM, Realization through GATES, MUX, PLD devices.
Specification of combinational systems using VHDL, Introduction to VHDL, Basic Language element of VHDL, Behavioral Modeling, Signal Assignment Statement, Structural modeling, Component Declaration, component instantiation, package declaration, package body, Design of standard combinational modules, Generate Statement   **[No. of Hrs.: 12]**

UNIT – II

Asynchronous sequential circuits design, Flow table, merger diagram, transition table, Description and design of sequential circuits using VHDL, Flip-flop, Register and Counter, Design of a Serial Adder with Accumulator, State Graph for Control Network, design of a Binary Multiplier, Multiplication of a Signed Binary Number   **[No. of Hrs.: 12]**

UNIT – III

Subprogram Overloading, Operator Overloading, Signatures, Generics and Configuration, Functions and Procedure, Model simulation, Writing a test bench, Dumping results into a text file, reading vectors from a text file, state machine modeling   **[No. of Hrs.: 12]**

UNIT – IV

Overview of FPGA and CPLD. Study of internal architecture of xilinx's vertex series of devices and altera's cyclone processor.   **[No. of Hrs.: 08]**

TEXT BOOKS:

1.   J. Bhaskar, " A VHDL Primer", Addison Wesley, 1999.
2.   C. H. Roth, "Digital System Design using VHDL", PWS Publishing, 2003.
3.   Moris Mano, "Fundamentals of Logic Design", Pearson Education,
3rd Edition, 2003.

REFERENCES BOOKS:

1.   M. Ercegovac, T. Lang and L.J. Moreno, "Introduction to Digital Systems",
        Wiley, 2000
2.   J.F. Wakerly, "Digital Design-Principles and Practices", PHL, 2000.
3.   Douglas Perry, "VHDL", MGH, 2000.
4.   Michae John Sebastian Smith, "Application-Specific Integrated Circuits",
        Addison-Wesley, 2000.
5.   Z. Navabi, " VHDL-Analysis and Modeling of Digital Systems", MGH,
2000.
.

Paper Code: ETEC-303

Paper: CONTROL ENGINEERING

	L	T	C
	3	1	4

Unit I

Definitions of Control Systems, Closed Loop and Open Loop Control, Examples of Control Systems; Laplace Transformation and Solution of Differential Equations; Concept of Mathematical model, Linear and Non-Linear Systems, Transfer Function with Simple Examples; Deriving transfer function of physical systems (Mechanical Translational Systems), Armature controlled and field controlled DC servomotors; AC servomotors and deriving their transfer functions; Block Diagram representation and Simplification.

[No. of Hours: 11]

Unit II

Signal Flow graph, Mason gain formula; Basic Control Actions: Proportional, integral and Derivative controllers, effect of feedback on control system; Transient and steady state response of first order system; Second order system, transient; Routh's Stability criterion, relative stability analysis; Static error co-efficients, position, velocity and acceleration error co-efficients.   **[No. of Hours: 11]**

Unit III

Root Locus Tecniques Bode Diagram, Minimum and Non-Minimum phase systems; Determination of Transfer from Bode Diagram; Polar Plots; Nyquist Plot; Stability Analysis using; Constant M & N Ioci.

[No. of Hours: 11]

Unit IV

Introduction to Compensators; Definitions of state, state variables, state space, representation of systems; Solution of time invariant, homogeneous state equation, state transition matrix and its properties; Z transform and solution of different equation; Transducers, synchro-transmitter; Stepper Motor, Tachogenerators; Rotating Amplifiers and Magnetic Amplifiers.   **[No. of Hours: 11]**

Text Books:

1.   I. J. Nagrath, M. Gopal, "Control System Engineering" New Age International, 2000.
2.   N. K. Jain, "Automatic Control System Engineering" Dhanpat Rai, 2nd Edition.

Reference Books:
1.   Ogata, "Modern Control Engineering" EEE, 4th Edition.
2.   Kuo, "Automatic Control Systems" PHI – 7th Edition.

**Code   No.:   ETCS
305   L   T   C**
Paper: Computer Architecture   3   1   4

UNIT – I

Introduction and overview: Review of digital components, Evolution of computers.

Register Transfer and Microoperation: Register transfer language, register transfer, bus and memory transfer, arithmetic microoperations, logic microoperations, shift microoperations.

Basic Computer Organization and Design: Instruction codes, computer registers, computer instructions, timing & control, instruction cycle, memory reference instructions, input-output and interrupts, design of basic computer, design of accumulator logic.   **[No. of Hrs: 11]**

UNIT – II

Microprogrammed Control Unit: Control memory, address sequencing.

Central Processing Unit: Introduction, general register organization, stack organization, instruction formats, addressing modes.

Pipeline and vector processing Parallel Processing, pipelining, arithmetic pipeline, RISC   Pipeline,   Vector   Processing,   Array Processors.   **[No. of Hrs: 11]**

UNIT – III

Computer Arithmetic: Introduction, addition and subtraction, multiplication algorithms, division algorithms, floating point arithmetic operation, decimal arithmetic unit, decimal arithmetic operations.

Input-Output Organization: Peripheral devices, input-output interface, asynchronous data transfer, modes of data transfer, priority interrupt, direct memory access, input-output processor.

                                                                                              **[N
          o. of Hrs: 11]**
UNIT – IV

Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory, memory management hardware.

Multiprocessors: Characteristics of multiprocessor, Interconnection Structure, Interprocessor Communication &
Synchronization   **[No. of Hrs:
11]**

TEXT BOOKS:

1.   M Mano, "Computer System and Architecture", PHI, 1993.

REFERENCES BOOKS:
1.   Malvino, "Digital Computer Electronics: An Introduction to Microcomputers", McGraw Hill, 1993.
2.   J. P. Hayes, "Computer Architecture and Organization", McGraw Hill, 1998.
3.   W. Stallings, "Computer Organization & Architecture", PHI, 2001.
4.   Dandamudi, "Fundamental of Computer Organization & Design", Wiley Dreamtech, 2005.

Paper Code: ETEC-307
                                                          L   T   C
Paper: Communication Circuits and Systems–II   **3   1   4**

Unit I
Random Process Probability, Random variable, Random Process, mean, moments, correlation & autocorrelation and covariance functions, ergodicity, power spectral density, Gaussian distribution.

[No. of Hours: 11]

Unit II
Baseband Modulation: Review of sampling theorem, uniform and non- uniform quantization, PCM ,DPCM ,DM ,ADM ,Mary waveforms , companding .
Baseband Detection: Error performance degradation in communication system, maximum likelihood receiver structure, matched filters, error performance of binary signaling , intersymbol interference , demodulation and detection of shaped pulses , channel characterization ,eye pattern.

[No. of Hours: 11]

Unit III
Bandpass modulation and demodulation :ASK ,FSK ,PSK DPSK, QPSK MSK coherent and non coherent detection of ASK ,FSK ,PSK and other keying techniques.
Probability of bit error for coherently detected BPSK FSK differentially, DPSK etc and comparison of bit error performance for various modulation types.   **[No. of Hours: 11]**

Unit IV
Line coding: NRZ,RZ, walsh codes , AMI coding , High density   bipolar code, binary with n-zero substitution codes.
Channel Coding: Discrete memory less channel, Binary symmetric channel, code rate & redundancy, Parity code, linear block codes, convolution codes, Reed Soloman codes.
Shannon hartly capacity theorm, Shannon limit, entropy, Huffman coding, LZ coding.

[No. of Hours: 11]

Text Books:

1.	B. P. Lathi, " Modern Digital and Analog Communication System" Oxford University Press – 3rd Edition.
2.	Taub Schilling, "Principles of Communication Systems" TMH, 2nd Edition.
Reference Books:
1.	Simon Haykin , "Communication Systems" John Wiley & Sons Inc, 4th Edition
2.	W. Tomasi, " Electronic Communication Systems" Pearson Education, 5th Edition

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.

UNIT – I

Basic Concepts and Conceptual Database Design: Database administrator & Database Users, Characteristics of the Database, Database Systems, Concepts and Architecture, Data Models, Schemes & Instances, DBMS Architecture & Data Independence, Database Languages & Interfaces, Overview of Hierarchical, Network & Relational Data Base Management Systems, Data Modelling Using The Entity-Relationship Model – Entities, Attributes and Relationships, Cardinality of Relationships, Strong and Weak Entity Sets, Generalization, Specialization, and Aggregation, Translating your ER Model into Relational Model **[No. of Hrs.: 11]**

UNIT – II

Relational Model, Languages & Systems: Relational Data Model & Relational Algebra, Relational Model Concepts, Relational Model Constraints, Relational Algebra, SQL – A Relational Database Language, Data Definition in SQL, View and Queries in SQL, Specifying Constraints and Indexes in SQL, Practicing SQL commands using ORACLE. **[No. of Hrs.: 11]**

UNIT – III

Relational Data Base Design and Oracle Architecture: Functional Dependencies & Normalization for Relational Databases, Functional Dependencies, Normal Forms Based on Primary Keys, (1NF, 2NF, 3NF & BCNF), Lossless Join and Dependency Preserving Decomposition, Oracle 8 Architecture, Database Storage, Oracle Software Structures, Shared Database Access Mechanism, Database Protection. **[No. of Hrs.: 11]**

UNIT – IV

Transaction Management: Transaction Concept and State, Implementation of Atomicity and Durability, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Concurrency Control Techniques, Lock-Based Protocols, Timestamp-based Protocols, Deadlock Handling, Recovery System, Failure Classification, Storage Structure, Recovery and Atomicity, Log-based Recovery, Shadow Paging, Recovery with Concurrent Transactions, Buffer Management, Indexing, Hashing and Query Processing: Query Processing, Overview, Measures of Query Cost, Selection Operation, Sorting, Join Operation, Other Operations, Evaluation of Expressions, Concepts of Object Oriented

Database Management Systems, Distributed Data Base Management Systems.   **[No. of Hrs.: 11]**

TEXT BOOKS:
1.   Korth, Silberschatz, "Database System Concepts", 4th Ed., TMH, 2003.
2.   Steve Bobrowski, "Oracle 8 Architecture", TMH, 2000

REFERENCES BOOKS:
1.   C. J. Date, "An Introduction to Database Systems", 7th Ed., Narosa Publishing, 2004
2.   Elmsari and Navathe, "Fundamentals of Database Systmes", 4th Ed., A. Wesley, 2004
3.   J. D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.

Code   **No.:   ETMS**

311   **L   T   C**

Paper: Organizational Behaviour   **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.

UNIT – I

Meaning & Nature of Management, Management Systems and Processes, Managerial Skills, Tasks & Responsibilities of a Professional

Manager.   **[No. of Hrs.: 11]**

UNIT – II

Planning Types and Process, Management by Objectives, Decision-Making Models, Organizational context of decisions, Problem solving techniques and processes, Controlling: Process and Techniques

                                              [No. of Hrs.: 11]

UNIT – III

Organizational Climate, Culture and Managerial ethos, Organisational structure & Design, Managerial

Communication.   **[No. of Hrs.: 11]**

UNIT – IV

Individual Determinants of organizational, Behaviours: Perceptions, Learning, Personality, Attitudes & Values, Motivation, Job Anxiety & Stress, Analysing, Interpersonal relations, Group Dynamics, Management of Organizational Conflicts, Management of Change, Leadership Styles & Influence.

                                              [No. of Hrs.: 11]

TEXT BOOKS:

1.   Stephen P. Robbins, David & Decenzo, "Fundamentals of Management", 3rd Edition, Pearson Education, 2002.
2.   Stoner, et. al., "Management", 6th Edition, PHI, 2002.
3.   J. S. Chandan, "Organisational Behaviour", Vikas Publishing House, 2004.
4.   John M. Ivancevich, T. N. Duening, "Business & Management: Principles and Guidelines", biztantra, Dreamtech, 2005.

REFERENCES BOOKS:

1.   Joseph W. Weiss, "Organisational Behaviour & Change, Managing Diversrity, Cross-Cultural Dynamics & Ethics", 2nd Edition, Vikas Publishing House, 2003

2. Richard Pettinger, "Introduction to Management", 3rd Edition, Palgrave McMillan, 2002.

3. Udai Pareek, "Understanding Organisational Behaviour", 1st Edition, Oxford University Press, 2004.

4. Fred Luthans, "Organisational Behaviour," 9th Edition, McGraw Hill International Edition, 2004.

Code No. : ETEC 351   **L   P   C**
Paper: Digital Circuits & Systems – II Lab.   **0   2   1**

Practical will be based on Digital Circuits & Systems – II.

Code No. : ETIT 353   **L   P   C**
Paper: Control Engineering Lab.   **0   2   1**

Practical will be based on Control Engineering. * Some lab experiments must be performed using any simulation software e.g. MATLAB.

Code No. : ETCS 355   **L   P   C**
Paper: Communication System & Circuits - II Lab.   **0   2   1**

Practical will be based on Communication System & Circuits – II.

Code No. : ETCS 357   **L   P   C**
Paper: Database Management Systems Lab.   **0   2   1**

Practical will be based on Database Management System.

Code No. : ETEC 359   **L   P   C**
Paper: *Practical Training   **0   0   1**

*NUES
Practical training conducted after fourth semester will be evaluated in the fifth semester based on Viva-Voce.

Paper Code: ETEC-302   **L   T   C**

Paper: MICROWAVE ENGINEERING   **3   1   4**

Unit I

Review of Maxwell's equation;
Microwaves: Introduction, areas of application
Wave Guide: Rectangular, cylindrical wave guide; Solution of wave equation, modes and field pattern; Propagation properties; Power transmission; Power losses; Excitation of modes.   **[No. of Hours: 11]**

Unit II

Components & Elements: S-parameters; Joint, bends, Irise and screws, short-circuit, Attenuator; Cavity resonators (Cylindrical and rectangular), Frequency meter; Hybrid couplers, Magic Tree; Faraday's rotation, Circulator, Phase shifter.
Microwave Tubes: Klystron Amplifier, Reflex- Klystron; Magnetron (cylindrical); Overview of TWT, CFA.   **[No. of Hours: 11]**

Unit III

M/W Solid – state Device & MICS: 6.1 M/W Bipolar Transistor; M/W FET; Varactor and Step –Recovery Diodes; pin Diode, Schottky Diode; Parametric Amplifiers; Tunnel Diode , Gunn Diode; Read Diode ,Impatt, Trapatt; Introduction to MIC, Stripline and Microstrips; Introduction to fabrication of MICs;
 [No. of Hours: 11]

Unit IV

Introduction to Microwave Detectors, Mixers, Switches
Microwave Measurements (Measurements of frequency, power, attenuation, phase shift, VSWR, impedance)
Introduction to Microwave filters.
Introduction to Radar: Radar range equation; Overview of pulsed radar; Overview of CW Doppler Radar; Overview of MTI radar.   **[No. of Hours: 11]**

Text Books:

1.   S.Y. Liao, "Microwave Devices" PHI – 3rd Edition.
2.   Kulkarni, "Microwave & Radar Engg." Umesh Publications, 2nd Edition.

Reference Books:

1.   Rizzi, "Microwave Engg. Passive Circuits" PHI – 2001.
2.   R. E. Collin, "Foundation of Microwave Engineering" Mc. Graw Hill, 2nd Edition.
3.   Kennedy, "Electronic Communication System" TMH, 4th Edition.
4.   Pozar, "Microwave Engineering" John Wiely, 2003.

Paper Code: ETEC-304   **L   T   C**

Paper: MICROPROCESSOR SYSTEM-I   **3   1   4**

Unit I

Introduction to Microprocessors and microcomputers, Study of 8 bit Microprocessor, 8085, Internal Architecture and operations, Introduction to 8085 instruction set, Additional in instructions of 8085,

[No. of Hours: 11]

Unit II

Addressing modes, Counters and time Delays, Stacks and subroutines, system timing, Various Data Transfer Schemes, system timings, instruction cycle, machine cycle, T-states, timing diagram for 8085 instruction. **[No. of Hours: 11]**

Unit III

Interrupts and their processing, Programmable Interrupt Controller.(8259)

Interfacing with memory, Interfacing with I/O device (memory mapped I/O, Peripheral I/O), Handshaking Concepts , Cache memory system., Study of Multipurpose programmable Device (8155), Study of Programmable peripheral Interface (8255). **[No. of Hours: 11]**

Unit IV

DMA and DMA Controller (8257), Programmable Interval Timer 8254, Programmable Keyboard / Display Interface (8279), IC 8212.

Serial I/O and Data Communication Concepts, Hardware Controlled Serial I/O using. Programmable Chips(8251), Software Controlled Serial I/O, Interfacing with A/D Converter D/A Converter and stepper motor. **[No. of Hours: 11]**

Text Books:
1.   Ramesh. S. Gaonkar, "Microprocessor architecture Programming and Application with 8085" Penram International Publishing, 4th Edition.
2.   K. J. Ayala, "The 8051 Microcontroller Architecture, Programming and Applications" Penram International Publishing, 2nd Edition.

Reference Books:

1.   B.Ram, "Fundamentals of microprocessors and microcomputer" Dhanpat Rai, 5th Edition.

2.   M.Rafiquzzaman, "Microprocessor Theory and Application" PHI – 10th Indian Reprint.

3.   Naresh Grover, "Microprocessor comprehensive studies Architecture, Programming and Interfacing" Dhanpat Rai, 2003.

Code   **No.:**   **ETIT**
306   **L**   **T**   **C**
Paper: Computer 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 of 12.5 marks.

UNIT – I

Uses of Computer Networks, Network Architecture, Reference Model (ISO-OSI, TCP/IP-Overview, IP Address Classes, Subneting), Domain Name Registration & Registrars

The Physical Layer: Theoretical basis for data communication, transmission media-Magnetic Media, Twisted Pair, Baseband Coaxial Cable, Broadband Coaxial Cable, Fibre Cable, Structured Cabling, Cable Mounting, Cable Testing, Wireless transmission, the telephone system, narrowband ISDN, broadband ISDN and ATM.   **[No. of Hrs.: 11]**

UNIT – II

The Data Link Layer: Data link layer design issues, error detection and correction, data link protocols, sliding window protocols, Examples of Data Link
Protocols.   **[No. of Hrs.: 11]**

UNIT - III

The Medium Access Sublayer: The channel allocation problem, multiple access protocols, IEEE standard 802 for LANS and MANS, high-speed LANs, satellite networks, Network devices-repeaters, hubs, switches and
bridges.   **[No. of Hrs.: 11]**

UNIT – IV

The Network Layer: Network layer design issues, routing algorithms, congestion control algorithm, internetworking, the network layer in the internet, the network layer in ATM
networks.
                [No. of Hrs.: 11]

TEXT BOOKS:
1.   A. S. Tananbaum, "Computer Networks", 3rd Ed, PHI, 1999.

REFERENCE BOOKS:
1.   U. Black, "Computer Networks-Protocols, Standards and Interfaces", PHI, 1996.
2.   W. Stallings, "Computer Communication Networks", PHI, 1999.
3.   Laura Chappell (ed), "Introduction to Cisco Router Configuration", Techmedia, 1999.

4.   Michael A. Miller, "Data & Network Communications", Vikas Publication, 1998.
5.   William A. Shay, "Understanding Data Communications & Networks", Vikas Publication, 1999.

Paper Code: ETEC-308   **L   T   C**
Paper: VLSI DESIGN   **3   1   4**

Unit I

Evolution of VLSI, MOS transistor theory – MOS structure, enhancement & depletion transistor, Threshold voltage, MOS device design equations, CMOS inverter- DC characteristics, static load MOS inverter, pull up/pull down ratio, state & Dynamic power dissipation, CMOS & NMOS process technology – explanation of different stages in fabrication, latch up.   **[No. of Hours: 11]**

Unit II

Switching characteristics & inter connection effects: Rise time, fall time delays Inverter design with delay constants. Parasitic effect, Super buffer.
CMOS logic gate design: Fan in, fan out **Typical** NAND, NOR, delays Transistor Sizing XOR, and XNOR gates.
CMOS logic structures: CMOS complimentary logic, Pseduo NMOS logic,   **[No. of Hours: 11]**

Unit III

Clocked CMOS logic , pass transistor logic , domino , zipper CMOS.
Clocking strategies: clocked system, latches & Registers, system timing set-up & hold timing, signal phase memory structure, 2 phase clocking, Two phase memory structure,   **[No. of Hours: 11]**

Unit IV

Two phase logic structure; four phase memory & logic structure
VLSI designing methodology – Introduction, VLSI designs flow, Design Hierarchy Concept of regularity, Modularity & Locality, VLSI design style, Design quality. Computer aided design technology: Design capture and verification tools.   **[No. of Hours: 11]**

Text Books:

1.   S. M. Kang, Y. Lebiebici, "CMOS digital integrated circuits analysis & design" TMH,

3rd Edition.

2. Weste and Eshrighian, "Principle of CMOS VLSI Design" Pearson Education, 2001.

Reference Book:
1. R. J. Baker, H.W.Li, D. E. Boyce, "CMOS Circuit Design, Layout and Simulation" PHI – 2000.
2. J. M. Rabaey, "Digital Integrated Circuits" PHI – 2nd Edition.
3. W. Wolf Pearson, "Modern VLSI Design Systems on Silicon" Pearson Education – 2nd Edition.
4. J. P. Vyenmura, "Introduction to VLSI Circuits and Systems" John Wiely, 1st Edition.

Paper Code: ETEC-310   **L   T   C**

Paper: Telecommunication Networks   **3   1   4**

Unit I

Introduction to Telecommunication networks: Overview of network structure and services, Overview of regulatory bodies and standers.

Evolution of Basic Switching System: Brief Overview of manual system; Brief overview of strowger step-by step system; Brief overview of Cross system; Brief Introduction to Electromagnetic Exchanges

Control of switching system: Stored Programme Control; Centralized SPC, Distributed SPC; Software Architecture, Application Software; Enhanced Services.   **[No. of Hours: 11]**

Unit II

Vocodors: Channel Vocoder; Forment Vocoder; Linear Predictive coding (LPC) based Vocoder; Pulse Transmission on Transmission line concepts.

Error detection and correction codes: Error detection codes(parity ,Linear block codes, cyclic redundancy check(CRC codes); Brust error detecting and correcting codes; Convolution codes.

Frequency division Multiplexing (FDM): FDM frames and hierarchy

Time Division Multiplexing (TDM): TDM frames and hierarchy; Bit interleaving; Word interleaving

Space division switching: Two stage network; Multistage network; Blocking probabilities , Lee graphs

Time Division Switching: Time Division space switching; Time Division Time Switching; Time multiplexed space switching; Time multiplexed Time Switching; Combination Switching.(two stage- TS,ST switch); Multistage Switching networks (TST, STS ,n-stage switches); Blocking probabilities, Lee graphs of multistage switching networks.   **[No. of Hours: 11]**

Unit III

Network traffic load and parameters
Grade of Service and Blocking Probability
Telecommunication transmission and Subscriber loops: Cable hierarchy for subscriber loops; Reference equivalents (RE); Two wire to four wire interface; Echoes and singing; Echo suppressors and echo cancellers; Subscriber loop interface (SLIC) and BORSCHT functions; Switching Hierchy and Routing; Transmission Plans; Signaling Techniques; In channel, Voice frequency signaling;

PCM signaling; Common channel signaling; Overview of SS6 and SS7 signaling systems

Radio System: Overview of Ionospheric and Tropospheric scatter communication; Line of sight (LOS) microwave communication; Link behavior, Antenna gain; Link budget analysis; Fading and Diversity techniques.   [
No. of Hours: 11]

Unit IV
Satellite communication; Overview of Geosynchronous and geostationary satellites; VSAT system, SCPC; Overview of FDMA , TDMA and CDMA; Satellite link budget analysis; Overview of Coaxial cable system and optical Network (SONET); Circuit switching and packet switching; Overview of Moderns; Overview of ATM (transport mechanism ,cell structure , switching); Overview of ISDN(Architecture,P-ISDN,B-ISDN); Overview of WLL (Wireless loop); Overview of high data Digital Subscriber loops (ADSL(Asymmetrical Digital Subscriber loop), VDSL); Overview of Local Microwave Distribution Services (LMDS); Overview of AIN(Advanced Intelligent Network)

No. of Hours: 11

Text Books:
1.   Thiagarajan Viswanathan, "Telecommunication switching systems and networks" PHI – 2001.
2.   J.C. Ballamy, "Digital Telephony" Wiely, 3rd Edition.

Reference Books:
1.   J. E. Flood, "Telecommunication switching and traffic networks" Pearson education, 2002.
2.   Freeman, "Telecommunication systems engineering" Wiely, New York – 3rd Edition.
3.   W Tomasi, "Electronics Communication systems" Pearson – 5th Edition.
4.   B.P Lathi, "Modern analog and digital communication systems" Oxford, 3rd Edition.

Paper Code: ETEC-312   **L   T   C**

Paper: Digital Signal Processing & Applications   **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.

Unit I

DFT, FFT, Algorithms, Hilbert transform, stability, structures of FIR, IIR filters
Design of FIR filter using window method, Park Mcdleard method, Effect of finite
register length in FIR filter design.

[No. of Hours: 11]

Unit II

Design of IIR filter, Butterworth, chebyshev and elliptic approximation,
transformation methods, LP,
BP, HP BS filters.   **[No. of Hours: 11]**

Unit III

Algorithms for optimizations and design of digital filters
Adaptive Filters: Kalman filter, wiener filters, applications in adaptive filtering.

[No. of Hours: 11]

Unit IV

Parametric and nonparametric spatial estimation, introduction to multirate signal
processing
Application of DSP to speech and Radar signal processing DSP processor
architecture

[No. of Hours: 11]

Text Books:
1.   Proakias, "Digital Signal Processing" PHI – 3rd Edition.
2.   Openheing & Schafer, "Digital Signal Processing" PHI – 1997.

Reference Books:
1.   S. K. Mitra, "Digital Signal Processing" (PHI) – 2nd Edition.
2.   Johny Johnson, "Introduction to Digital Signal Processing" PHI – 1992.

Code No. :   **ETEC
352**   **L   P   C**
Paper: Microwave Engineering Lab.   **0   2   1**

Practical will be based on Microwave Engineering.

Code No. :   **ETEC
354**   **L   P   C**
Paper: Microprocessor System-I Lab.   **0   2   1**

Practical will be based on Microprocessor System-I.

Code No. :   **ETEC
356**   **L   P   C**
Paper: VLSI Design Lab.   **0   2   1**

Practical will be based on VLSI Design.

Code No. :   **ETEC
358**   **L   P   C**
Paper: Telecommunication Networks Lab.   **0   2   1**

Practical will be based on Telecommunication Networks.

Code No. :   **ETEC
360**   **L   P   C**
Paper: Digital Signal Processing and Applications Lab.   **0   2   1**

Practical will be based on Digital Signal Processing and Applications.

Paper Code: ETEC-401   **L   T   C**

Paper: Microprocessor System-II   **3   1   4**

Unit I

Evolution of Microprocessor, Internal microprocessor (8086 to Pentium) architecture of 8086; Programming Model, Real mode memory addressing, Introduction to protected mode memory addressing memory paging.
Addressing modes: Data, program, Stack, memory-addressing modes   **[No. of Hours: 11]**

Unit II

Instruction set of 8086, Assembly language programming for 8086 microprocessor, Memory
Segmentation.
   [No. of Hours: 11]

Unit III

16 and 32 – bit memory interfacing, various bus protocols like ISA, EISA, VESA, PCI.
Architecture Co- processor (8087), programming with 8087, Multi Processor System,   Introduction   to   MMX technology.   **[No. of Hours: 11]**

Unit IV

Introduction to Pentium and its higher generations: architecture, memory management.
Assembler, debugger, Introduction to bit Slice processor , Signal processing processor and transputers , Introduction to development tools , MDS , logic analyzer , in-circuit emulator.   **[No. of Hours: 11]**

Text Books:

1. Barry B. Brey, "The Intel Microprocessors: Architecture, Programming & Interfacing" PHI, 6th Edition, 2003.
2. D. V. Hall, "Microprocessor and Interfacing Programming & Hardware" TMH –
2nd Edition.

Reference Books:

1. Uffenback, "The 8086 Family Design" PHI, 2nd Edition.
2. Lice & Gibson, "Microcomputer System 8086 / 8088" PHI, 2nd Edition.
3. H. P. Messmer, "Family Architecture Programing & Design: The Indispensible PC Hardware Book" Addison Wesley, 1997.

Paper Code: ETEC-403 **L   T   C**

Paper: OPTICAL COMMUNICATION **3   1   4**

Unit I

Introduction: Measurement of Information, Channel Capacity, Communication System Architecture, Basic Optical Communication System, Advantage of Optical Communication System.
Propagation in Dielectric Waveguides: Introduction, Step-index Fibers, Graded Index Fibers, Modes & Rays, Slab Wave Guide. **[No. of Hours: 11]**

Unit II

Attenuation in Optical Fibers: Introduction, Absorption, Scattering, Very Low Loss Materials, All Plastic & Polymer-Clad-Silica FibersS

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. **[No. of Hours: 11]**

Unit III

Source & Detectors: Design of LED's for Optical Communication, Semiconductor Lasers for Optical Fiber Communication System, Semiconductor Photodiode Detectors, Avalanche Photodiode Detectors & Photo multiplier Tubes.

Optical Fiber Communication System: Telecommunication, Local Distribution Series, Computer Networks Local Data Transmission & Telemetry, Digital Optical Fiber Communication System-First Generation, System, Second Generation System, Future System. **[No. of Hours: 11]**

Unit IV

Data Communication Networks- Network Topologies, Mac Protocols, Analog System.
Advanced Multiplexing Strategies- Optical TDM, Sub carrier Multiplexing, WDM Network Architecutres; SONET/SDH, Optical Transport Network, Optical Access Network, Optical Premise Network.
Applications-Military Applications, Civil, Consumer & Industrial Applications. **[No. of Hours: 11]**

Text Books:
1. "Optical Fibre Communication Senior", PHI – 2nd Edition.
2. J. Gowar, "Optical Communication System" EEE – 2nd Edition.

Reference Books:
1. Keiser, "Optical Fibre Communication" Mc. Graw Hill – 2nd Edition.

Paper Code: ETIT-405   **L   T   C**

Paper: NETWORK TECHNOLOGY   **3   1   4**

Unit I

Evolution of Internet, WWW undergoing technology, E-mail, Application layer services and protocols (RPC, NFC, SMTP, FTP, TELNET) Network Management Address and domain Management, (SNMP), Internet searching tools, gopher, Archie, Veronica, WWW, Lynx, Mosaic, WAIS, Usenet, Security issues, CGI, PERL, HTML, VRML, JAVA, VB script and other internet development tools.

[No. of Hours: 11]

Unit –II

SLIP/PPP Dedicated lines, BOOTP, DHCP, Domain management (DNS), Transport Layer issues, TCP/IP, Gateway, Dial-up, Internet networking TCP/IP protocols, IP addressing, Network Security.

[No. of Hours: 11]

Unit –III

Review of LAN, Node, LAN Manager, Software of IBASE5 Node, 10BASE5 Ethernet and 10BASE2 (Cheaper net), Twisted pair Ethernet, Serial Communication, Connecting LANs and WANS, FDDI, Serial Communication Circuits, Modems, SDH/SONET, Inter Networking Routing Algorithms, Routing protocols (RIP, BGP, OSPF). **[No. of Hours: 11]**

Unit IV

USART-Processor Interface Data Buffer Block of 8251A, Control logic of USART, PROTOCOLS, Transmitter, Receiver, Synchronous Modems and Asynchronous Modems. SYNDET/BRKDET ion 8251A, Monitoring of 8251A, writing characters to be transmitted to 8251A, Monitoring of 8251A. Read status, ISDN: Technology, devices, Architecture Protocols, Flow Control Error detection and Correction, ATM, Technology. **[No. of Hours: 11]**

Text Books:

1. Forouzan, "TCP/IP", Mc- Graw Hill, 2004.

2. Tannenbaum " Computer Networks," PHI – 4th Edition

Reference Books

1. Forouzan, "Data Communication and Networking", Mc- Graw Hill, 2nd Edition
2. Ross and Kurose " Computer Networks"

UNIT – I

Introduction to Personal Communications Services (PCS): PCS Architecture, Mobility management, Networks signalling.

Global System for Mobile Communication (GSM) system overview: GSM Architecture, Mobility management, Network signalling.

General Packet Radio Services (GPRS): GPRS Architecture, GPRS Network Nodes.

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

UNIT – II

Mobile Data Communication: WLANs (Wireless LANs) IEEE 802.11 standard, Mobile IP.

Wireless Application Protocol (WAP): The Mobile Internet standard, WAP Gateway and Protocols, wireless mark up Languages (WML). **[No. of Hrs.: 11]**

UNIT – III

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.

Wireless Local Loop(WLL): Introduction to WLL Architecture, wireless Local Loop Technologies.

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

UNIT – IV

Global Mobile Satellite Systems; case studies of the IRIDIUM and GLOBALSTAR systems.

Wireless Enterprise Networks: Introduction to Virtual Networks, Blue tooth technology, Blue tooth Protocols.

[No. of Hrs.: 11]

TEXT BOOKS:
1. Yi-Bing Lin & Imrich Chlamtac, "Wireless and Mobile Networks Architectures", John Wiley & Sons, 2001.
2. Raj Pandya, "Mobile and Personal Communication systems and services", Prentice Hall of India, 2001.

3.   Hansmann, "Principles of Mobile Computing", Wiley Dreamtech, 2004.

REFERENCE BOOKS:

1.   Mark Ciampa, "Guide to Designing and Implementing wireless LANs", Thomson learning, Vikas Publishing House, 2001.
2.   Ray Rischpater, "Wireless Web Development", Springer Publishing, 2000.
3.   Sandeep Singhal, "The Wireless Application Protocol", Pearson Education Asia, 2000.
4.   P.Stavronlakis, "Third Generation Mobile Telecommunication systems", Springer Publishers, 2001.

Paper Code: ETEC-409   **L   T   C**

Paper: ADVANCED 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.

Unit I
Review of MOS modeling , Integrated circuit layout : Matching concepts , MOS transistor layout, Resistor and capacitor layout Noise in integrated circuits – Shot noise, Burst, Avalanche noise

MOS current and sources : Simple ,cascade **,** high swing cascade

MOS current mirrors: Simple, standard cascade, Wilson, wilder regulated cascade.

[No. of Hours: 11]

Unit II
CMOS amplifiers: Gain calculations, frequency response of active load, current source push pull inverters. Large signal and small signal analysis, of differential and cascade amplifiers slow rate Qualitative discussion of output amplifiers.

CMOS opanp- Ideal opamp, characterization, classification, Two stage opamp, miller compensation Qualitative discussion of PSRR, cascade and folded opamp.   **[No. of Hours: 11]**

Unit III
Comparators: Characterization, static & dynamic characteristics Two stage open loop comparator, Auto zeroing techniques, comparator using hysteresis high speed comparators

MOSFET switch: Charge injection, capacitive feed through sample and hold circuits.

Switch capacitor circuits- Resistor emulation integrator, charge amplifier, switch capacitor   amplifier   OTA filters.   **[No. of Hours: 11]**

Unit IV
Phase Lock loop: Various stage of PLL: XOR phase detector and PFD, VCO, current starved, loop filter

Data Converters: Current scaling DAC, Voltage scalling DAC charge scaling DAC, Extending resolution of parallel DAC, similar scaled DACs

High speed ADCS, parallel or flash ADCS, interpolating ADCS, folding ADCS, Multibit pipeline ADCS delta sigma modular, Decimators filters.   **[No. of Hours: 11]**

Text Books:

1. P. E. Allen, D. R. Holberg "CMOS Analog Circuit Design" Oxford University Press 2002.

2. R. J. Baker, H. W. Li and D. E. Boyce, "CMOS Circuit Design, Layout and Simulation" PHI – 2000.

Reference Books:

1. B. Razavi, "Design of Analog CMOS Integrated Circuits" TMH – 2002.

2. P. R. Gray, P. J. Hurrt, S. H. Lweic, RoG. Meyer, "Analysis and Design of Analog Integrated Circuits" John Wiley and Sons Inc. 2001.

3. D. A. John, Ken Martin " Analog Integrated Circuits" Wiley, 1997.

4. Geiger, Allen, Strader "VLSI Design Techniques for Analog and Digital Circuits" Mc. Graw Hill, 1990.

Code   No.:   ETEC
411   **L   T   C**
Paper: Digital Image Processing   **3   1   4**

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 Neighbours, 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.
                                                                                      [No
                      . of Hrs.: 10]

UNIT - II

Image Enhancement in the Frequency Domain: Introduction to Fourier Transform and the frequency Domain, Smoothing and Sharpening Frequency Domain Filters, Homomorphic Filtering.

Image Restoration: A model of The Image Degradation / Restoration Process, Noise Models, Restoration in the presence of Noise Only Spatial Filtering, Pereodic Noise Reduction by Frequency Domain Filtering, Linear Position-Invarient Dedradations, Estimation of Degradation Function, Inverse filtering, Wiener filtering, Constrained Least Square Filtering, Geometric Mean Filter, Geometric
Transformations.   **[N**
o. of Hrs.: 12]

UNIT - III

Image Compression: Coding, Interpixel and Psychovisual Redundancy, Image Compression models, Elements of Information Theory, Error free comparison, Lossy compression, Image compression standards.

Image Segmentation: Detection of Discontinuities, Edge linking and boundary detection, Thresholding, Region Oriented Segmentation, Motion based segmentation.   **[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 Recoginition: Patterns and Pattern Classes, Decision-Theoretic Methods, Structural

Methods.

[No. of Hrs.: 10]

TEXT BOOKS:

1.   Rafael C. Conzalez & Richard E. Woods, "Digital Image Processing", 2nd edition, Pearson Education, 2002.
2.   A.K. Jain, "Fundamental of Digital Image Processing", PHI, 1989.

REFERENCES:

1.   Bernd Jahne, "Digital Image Processing", 5th Ed., Springer, 2002.
2.   William K Pratt, "Digital Image Processing: Piks Inside", John Wiley & Sons, 2001.

Paper Code: ETEC-413

Paper: POWER ELECTRONICS

L   T   C

3   1   4

Unit I

Power Semiconductor Devices: Two-transistor Model of Thyristor, Methods of Triggering a Thyristor, Thyristor Types.

Triggering Devices: Triggering Devices, Unijunction Transistor, Characteristics and Applications of UJT, Programmable Unijunction Transistor, DIAC, Silicon-Controlled Switch, Silicon Unilateral Switch, Silicon Bilateral Switch, Shockley Diode, Opto-Isolators.   **[No. of Hours: 11**]

Unit II

Thyristor Firing Circuits Turn on systems: Requirements for Triggering Circuits, Thyristor Firing Circuits, Full Wave Control of AC with One Thyristor, Light Activated SCRs (LASCR) Control Circuit, Pulse Transformer Triggering, Firing SCR by UJT, TRIAC Firing Circuit, Phase Control of SCR by Pedestal and Ramp Controlled Rectifier: Types of Converters, Effect of Inductive Load, Commutating Diode or Free-Wheeling Diode, Controlled Rectifiers, Bi-Phase Half-Wave (Single Way), Single-Phase Full-Wave Phase Controlled Converter Using Bridge Principle (Double   Way),   Harmonics
Singal Phase full-wave phase controlled converter using bridge principal (Double way) harmonics.

[No. of Hours: 11]

Unit III

Inverters: Types of Inverters, Bridge Inverters, Voltage Source Inverters (VSI), Pulse Width Modulated Inverters, Current Source Inverter

AC Voltage Controllers: Types of AC Voltage Controllers, AC Phase Voltage Controllers, Single-Phase Voltage Controller with R-L Load, Harmonic Analysis of Single-Phase Full-Wave Controller with R-L Load, Gating Signals

DC to DC Converters (Choppers): DC Choppers, Chopper classification, Two Quadrant Chopper, Four Quadrant Chopper, Morgan Chopper.   **[No. of Hours: 11]**

Unit IV

Cycloconverters: Types of Cycloconverters, Single-Phase Cycloconverter, Three-Phase Cycloconverters. Thyristor Protection: Protection, dv/dt Protection, di/dt Protection, Over Voltage Protection Thyristor protection : Protection , dv / dt protection, di / dt protection , Over voltage protection.

Industrial Applications: "One Shot" Thyristor Trigger Circuit, Overvoltage Protection, Simple Battery Charger, Battery Charging Regulator, AC Static Switches DC Static Switch Microprocessor based Applications. **[No. of Hours: 11]**

Text Books:
1. "Power Electronics: Circuits, Devices & Applications" PHI – 2nd Edition.
2. P. C. Sen, "Power Electronics" TMH – 2nd Edition.

Reference Books:
1. H. C. Rai, "Power Electronics Devices, Circuits, Systems and Application", Galgotia, 3rd Ed.
2. P. S. Bimbhara, "Electrical Machinery, Theory Performance and Applications" Khanna Publications, 7th Ed.

Code No.: ETCS 415	L	T	C
Paper: Advanced Computer Architecture	3	1	4

UNIT – I

Parallel computer models: The state of computing , Multiprocessors and multicomputers, Multivector and SIMD computers, Architectural development tracks

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

UNIT - II

System Interconnect Architectures : Network properties and routing, Static interconnection networks, Dynamic interconnection Networks, Multiprocessor system interconnects, Hierarchical bus systems, Crossbar switch and multiport memory,Multistage and combining network.

Processors and Memory Hierarchy : Advanced processor technology, Instruction-set Architectures,CISC Scalar Processors, RISC Scalar Processors, Superscalar Processors,VLIW Architectures, Vector and Symbolic processors

Memory Technology :Hierarchical memory technology, Inclusion, Coherence and Locality, Memory capacity planning, Virtual Memory Technology **[No. of Hrs.: 11]**

UNIT - III

Backplane Bus System: Backplane bus specification, Addressing and timing protocols, Arbitration transaction and interrupt, Cache addressing models, Direct mapping and associative caches.

Pipelining: Linear pipeline processor, Nonlinear pipeline processor, Instruction pipeline design, Mechanisms for instruction pipelining, Dynamic instruction scheduling, Branch handling techniques, Arithmetic Pipeline Design, Computer arithmetic principles, Static arithmetic pipeline, Multifunctional arithmetic pipelines **[No. of Hrs. 11]**

UNIT - IV
Vector Processing Principles : Vector instruction types, Vector-access memory schemes.
Synchronous Parallel Processing : SIMD Architecture and Programming Principles, SIMD Parallel Algorithms, SIMD Computers and Performance Enhancement **[No. of Hrs.: 11]**

TEXT BOOKS:
1.   Kai Hwang, "Advanced computer architecture"; TMH, 2000.
REFERENCES BOOKS:
1.   J.P.Hayes, "computer Architecture and organization", MGH, 1998.
2.   M.J Flynn, "Computer Architecture, Pipelined and Parallel Processor Design", Narosa Publishing, 1998.
3.   D.A.Patterson, J.L.Hennessy, "Computer Architecture :A quantitative approach", Morgan Kauffmann, 2002.
4.   Hwang and Briggs, " Computer Architecture and Parallel Processing"; MGH, 2000.

Paper Code: ETCS-417   **L   T   C**

Paper: COMPUTER GRAPHICS AND MULTIMEDIA   **3   1   4**

Unit I

Basic raster graphics, algorithms for drawing 2 D Primitives lines, circles, ellipses, arcs, clipping, clipping circles, ellipses & polygon.
Polygon Meshes in 3 D, curves, cubic & surfaces, Solid modeling.   **[No. of Hours: 11]**

Unit II

Geometric Transformation: 2 D, 3 D transformations, window to view port transformations, achromatic and color models.   **[No. of Hours: 11]**

Unit III

Graphics Hardware: Hardcopy & display techniques, Input devices, image scanners
Image manipulation & storage: File formats for BMP, GIF, TIFF, IPEG, MPEG-II, Introduction to animation techniques.
Elementary filtering techniques, elementary Image processing techniques, Geometric & multi-pass transformation mechanisms for image storage & retrieval.
Procedural models, fractals, grammar-based models, multi-particle system, volume rendering.

[No. of Hours: 11]

Unit IV

Shading Techniques: Transparency, Shadows, Object reflection, Guard & Phong shading techniques. Visible surface determination techniques for visible line determination, Z-buffer algorithm, scan line algorithm, algorithm for oct-tres, algorithm for curve surfaces, visible surfaces ray-tracing, recursive ray tracing, radio-city   methods.   **[No. of Hours: 11]**

Text Books:
1.   Hern & Baker, "Computer Graphics" PHI – 2nd Edition.
2.   Foley and others "Computer Graphics, Principles & Practices", Pearson Education – 2nd Edition.
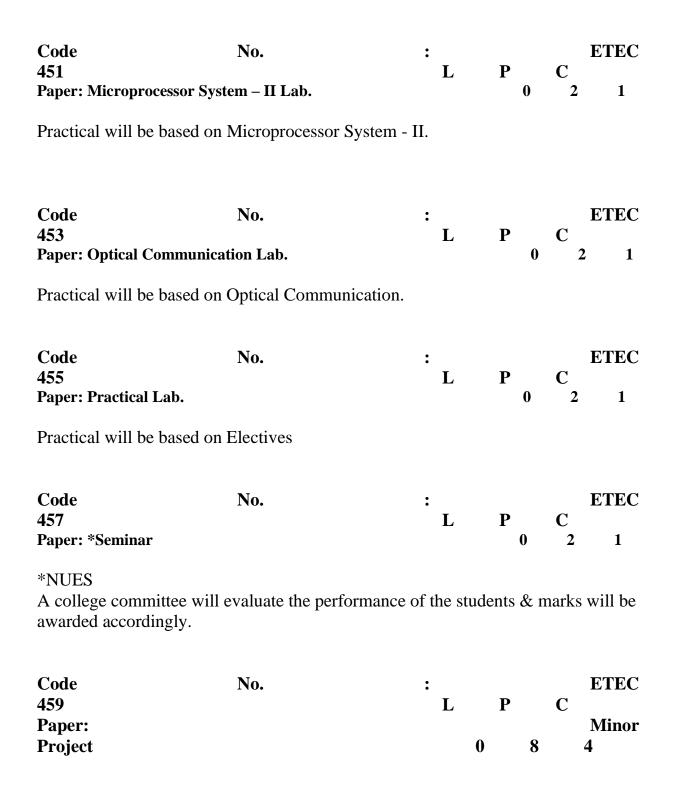**Reference Books:**

1. Harrington, "Computer Graphics, A Programming Approach" Mc. Graw Hill, 2nd Editon.

Code No.: ETEC 419   **L**   **P**   **C**

Paper: Project   **-**   **4**   **4**

Students may select a project related to any of the subjects of the current semester.

Code No. : ETEC 451 **L P C**

Paper: Microprocessor System – II Lab. **0 2 1**

Practical will be based on Microprocessor System - II.

Code No. : ETEC 453 **L P C**

Paper: Optical Communication Lab. **0 2 1**

Practical will be based on Optical Communication.

Code No. : ETEC 455 **L P C**

Paper: Practical Lab. **0 2 1**

Practical will be based on Electives

Code No. : ETEC 457 **L P C**

Paper: *Seminar **0 2 1**

*NUES
A college committee will evaluate the performance of the students & marks will be awarded accordingly.

Code No. : ETEC 459 **L P C**

Paper: **Minor**
Project **0 8 4**

Students may choose a project based on any subject of Electronics & Communication. The student will submit a synopsis at the beginning of the semester for approval from the departmental committee in a specified format. The student will have to present the progress of the work through seminars and progress reports.

**Code   No.   :   ETCS
461   L   P   C
Paper: *Practical Training   0   0   1**

*NUES

Practical training conducted after sixth semester will be evaluated in the Seventh Semester based on Viva-Voce.

Code   **No.: ETIT**
402   **L   T   C**
                                                      3   1   4
Paper: Mobile Communication

UNIT – I

Introduction to Cellular Mobile Systems: A basic cellular system, performance criteria, uniqueness of mobile radio environment, operation of cellular systems, planning a cellular system, overview of generations of cellular systems.

Elements of Cellular Radio Systems Design and Interference: General description of the problem, concept of frequency reuse channels, co-channel interference reduction factor, desired C/I from a normal case in an omni directional antenna system, cell splitting, consideration of the components of cellular systems, Introduction to co-channel interference, co-channel measurement design of antenna system, antenna parameter and their effects.   **[No. of Hrs.: 11]**

UNIT – II

Cell Coverage for Signal & Antenna Structures: General introduction, obtaining the mobile point to point mode, propagation over water or flat open area, foliage loss, propagation near in distance, long distance propagation, point to point prediction model – characteristics, cell site, antenna heights and signal coverage cells, mobile to mobile propagation, Characteristics of basic antenna structures, antenna at cell site, mobile antennas.

Frequency Management & Channel Assignment, Hand Off & Dropped Calls: Frequency Management, fixed channel assignment, non-fixed channel assignment, traffic & channel assignment, Why hand off, types of handoff and their characteristics, dropped call rates & their evaluation.   **[No. of Hrs.: 11]**

UNIT – III

Modulation methods and coding for error detection and correction: Introduction to Digital modulation techniques, modulation methods in cellular wireless systems, OFDM, Block Coding, convolution coding and Turbo coding.

Multiple access techniques: FDMA, TDMA, CDMA: Time-division multiple access (TDMA), code division multiple access (CDMA), CDMA capacity, probability of bit error considerations, CDMA compared with TDMA.   **[No. of Hrs.: 11]**

UNIT – IV

Second generation, digital, wireless systems: GSM, IS_136 (D-AMPS), IS-95, mobile management, voice signal processing and coding.   **[No. of Hrs.: 11]**

TEXT BOOKS:

1. William, C. Y. Lee, "Mobile Cellular Telecommunications", 2nd Edition, McGraw Hill, 1990.
2. Mischa Schwartz, "Mobile Wireless Communications", Cambridge University Press, UK, 2005.

REFERENCE BOOKS:

1. "Mobile Communication Hand Books", 2nd Edition, IEEE Press.
2. Theodore S Rappaport, "Wireless Communication Principles and Practice", 2nd Edition, Pearson Education, 2002.
3. Lawrence Harte, "3G Wireless Demystified", McGraw Hill Publications, 2001.
4. Kaveh Pahlavan and Prashant Krishnamurthy", Principles of Wireless Networks", PHI, 2001.

Code   **No.:**   **ETEC**
404   **L**   **T**   **C**
Paper: Embedded System   **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.

UNIT – I

Introduction to an embedded systems design & RTOS: Introduction to Embedded system, Processor in the System, Microcontroller, Memory Devices, Embedded System Project Management, ESD and Co-design issues in System development Process, Design cycle in the development phase for an embedded system, Use of target system or its emulator and In-circuit emulator, Use of software tools for development of an ES.

Inter-process Communication and Synchronization of Processes, Tasks and Threads, Problem of Sharing Data by Multiple Tasks, Real Time Operating Systems: OS Services, I/O Subsystems, Interrupt Routines in RTOS Environment, RTOS Task Scheduling model, Interrupt Latency and Response times of the tasks.   **[No. of Hrs.: 11]**

UNIT – II

Overview of Microcontroller: Microcontroller and Embedded Processors, Overview of 8051 Microcontroller family: Architecture, basic assembly language programming concepts, The program Counter and ROM Spaces in the 8051, Data types, 8051 Flag Bits ad PSW Register, 8051 Register Banks and Stack Instruction set, Loop and Jump Instructions, Call Instructions, Time delay generations and calculations, I/O port programming Addressing Modes, accessing memory using various addressing modes, Arithmetic instructions and programs, Logical instructions, BCD and ASCII application programs, Single-bit instruction programming, Reading input pins vs. port Latch, Programming of 8051 Timers, Counter Programming   **[No. of Hrs.: 11]**

UNIT – III

Communication with 8051: Basics of Communication, Overview of RS-232, I^{2}C Bus, UART, USB, 8051 connections to RS-232, 8051 serial communication programming, 8051 interrupts, Programming of timer interrupts, Programming of External hardware interrupts, Programming of the serial communication interrupts, Interrupt priority in the 8051   **[No. of Hrs.: 11]**

UNIT - IV

Interfacing with 8051: Interfacing an LCD to the 8051, 8051 interfacing to ADC, Sensors, Interfacing a Stepper Motor, 8051 interfacing to the keyboard, Interfacing a DAC to the 8051, 8255 Interfacing with 8031/51, 8051/31 interfacing to external memory   **[No. of Hrs.: 11]**

TEXT BOOKS:
1.   Raj Kamal, "Embedded Systems", TMH, 2004.
2.   M.A. Mazidi and J. G. Mazidi, "The 8051 Microcontroller and Embedded Systems", PHI, 2004.

REFERENCES BOOKS:
1.   David E. Simon, "An Embedded Software Primer", Pearson Education, 1999.
2.   K.J. Ayala, "The 8051 Microcontroller", Penram International, 1991.
3.   Dr. Rajiv Kapadia, "8051 Microcontroller & Embedded Systems", Jaico Press
4.   Dr. Prasad, "Embedded Real Time System", Wiley Dreamtech, 2004.

Paper Code: ETEC-406   **L   T   C**

Paper: CONSUMER ELECTRONICS   **2   1   3**

Unit I

Audio System: Microphones: construction, working principles and applications of microphones, their types e.g. i) Carbon ii) moving coil iii) velocity iv) crystal v) condenser vi) cordless etc.

Loud speaker: Direct readiating, horn loaded woofer , tweeter , mid range , multi-speaker system , baffles and enclosures.

Sound recording on magnetic tape , its principles ,block digram , and tape transport mechanism.

Digital sound recording on tape and disc.

CD system, Hi- Fi system, pre- amplifier and equalizer system, stereo amplifiers   **[No. of Hours: 11]**

Unit II

Television: **Monpchrome TV Communication:** Elements of TV communication system; Scanning – its need for picture transmission; Need synchronizing and blanking pulses; Progressive scanning – Gross structure filters, interlaced scanning, resolution and band width requirement, tonal gradation; Composite Video signal (CVS)at the end of even and add fields. Equalizing pulses and their need; Monochrome picture tube – construction and working, comparison of magnetic and electric of Construction and working of camera tube: vidicon and plumbicon , Block diagram of TV camera and the transmitter chain

Block diagram of a TV receiver : function of each block and wave form at the input and out put of each block; Frequency range of various VHF bands and channels used in India Major specification of the CCIR.

Concepts of positive and negative modulation VSB Transmission Turner: Typical circuits of scanning and EHT stages of TV receiver , keyed AGC , function and location of brightness contrast V- hold , H- hold of centering control; Identification of faulty stage by analyzing the symptoms and basic idea of a few important faults and there remedies.   **[No. of Hours: 11]**

Unit III

Color TV: Primary colors, trisimulus values, trichromitc coefficients, concepts of additive and subtracting mixing of colours, concepts of luminance, Hue and saturation, Representation of a color in colour triangle, non spectral colour ,

visibility curve; Compatibility of colour TV system with monochrome system . Block diagram of colour TV camera, Basic colour TV system – NTSC, SECAM, and PAL their advantages and disadvantages; Construction and working principles of Trinitron and PIL types of colour picture tubes. Concepts of convergence, purity, beam shifting; Need for luminance and band sharing by color signals, sub – carriers frequency, colour difference signal and its need synchronous quadratic modulation and representation of a color by a vector, brust signal and its need , chrominance signal; Block diagram of PAL TV receiver. **[No. of Hours: 11]**

Unit IV
Explanation and working digital TV LCD TV , HDTV , Plasma TV
Cable Television: Block diagram and principle of working of cable TV and DTH, Cable TV using internet; Study of VCD and DVD , mobile phone architecture , FAX , Touch tone telephone set

[No. of Hours: 11]

Text Books:
1. R. R. Gulati, "Modern Television Practice" New Age International, 2nd Edition.
2. S. P. Bali, "Consumer Electronics" Pearson Education, 1st Edition.
3. R. G. Gupta, "Audio & Video Systems" TMH – 2nd Edition.

Reference Books:

1. A. Dhake, "Television & Video Engineering" TMH – 2nd Edition.
2. R.R. Gulati, "Monochrome & Colour Television" New age International Publisher, 2nd Edition.

**Code   No.:   ETCS
     408   L   T   C**
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.

UNIT – I
Scope of AI: Games, theorem proving, natural language processing, vision and speech processing, robotics, expert systems, AI techniques-search knowledge, abstraction.
Problem Solving (Blind): State space search; production systems, search space control; depth-first, breadth-first search.
Heuristic Based Search: Heuristic search, Hill climbing, best-first search, branch and bound, Problem Reduction, Constraint Satisfaction End, Means-End Analysis.   **[No. of Hrs.: 12]**

UNIT – II
Game Playing: Game Tree, Minimax Algorithm, Alpha Beta Cutoff, Modified Minimax Algorithm, Horizon Effect, Futility Cut-off.
Knowledge Representation: Predicate Logic: Unificatioin, Modus Ponens, Modus Tolens, Resolution in Predicate Logic, Conflict Resolution Forward Chaining, Backward Chaining, Declarative and Procedural Representation, Rule based Systems.
Structured Knowledge Representation: Semantic Nets: Slots, exceptions and default   frames,   conceptual   dependency, scripts.   **[No. of Hrs.: 12]**

UNIT – III
Handling Uncertainty: Non-Monotonic Reasoning, Probabilistic reasoning, use of certainty factors, fuzzy logic.
Natural Language Processing: Introduction, Syntactic Processing, Semantic Processing,   Pragmatic Processing.   **[N o. of Hrs.: 10]**

UNIT – IV
Learning: Concept of learning, learning automation, genetic algorithm, learning by inductions, neural nets.
Expert Systems: Need and justification for expert systems, knowledge acquisition, Case   Studies: MYCIN, RI.   **[No.   of Hrs.: 10]**

TEXT BOOKS:
1.   E. Rich and K. Knight, "Artificial Intelligence", TMH, 2nd Ed., 1992.
2.   N. J. Nilsson, "Principles of AI", Narosa Publ. House, 1990.
3.   M. N. Hoda, "Foundation Course in Artificial Intelligence", Vikas Pub., 2004.

REFERENCES BOOKS:
1.   P. H. Winston, "Artificial Intelligence", Pearson Education, 3rd Edition, 2002.
2.   D. W. Patterson, "Introduction to AI and Expert Systems", PHI, 1992.
3.   R. J. Schalkoff, "Artificial Intelligence – An Engineering Approach", McGraw Hill Int. Ed. Singapore, 1992.
4.   M. Sasikumar, S. Ramani, "Rule Based Expert Systems", Narosa Publishing House, 1994.
5.   Tim Johns, "Artificial Intelligence, Application Programming", Wiley Dreamtech, 2005.

Paper Code: ETEC-410   **L   T   C**

Paper:
INSTRUMENTAITON   **3   1   4**

Unit I

Introduction to Measurement & Instrumentation; Classification, Characteristics of measuring instruments; Standards of Measurement & Error; Classification of transducers; Inductive, capacitive transducers; LVDT, Displacement Transducers; Temperature Measurement (RTD, Thermocouple , themistor); Photosensitive Devices , Moisture measurement; Interfacing of transducers to electronics (control & measuring system)   **[No. of Hours: 11]**

Unit II

Instrumentation Amplifier; A/D & D/A Converter; Multiplexing encoders (Spatial); A.C. Voltmeter using rectifier; True RMS responding Voltmeter; Electronics Multimeter; Digital Voltmeter; Q Meter; CRT Circuits.   **[No. of Hours: 11]**

Unit III

Deflection Systems of CRO; Vector Impedance Meter; Digital Storage Oscilloscope; Frequency Selective Analyzer; Heterodyne wave analyzer; Harmonic Distortion analyzer; Spectrum Analyzer; Introduction , Elements of PLC; Concepts of Internal Relay ,Timers & Counters. Shift Register.

[No. of Hours: 11]

Unit IV

Interfacing of PLC; PLC Programming; Testing of audio amplifier; Testing of Radio Receiver; Instruments used in Industrial control Computers; Signal Timing in a microprocessor based measurement system; Fiber optic Instrumentation; Fiber optic power measurements using optical time domain reflector.   **[No. of Hours: 11]**

Text Books:
   1. A. K. Sawhney, "Measurement & Instrumentation" Dhanpat Rai Publications, 2005.

2. Helfrick, Cooper, "Modern Electronic Instrumentation & Measurement Techniques", PHI – 4th Reprint.

Reference Books:
1. Johnson, "Process Control Instrumentation" PHI – 7th Edition.

Code No.: ETIT 412   **L   T   C**

Paper: Network Security   **3   1   4**

UNIT – I

Introduction: Codes and Ciphers – Some Classifical systems – Statistical theory of cipher systems – Complexity theory of Crypto systems – Stream ciphers, Block ciphers.

Stream Ciphers: Rotor based system – shift register based systems – Design considerations for stream ciphers – Cryptanalysis of stream ciphers – Combined eneryption and encoding.

Block Ciphers – DES and variant, modes of use of DES. **[No. of Hrs.: 11]**

UNIT – II

Public Key systems – Knacksack systems – RSK – Diffle Hellman Exchange 0 Authentication and Digital signatures, Elliptic curve based systems.

System Identification and clustering

Cryptology of speech signals – narrow band and wide band systems – analogue & digital systems of speech encryption. **[No. of Hrs.: 11]**

UNIT – III

Network Security: Hash function – Authentication:

Protocols – Digital Signature standards.
Electronics Mail Security – PGP (Pretty Good Privacy) MIME, Data Compression technique.
IP Security: Architecture, Authentication Leader, Encapsulating security Payload – Key management.
Web Security: Secure Socket Layer & Transport Layer security, Secure electronic transactions.
Firewalls Design principle, established systems. **[No. of Hrs.: 12]**

UNIT – IV

Telecommunication Network architecture, TMN management layers, Management information Model, Management servicing and functions, Structure of management information and TMN information model.

    [No. of Hrs.: 10]

TEXT BOOKS:
1.   William Stallings, "Network Security Essentials, 2nd Edition, 2002.
2.   William Stallings, "Cryptography & Network Security", 3rd Edition, 1999.

Paper Code: ETEC-414   **L   T   C**
Paper: BIO- MEDICAL ELECTRONICS   **3   1   4**

Unit I
Introduction: The age of Biomedical engineering Development of Biomedical Instrumentation, Man- Instrumentation system , Components , Physiological system of the body , Problem encountered in measuring a living system.
Transducers & Electrodes: The Transducers & Transduction principle, Active transducers, Passive Transducers , transducer for Biomedical Applications.
Sources of Biomedical Potentials.: Resting & Action potentials , Propagation of active potential , The Bioelectric potential – ECG , EEG , EMG , and Evoked responses.   **[No. of Hours: 11]**

Unit II
Electrodes: Electrode theory, Biopotential Electrodes- Microelectrodes Body surface electrodes, Needle Electrodes, Biochemical transducers, Reference electrodes, PH electrodes, Blood Gas electrodes.
Cardiovascular Measurements: Electrocardiography – ECG amplifiers, Electrodes & leads, ECG recorders – Three channel, Vector Cardiographs, ECG system for stress testing, Continuous ECG recording (Holter Recording), Blood pressure measurement, Blood flow measurement, Heart sound measurements.
 [No. of Hours: 11]

Unit III
Patient Care & Monitoring – Elements of Intensive care monitoring, patient monitoring display , Diagnosis, Calibration & reparability of patient monitoring equipment pacemakers & Defibrillators.
Measurement in Respiratory system: Physiology of respiratory system Measurement of breathing mechanics Spiro meter, Respiratory therapy equipments Inhalators ventilators & Respirators , Humidifiers , Nebulizers Aspirators.   **[No. of Hours: 11]**

Unit IV
Diagnostic Techniques: Ultrasonic Diagnosis, Eco- Cardiograph, Eco Encephalography, Ophthalmic scans, X- Ray & radio – isotope Instrumentation, CAT scan, Emission Computerized Temenography, MRI.

Bio Telemetry : The Components of a Biotelemetry system Implant able units, Telemetry for ECG measurements during exercise , for Emergency patient monitoring .
Other Prosthetic devices like Hearing Aid, Myoelectric Arm, special aspects-safety of medical Electronics Equipments, Shock hazards from Electrical equipment and prevention against them.

[No.   of Hours: 11]

Text Books:
1. Khandpur R.S. / Biomedical Instrumentation / TMH
2. Tompkins / Biomedical DSP : C Language Examples and Laboratory Experiments for the IBM PC/ PHI.
3. Cornwell / Biomedical Instrumentation and Measurements / PHI.

Paper Code: ETEC-416

L   T   C

Paper: INTEGRATED CIRCUITS TECHNOLOGY   **3   1   4**

Unit I

Classification of ICs. Electronic grade Silicon, Czochralski and Flot Zone Crystal Growing Methods, Oxygen and carbon in Silicon, Segregation coefficients, Silicon shaping and wafer preparation, Vapor Phase Epitaxy.   **[No. of Hours: 11]**

Unit II

Oxidation - Thermal, Dry & Wet, High Pressure and Plasma Oxiadation, Lithography - Optical Lithography, Photomask, Photo resist and Process, Electron Lithography, X-ray Lithography, Ion Beam Lithography.

Etching - Wet Chemical Etching, Reactive etching, Impurity Doping – Diffusion. **[No. of Hours: 11]**

Unit III

Ion Implantation, Metallization - desired Properties, Applications, Ohmic contacts, Choices and Problems. Integrated Elements: Isolation of circuit elements, Bipolar Technology: NPN Transistors, PNP Transistors, Integrated Diodes, Semiconductor Resistors, Capacitors and Inductors, MOS Technology: NMOS and CMOS IC Technology.   **[No. of Hours: 11]**

Unit IV

Design of typical ICs, Back side of preparation, Wafer sort, Device Separation, Die Bonding, Wire Bonding, Package Types and Considerations, Testing of ICs.

Fabrication Facilities and Environment - pure water system, clean room and personnel, Characteristics of VLSI, Problem of raising the scale of integration - Causes of IC failures - Electron static Discharge Damage and Alpha Particle Induced soft errors, Yield and Reliability, Methods of reliability evaluation, Non silicon Technology (GaAs ICs), Future trends.   **[No. of Hours: 11]**

Text Books:

1. S. M. Sze, "VLSI Technology" Mc. Graw Hill.

Paper Code: ETEC-418

L   T   C

Paper: Introduction to NanoTechnology

3   1   4

UNIT – I

Introduction to Modern Electronics and its Trends towards Nanoelectronics: International Technology roadmap characteristics: New Concepts in Electronics, From Microelectronics Towards 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.

[No. of Hrs.: 11]

UNIT – 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.   **[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.

[No. of Hrs.: 11]

UNIT – IV

Newly Emerged 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.

[No. of Hrs.: 11]

TEXT BOOKS:

1.   C. P. Poole and F. J. Owens, "Introduction to NanoTechnology", John Wiley & Sons, 2003.
2.   M. A. Ratner and D. Ratner, "Nanotechnology: A gentle introduction to the next big Idea", PHI, 2003.

REFERENCE BOOKS:

1.   Rainer Waser, "Nanoelectronics and INformation Technology: Advanced Electronic Materials and Novel Devices", John Wiley & sons, 2005.
2.   Jurgen Schulte, "Nanotechnology: Global Strategies, Industry Trends and Applications", John Wiley, 2004.
3.   Serge Luryi, Jimmy Xu, Alex Zaslavsky, "Future trends in Microelectronics: The Nano Millenium", John Wiley, 2004.
4.   S. E. Lyshevski, "Nano and Micro Electromechanical Systems Fundamentals of Nano and Micro-ENgineering", 2nd Edition, CRC Press, 2004.

Code   No.   :   ETEC 452   L   P   C
Paper: Embedded System Lab.   0   2   1

Practical will be based on Embedded System.

Code   No.   :   ETEC 454   L   P   C
Paper: Electives   0   2   1

Practical will be based on ELECTIVES

Code   No.   :   ETEC 456   L   P   C
Paper: Major Project   0   14   7

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