SCHEME OF INSTRUCTION AND EXAMINATION

FOUR YEAR B.TECH. DEGREE COURSE

(**Effective from 2006-07)**

(Common to CSE & ECE Branches)

FIRST YEAR

Sl. No.	Subject	Abbre-viation	Scheme of Instruction periods/week			Duration of Univ. Exam Hours	Scheme of Examination Max Marks		
			L	D/T	P		Univ. Exam	Sessional Exam	Total
	Theory								
1.	Professional Communication in English	PCE	2	-	-	3	70	30	100
2.	Computer Programming	CP	3	-	-	3	70	30	100
3.	Engineering Mathematics – I	EM1	2	1	-	3	70	30	100
4.	Engineering Mathematics – II	EM2	2	1	-	3	70	30	100
5	Engineering Physics & Chemistry	EPC	3	-	-	3	70	30	100
6.	Network Theory	NT	3	1	-	3	70	30	100
7.	Electronic Devices & Circuits	EDC	3	1	-	3	70	30	100
	Practical								
8.	Engineering Drawing Practice Lab	EDP	1	3	-	3	50	25	75
9.	Phonetics & Communication Skills Lab	PCP	-	-	2	2	50	25	75
10	Computer Programming Lab	CPP	-	-	3	3	50	25	75
11	Electronic Devices & Circuits Lab	EDCP	-	-	3	3	50	25	75
12	Engineering Workshop Practice Lab	EWP	-	-	3	3	50	25	75
			19	**7**	**11**		**740**	**335**	**1075**

NOTE: The end examination question paper shall consist of eight questions. The student shall answer any five questions.

FOUR YEAR B.Tech DEGREE COURSE
Scheme of Instruction and Examination
(Effective for the batches admitted from 2006-07)

II ECE - First Semester

Sl. No.	Subject	Abbre-viation	Scheme of Instruction periods/week			Duration of Univ. Exam Hours	Scheme of Examination Max Marks		
			L	D/T	P		Univ. Exam	Sessional Exam	Total
	Theory								
1.	Environmental Studies	ESD	4	-	-	3	70	30	100
2.	Engineering Mathematics	EMM	4	1	-	3	70	30	100
3.	Managerial Economics and Financial Accounting	MEFA	4	-	-	3	70	30	100
4.	C++ with Data Structures	CDS	4	1	-	3	70	30	100
5	Analog Circuits	AC	4	1	-	3	70	30	100
6.	Electromagnetics	EM	4	1	-	3	70	30	100
	Practical								
7	Data Structures with C++ Lab	DSCP	-	-	3	3	50	25	75
8	Analog Circuits Lab	ACP	-	-	3	3	50	25	75
Total			**24**	**4**	**6**		**520**	**230**	**750**

L: Lecture periods per week
T/S: Tutorial/ Seminar periods per week
P: Practical / Drawing periods per week

NOTE: The end examination question paper shall consist of eight questions.
The student shall answer any five questions.

FOUR YEAR B.Tech DEGREE COURSE
Scheme of Instruction and Examination
(Effective for the batches admitted from 2006-07)

II ECE - Second Semester

Sl. No.	Subject	Abbre-viation	Scheme of Instruction periods/week			Duration of Univ. Exam Hours	Scheme of Examination Max Marks		
			L	D/T	P		Univ. Exam	Sessional Exam	Total
	Theory								
1.	Signals and Systems	SS	4	1	-	3	70	30	100
2.	Networks and Transmission Lines	NTL	4	1	-	3	70	30	100
3.	Pulse & Digital Electronics	PDE	4	1	-	3	70	30	100
4.	Probability and Stochastic Process	PSP	4	1	-	3	70	30	100
5	Electrical Technology	ET	4	1	-	3	70	30	100
6.	Electronic Measurements and instrumentation	EMI	4	1	-	3	70	30	100
Practical									
7	Networks and transmission lines Lab	NTLP	-	-	3	3	50	25	75
8	Pulse and Digital Electronics Lab	PDEP	-	-	3	3	50	25	75
Total			**24**	**6**	**6**	**-**	**520**	**230**	**750**

L: Lecture periods per week
T/S: Tutorial/ Seminar periods per week
P: Practical / Drawing periods per week

NOTE: The end examination question paper shall consist of eight questions. The student shall answer any five questions.

FOUR YEAR B.Tech DEGREE COURSE
Scheme of Instruction and Examination
(Effective for the batches admitted from 2006-07)

III ECE - First Semester

Sl. No.	Subject	Abbre-viation	Scheme of Instruction periods/week			Duration of Univ. Exam Hours	Scheme of Examination Max Marks		
			L	D/T	P		Univ. Exam	Sessional Exam	Total
	Theory								
1	Computer Organisation	CO	4	1	-	3	70	30	100
2	Digital Design Through VHDL	VHDL	4	1	-	3	70	30	100
3	Analog Communication	ACM	4	1	-	3	70	30	100
4	Digital Communications	DC	4	1	-	3	70	30	100
5	Antenna and Wave propagation	AWP	4	1	-	3	70	30	100
6	Integrated Circuits and applications	ICA	4	1	-	3	70	30	100
	Practical								
7	Linear IC applications Lab	ICAP	-	-	3	3	50	25	75
8	Analog and Digital Communications Lab	ADCP	-	-	3	3	50	25	75
Total			**24**	**6**	**6**	**-**	**520**	**230**	**750**

L: Lecture periods per week
T/S: Tutorial/ Seminar periods per week
P: Practical / Drawing periods per week

NOTE: The end examination question paper shall consist of eight questions. The student shall answer any five questions.

FOUR YEAR B.Tech DEGREE COURSE
Scheme of Instruction and Examination
(Effective for the batches admitted from 2006-07)

III ECE - Second Semester

Sl. No.	Subject	Abbre-viation	Scheme of Instruction periods/week			Duration of Univ. Exam Hours	Scheme of Examination Max Marks		
			L	D/T	P		Univ. Exam	Sessional Exam	Total
	Theory								
1	Digital Signal processing	DSP	4	1	-	3	70	30	100
2	Linear Control Systems	LCS	3	1	-	3	70	30	100
3	Communication systems	CS	5	-	-	3	70	30	100
4	Microwave Engineering	MWE	3	1	-	3	70	30	100
5	Microprocessors theory	MPT	4	1	-	3	70	30	100
6	Software Engineering	SE	5	-	-	3	70	30	100
	Practical								
7	DSP Lab	DSPP	-	-	3	3	50	25	75
8	Microprocessors Lab	MPP	-	-	3	3	50	25	75
Total			**24**	**4**	**6**	**-**	**520**	**230**	**750**

L: Lecture periods per week
T/S: Tutorial/ Seminar periods per week
P: Practical / Drawing periods per week

NOTE: The end examination question paper shall consist of eight questions. The student shall answer any five questions.

FOUR YEAR B.Tech DEGREE COURSE
Scheme of Instruction and Examination
(Effective for the batches admitted from 2006-07)

IV ECE - First Semester

Sl. No.	Subject	Abbre-viation	Scheme of Instruction periods/week			Duration of Univ. Exam Hours	Scheme of Examination Max Marks		
			L	D/T	P		Univ. Exam	Sessional Exam	Total
	Theory								
1	VLSI Design	VLSI	4	1	-	3	70	30	100
2	Optical Communications	OC	4	1	-	3	70	30	100
3	Embedded Systems Design	ES	4	1	-	3	70	30	100
4	Digital Image Processing	DIP	4	1		3	70	30	100
5	Elective – I		4	-	-	3	70	30	100
6	Elective – II		4	-	-	3	70	30	100
	Practical								
7	VHDL & Embedded Systems Lab	VHDLP	-	-	3	3	50	25	75
8	Microwave & Fiber Optics Lab	MWFOP	-	-	3	3	50	25	75
Total			**24**	**4**	**6**		**520**	**230**	**750**

L: Lecture periods per week
T/S: Tutorial/ Seminar periods per week
P: Practical / Drawing periods per week

NOTE: The end examination question paper shall consist of eight questions. The student shall answer any five questions.

FOUR YEAR B.Tech DEGREE COURSE
Scheme of Instruction and Examination
(Effective for the batches admitted from 2006-07)

IV ECE - Second Semester

Sl. No.	Subject	Abbre-viation	Scheme of Instruction periods/week			Duration of Univ. Exam Hours	Scheme of Examination Max Marks		
			L	D/T	P		Univ. Exam	Sessional Exam	Total
	Theory								
1	Elective – III		3	1	-	3	70	30	100
2	Elective – IV		3	1	-	3	70	30	100
	Practical								
3	Project work	PWP	-	-	6	-	150	50	200
			-	-					
	Total		**6**	**2**	**6**		**290**	**110**	**400**

L: Lecture periods per week
T/S: Tutorial/ Seminar periods per week
P: Practical / Drawing periods per week

NOTE: The end examination question paper shall consist of eight questions.
The student shall answer any five questions.

LIST OF ELECTIVES

S. No.	Title	Abbreviation
1	**Mobile Communications**	MCN
2	**Introduction to Operating Systems**	ITOS
3	**Computer Networks**	CN
4	**Neural Networks and Fuzzy Logic**	NNFL
5	**Advanced Microprocessors**	AMPR
6	**Industrial and Power Electronics**	IPE
7	**Radar Engineering.**	RE
8	**Biomedical Instrumentation**	BMI
9	**Microwave Devices and Integrated Circuits**	MIC

ECE SYLLABUS

PROFESSIONAL COMMUNICATION IN ENGLISH (PCE)
(Common to All Branches of I. B.Tech)

Contact Periods : 2 L/week — Sessional Marks : 30
University Exam : 3 Hours — University Marks : 70

I. **Text** : Selections from "Heritage of English " edited by Devendra Kohli and Harish Trivedi, Published by Macmillan India Ltd., Hyderabad.

Selected Topics

1. A Tea Party : Ruth Prawer Jhabvala
2. The Panorama of India's Past : Jawaharlal Nehru
3. English Zindabad Vs Angrezi Hatao : Kushwant Singh
4. Examination : R.K. Narayan
5. Man's War Against Nature : Rachel Carson

Vocabulary Based on the Text Book :

a. Synonyms
b. Antonyms
c. Idioms and Verbal Phrases
d. One Word Substitutes
e. Prefixes and Suffixes

II Technical Report Writing :

a. Feasibility Report on the establishment of an industry
b. Factual Report

III Composition:

a. Letter Writing
b. Resume preparation

IV Grammar :

1. Remedial Grammar (correction of sentences)
2. Word order in English sentences
3. Voices
4. Direct and Indirect Speeches
5. Degrees of comparison
6. Simple, Complex, Compound and Compound-complex sentences

Reference Books :

1. "Practical English Usage" by Michael Swan published by Oxford University Press
2. "English Grammar , Composition and Correspondence" by M.A. Pink and S.E. Thomas Published by S. Chand & Co.,
3. "English for Professional Students" by S.S. Prabhakara Rao.
4. "Effective Technical Communication" by M. Ashraf Rizvi, Published by Tata McGraw-Hill Publishing Company Ltd.

COMPUTER PROGRAMMING (CP)
(Common to All Branches of I B.Tech.)

Contact Periods: 3L / Week	Sessional Marks: 30
University Exam: 3 Hours.	University Marks: 70

Unit –1

Over view of revolution in computers & communications: From the analog to the digital age, Overview of a computer and communications system: people, procedures, Data, information, Hardware - operations of computing, hardware Categories, Software - application software and system software, developments in computer technology, types of programming languages, algorithms, flow charts.

Problem Solving: C fundamentals, Syntax, identifiers and key words, data types, constants and variable declarations, Arithmetic operators, expressions, assignment statements, data input / output, printf, scanf, getchar, putchar, gets, puts.

Unit – 2

Flow Control: Relational, logical operators, conditions and boolean expressions. Selection, if, If else, nested if statements, switch statement, goto statement. Looping, conditional loops, count loops. While, do-while, for loops, break, continue, nested loops, Examples to find terms and sums for series problems.

Unit – 3

Subprograms: Definition of a function, accessing of a function, passing arguments to a function, argument data types, function prototypes. Local and global variable declarations, storage classes-automatic, external, static, register, recursion.

Unit – 4

Arrays: Defining an array, processing an array, passing arrays to a function, multidimensional arrays, character strings and character arrays. Searching-linear search, binary search, Sorting-Selection, bubble, matrix operations.

Pointers : Concept of pointers, Pointer declarations, passing pointers to a function, pointers and one-dimensional arrays, Operations on pointers, pointers and multidimensional arrays of pointers.

Unit – 5

Structures and Unions: Defining a structure, processing a structure, User-defined data types (typedef), structures and pointers, passing structures to a function, self-referential structures, unions.

Data Files: Opening and closing a data file, creating a data file, processing a data file.

Text Books:

1. Programming with C-Byron S. Gottfried (Tata Mc Graw Hill Publications – Schuam Outline Series)
2. Using Information Technology By Sawyer, Williams, and Hutchinson

Reference Book: Programming in C By E. Balaguruswamy (TMH)

ENGINEERING MATHEMATICS – I (EM1)
(Common to CSE & ECE Branches of I B.Tech)

Contact Periods : (2L + 1 T) / Week — Sessional Marks : 30
University Exam : 3 Hours — University Marks : 70

Unit – 1:
Matrix Algebra : Rank of a matrix, Elementary transformations of a matrix, Normal form of a matrix, Linear dependence of Vectors, Consistency of a system of linear equations, Rouche's theorem (statement only). Linear and orthogonal transformations, orthogonal matrix, Eigen values and Eigen Vectors. Properties of eigen values and vectors. Cayley-Hamilton theorem. Complex matrices.

Unit – 2
Partial Differential Equations: Formation of equations by eliminating arbitrary constants and functions, Linear equations of First order, Lagrange's equation. Non-linear equations of First order. Homogenous linear equations with constant coefficients. Applications to one dimensional wave equation, one dimensional heat flow.

Unit-3
Infinite Series : Convergence and divergence of series. General properties, Series of positive terms, Comparision test, D'Alembert's ratio test, Cauchy's root test, Raabe's test and Logarithmic test (all tests statements only). Alternating series, Leibnitiz's rule. Convergence and summation of Binomial, Exponential and Logarithmic series.

Unit – 4
Fourier Series : Euler's formulae, Conditions for a fourier expansion. Dirichlet's conditions. Functions having point of discontinuity. Odd and even functions. Change of interval, Half range series, Parseval's formula. Practical harmonic analysis.

Unit – 5
Vector Calculus : Scalar and Vector point functions. Gradient, Divergence and Curl of vectors. Irrotational and Solenoidal fields. Green's theorem, Stoke's theorem, Gauss-Divergence theorem and applications.

Text Books :
1. Advance Engg. Mathematics - E. Kreyszig (Wiley-Eastern Ltd)
2. Engg. Mathematics Series – M.K. Venkataraman (National Pub. Co.)

Reference Books:
1. Higher Engg. Mathematics – B.S. Grewal (Khanna Publishers)
2. Engineering Mathematics -- N.P. Bali and others (Lakshmi Publishers)

ENGINEERING MATHEMATICS – II (EM2)

(Common to CSE & ECE Branches of I B.Tech)

Contact Periods : (2L + 1 T) / Week Sessional Marks : 30
University Exam : 3 Hours University Marks : 70

Unit – 1 :

Ordinary Differential Equations : Solutions of first order and first degree equations-Homogenous and Non-homogeneous equations. Linear equations, Bernoulli's equations, Exact and reducible to exact equations. Linear Differential Equations of higher order with constant coefficients. Applications to electrical circuits.

Unit – 2:

Laplace Transforms : Definition, Transforms of elementary functions. Properties of Laplace transforms, Transforms of derivatives and integrals, multiplication by t^n and division by t. Periodic functions, second shifting theorem. Inverse Laplace transforms. Convolution theorem. Solutions of ordinary differential equations by transform techniques.

Unit – 3 :

Numerical Methods : Solutions of algebraic and transcendental equations-method of False position. Newton-Raphson method, Iteration method. Solution of simultaneous linear equations—Gauss elimination method, Gauss-Seidal method, Gauss-Crout's method. Finite differences, operators. E,Δ,∇,δ & μ. Relations between the operators. Newton's interpolation formulae, Lagrange's interpolation formula. Inverse Lagranges interpolation formula.

Unit- 4 :

Multiple Integrals : Double integrals. Change of order of integration. Double integrals in polar coordinates. Change to polar coordinates. Triple integrals (Cartesian and polar only). Applications of multiple integrals – Areas enclosed by curves and volumes of solids. Gamma function, Beta function. Value of $\Gamma(1/2)$. Relation between Beta and Gamma functions.

Unit – 5 :

Statistical Methods : Simple correlation. Lines of regression. Rank correlation. Normal test-Test for single proportion, difference of proportions, single mean and difference of means, Student's t-distribution, t-test, test for single mean and difference of means, Chi-square test.

Text Books :

1. Advance Engg. Mathematics - E. Kreyszig (Wiley-Eastern Ltd)
2. Engg. Mathematics Series – M.K. Venkataraman (National Pub. Co.)

Reference Books:

1. Higher Engg. Mathematics – B.S. Grewal (Khanna Publishers)
2. Engineering Mathematics -- N.P. Bali and others (Lakshmi Publishers)

ENGINEERING PHYSICS AND CHEMISTRY (EPC)
(Common to CSE & ECE Branches of I B.Tech)

Contact Periods : 3 periods/week — Sessional Marks : 30
University Exam : 3 Hours — University Marks : 70

Part-A Engineering Physics

Lectures: 2 Periods/week — Sessional Marks : 18
University Marks : 42

Unit-1:

Oscillations : Free, Damped and Forced Vibrations Equation of motion and solution, Resonance, Effect of damping on resonance , Applications to electromagnetic oscillators LC and LCR circuits
Ultrasonics : Introduction, Production of ultrasonic waves, Magnetostriction method and Piezo electric method, Detection of ultrasonic waves, Properties of ultrasonic waves, Determination of velocity of ultrasonic waves in liquids, Applications of ultrasonic waves.

Unit-2:

Electrical Conductivity in Metals : Classical Free Electron theory (Drude-Lorentz theory) Relaxation time, mean collision time, mean free path, drift velocity. Expression for electrical conductivity in metals. Effect of temperature and impurity on resistivity of metals. Electrons in periodic lattice, Kroning-Penny model (qualitative treatment). Energy bands, Metals, Insulators and semiconductors. Superconductivity, properties. Meissner effect – Type-I & Type-II Superconductors and applications.

Dielectric Materials: Polar and Non-Polar dielectrics, Polarization of dielectrics-Ionic Polarizability, Orientation polarizability, Electronic polarizability, expression for electronic polarizability, Frequency dependence of electronic polarizability, Ferro-electric crystals, piezo-electric crystals, Applications of ferro-electric and piezo-electric crystals.

Unit-3:

Moving Charges in fields: Motion of charged particle in an uniform electric, magnetic and combined filed, Hall effect, CRO, Electromagnetic and Electrostatic Deflection sensitivities , Applications of CRO.

Lasers & Fibre Optics: Introduction, Properties of laser light, Requirement for laser action, Spontaneous and Stimulated emission, Population inversion, Pumping and active system, Ruby laser, Gas laser and Semiconductor laser, Applications of lasers. Principle of Optical fibre-Step-index fibre-graded-index fibre-Numerical aparture-Acceptance of angle-Transmission signal in Step-index and graded-index fibre-Optical fibres in communication and sensing applications.

Text Books :

1. Engineering Physics - by R.K. Gaur & S.L. Gupta (Dhanpatrai)
2. Unified Physics (Vol III)- by Satya Prakash (Pragathi Prakasam)

Reference Books :

1. Solid State Physics - by S.O. Pillai (New Age International)
2. Physics I & II by - by Halliday & Resnick (Wiley Eastern)
3. Solid State Physics - by K. Vijaya Kumar & T. Sreekanth (S. Chand)

Part – B Engineering Chemistry

Lectures: 1 Periods/week | Sessional Marks : 12 | University Marks : 28

Unit – 4

Thermodynamics: System-isolated, closed and open systems, State of system. Homogeneous and heterogeneous systems, Extensive and intensive properties, Reversible and irreversible processes, Isothermal and adiabatic processes, First law of Thermodynamics, Internal energy, Enthalpy, Molar heat capacities, Application of equation to isothermal and adiabatic expansions of an ideal gas, Second law of Thermodynamics, its application to carnot cycle,conditions for equilibrium and spontaneity.

Electrochemistry: Electrode potentials, Nernst equation, Electrochemical series, applications of emf in the determination of pH.
Corrosion: Theories of Corrosion, Galvanic and Concentration cells, methods of minimizing corrosion – (a) Cathodic protection and (b) Metal coatings – Hot dipping and Electroplating.

Unit – 5

Polymers: Definitions, Addition and condensation polymerization (without mechanisms), Plastics – Thermosetting and Thermoplastic resins, compounding of plastics, preparation and engineering uses of (i) Polyethylene, (ii) Teflon (iii) Nylon (iv) PVC and (v) Bakelite. Natural Rubber – Preparation and processing of latex, Compounding of rubber, Vulcanization. Preparation and engineering uses of (i) Buna-S and (ii) Silicon rubber.

Fuels and Combustion: Classification of fuels, Characteristics of a good fuel, Calorific value – units, Gross and net calorific values, determination of calorific value by using Bomb calorimeter. Petrol – Knocking and octane number, Diesel – Ignition and cetane number. Manufacture, composition and uses of producer gas.
Combustion calculations, Flue gas analysis by Orsat's apparatus

Text Books:

1. Essentials of Physical Chemistry – B.S.Bahl, G.D.Tuli and Arun Bahl (S.Chand & Co., New Delhi)
2. Engineering Chemistry – P.C.Jain and Monica jain (Dhanpat Rai Publishing Company, New Delhi)

Reference Books:

1. Chemistry of Engineering Materials – C.V.Agarwal (Tara Publishers, Varanasi)
2. Chemistry of Engineering & Technology (Vol. I & II) – J.C.Kuriacose and T.Rajaram (Tata McGraw-Hill Pub. Co., New Delhi)
3. Text Book of Physical Chemistry – B.R.Puri, L.R.Sarma and M.S.Pathania (Shobhanlal Nagin Chand & Co., Jalandhar)

NETWORK THEORY (NT)

(Common to CSE & ECE Branches of I B.Tech)

Contact Periods: (3 L + 1 L) /Week — Sessional Mark: 30

University Exam: 3 Hours — University Marks: 70

Unit- I

Basic circuit concepts: Basic circuit elements, Energy sources, source transformation, ohms law, Kirchoff's laws, concept of power and energy of R, L & C elements. loop analysis and nodal analysis, response of RLC circuits for arbitrary excitations.

Average and R.M.S values, form factor and peak factor of sinusoidal and non non-sinusoidal quantities. .Phasor representation of AC quantities, response of RLC with sinusoidal excitation, concept of impedance, impedance triangle, admittance, concept of complex power, real,reactive power and power factor.

Unit – II

Analysis of series, parallel and series-parallel circuits with suitable examples and phasor diagrams, star-delta transformation.

Resonance: Series & Parallel resonance, Resonant Frequency, Voltage Magnification, Q-Factor, Band-Width and Half-Power Frequencies. Current locus diagrams of RL and RC circuits – their applications.

Unit-III

Network Topology: Concept of graph and tree, incident matrix , tie set and cut set schedules.

Network Theorems: Superposition Theorem, Reciprocity, Thevenin's, Norton's, Maximum power Transfer, Millmans, Tellegens and Compensation theorems (simple problems).

Unit – IV

Coupled Circuits: Concept of self and mutual inductance, co-efficient of coupling, dot rule, conductively coupled and inductively coupled equivalent circuits with suitable problems

Polyphase Circuits: Generation of three Phase voltages ,currents and power, phase sequence, Relation between Line & Phase quantities in Star and Delta Connection, Analysis of three Phase balanced and unbalanced circuits with vector diagram, Measurement of real & reactive power by one watt meter method & two wattmeter method, effect of Power factor on wattmeter reading.

Unit- V

Network Parameters: Two port network parameters, Impedance parameters, admittance parameters, transmission line parameters for a given T & π networks (simple problems).

Transients: Transients in RL, RC & RLC circuits for DC & AC excitations using Laplace transform methods.

Text Books:

1. Electric Circuits – by Joseph Edminister – Schaum's Series (TMH)
2. Circuit Theory – by Ajith Chakravarthy (Danpat Rai & Sons)
3. Electrical Circuit Theory – by R.P.Punagin, Interline Blr.
4. Circuit Theory – by Hayt & Kemmerly (MGH).

Reference Books:

1. Network Analysis – by Vanvalken Berg (PHI)
2. Circuits & Network – by Sudhakar & Shyam Mohan (TMH)
3. Networks & Systems – by Roy Choudary ,New Age .
4. Electric Circuits Theory – by R.L.Boylstad (UBS)

ELECTRONIC DEVICES AND CIRCUITS (EDC)
(Common to CSE & ECE Branches of I B.Tech)

Lectures: 4 Periods/week — Sessional Marks : 30
University Exam: 3hours — University Marks : 70

Unit-I

Semiconductor Diode: Semiconductor materials and its energy band diagram, quantitative theory, Hall effect, p-n junction as diode, band structures of an open circuited p-n junction, current components, quantitive theory of p-n diode currents, volt-ampere characteristics, temperature dependence, diode resistance, diode capacitance, breakdown diodes half-wave and full-wave rectifiers, capacitive and inductance filters.

Unit-II

Transistors: The junction transistor and its current components, transistor as an amplifier, detailed study of currents in transistor, transistor alpha, CB,CE configuration, CE cut-off saturation region, CE current gain, CC configuration, operating point, bias stability, collector to base bias, self bias stabilization, bias compensation, thermal runaway and stability. CE Amplifier, Two stage amplifier.

Unit-III

Field Effect Transistors: The junction FET, pinch off voltage, JFET V-I characteristics, FET small signal model, MOSFET, common source amplifier, common drain amplifier, generalized FET amplifier, biasing the FET, FET as voltage variable resistor. Introduction to fabrication of Integrated Circuits – Monolithic diodes & transistors.

Unit-IV

Advanced Electronic Devices and Oscillators: Characteristics and Operation of UJT, SCR, TRIAC, DIAC, Photodiode, Phototransistor.

Oscillators: Basic principle of oscillators (Barkhausen Criterion), Phase-shift oscillator, Colpitts, Hartley, Wien bridge oscillator.

Unit-V

Signals & Transmission Media:

Analog and digital signals, Encoding and Modulating – Digital to Digital Conversion, Analog to Digital Conversion, Digital to Analog Conversion, Analog to Analog Conversion. Transmission Media – Guided Media and Unguided Media.

TEXT BOOKS:

1. Electronic devices and circuits by Millman & Halkias(TMH) (Units I-IV)
2. Data Communications and Networking – Behrouz A. Forouzan - Tata McGraw Hill. (Unit –V)

ENVIRONMENTAL STUDIES (ESD)
(For II B.Tech., ECE - I Sem)

Contact Periods: 4L /week	Sessional Exam Marks : 30
End Exam : 3 hours	End Exam Marks : 70

Unit 1:
Introduction : Multidisciplinary nature of Environmental studies, definition, scope and importance.
Natural Resources:
Water resources-use and over utilization of surface and ground water, floods, drought, conflicts over water. Dams-benefits and problems.
Forest resources-use and over-exploitation of forests, deforestation, timber extraction, mining, dams and their effects on forests and tribal people.
Energy resources-growing energy needs, renewable and non-renewable energy sources, alternate energy sources, need for the conservation of energy.

Unit-2
Ecosystems: Concepts of an ecosystem, structure and function of an ecosystem, Energy and nutrient flow in an ecosystem, relation between producers, consumers and decomposers. Ecological succession, Food chains, food webs and ecological pyramids. Introduction, characteristic features and functions of (i) Forest ecosystem (ii) Grass land ecosystem (iii) Desert ecosystem (iv) Pond ecosystem (v) Ocean ecosystem and (vi) River ecosystem.

Unit-3
Biodiversity and its conservation: Definition, genetic, species and ecosystem diversity. Biogeographical classification of India. Value of biodiversity-consumptive use, productive use, social, ethical, aesthetic and optional values. Threats to biodiversity-habitat loss, poaching of wildlife, man-wildlife conflicts. Endangered and endemic species of India. Conservation of biodiversity.

Unit -4
Environmental pollution: Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution and nuclear hazards. Role of individual in prevention of pollution.
Solid waste Management: Urban, industrial, nuclear and e-waste management.

Unit -5
Social Issues and Environment: Consumerism and waste products, from unsustainable to sustainable development. Population explosion-Family welfare programme. Environment and human health epidemics. Women and child welfare. Role of information Technology in environment and human health. Need for public awareness.
Environment protection Act: Air, Water, forest and wild life acts, enforcement of environmental legislation.

Text Books:
1. Environmental studies -Benny Joseph, Tata Mc Grow Hill.
2. Introduction to Environmental Engineering & Science - Gilbert M. Masters, Pearson,

3. Environmental Science - Chandrasekhar M., Hitech Publishers.

Reference Books:

1. Environmental Chemistry - A.K. De, New Age India publishing.
2. Fundamentals of Ecology - E.P. Odum, W.B. Sunders Co. USA.
3. Waste water Treatment - M.N. Rao and A.K. Datta, Oxford and IBH.
4. The Biodiversity of India - Bharucha Erach, Mapin publishing Pvt. Ltd.
5. Ecological and Environmental Studies - Santosh kumar Garg, Rajeshwari Garg and Ranjni Garg, Khanna publishers.
6. Environmental Studies - Anjaneyulu Y., B.S. Publications.

ENGINEERING MATHEMATICS (EMM)
(For II B.Tech. E.C.E – I Sem)

Contact Periods:: (4L + 1T) /week	Sessional Exam Marks : 30
End Exam : 3 hours	End Exam Marks : 70

Unit-I

Complex Variables: Differentiability, Cauchy-Riemann equations, analytic functions, sufficient condition for analyticity, harmonic function, construction of an analytical function whose real/imaginary part is given (Milne – Thomson method). Confirmal mapping (e^z, z^n, sin z, cos z). Bilinear transformation, Taylor's and Laurent's series.

Unit - II

Complex Integration: Cauchy's Integral theorem, Cauchy's integral formula, derivatives using integral formula, poles and residues, residue theorem, calculation of residues, evaluation of real integrals by contour integration.

Unit -III

Special Functions: Bessel function. Recurrence formula for $J_n(x)$. Generation function. Orthogonality of Bessel function, Legendre's equation. Rodrigues formula, Legendre polynomials, generating function, recurrence formula for $P_n(x)$. Orthogonality of Legendre polynomials.

Unit - IV

Numerical Analysis: Numerical differentiation, solution of ordinary differential equations, Taylor's method, Picord's method, Euler's method and Modified Euler's method, Runge – Kutta second and fourth order methods, Predictor corrector methods, Milne's method and Adams method.

Unit- V

Probability: Baye's theorem, concept of Random variables, discrete and continuous variables, distribution function of discrete and continuous random variables, properties. Mean and variance of a random variable.

Text Books:

1. Higher Engineering Mathematics – B.S.Grewal – Khanna Publications.
2. Numerical Methods in science and engineering – M.K.Venkat raman – National Publications.

3. Fundamentals of Mathematical Statistics – S.C.Gupta and V.K.Kapoor – S.Chand &Co.

MANAGERIAL ECONOMICS & FINANCIAL ACCOUNTING (MEFA)

(For II B.Tech., I Sem E.C.E.)

Contact Periods: 4L/week — Sessional Exam Marks : 30
University Exam : 3 Hrs. — End Exam Marks : 70

Unit-I

Managerial Economics- Definition - Nature and Scope - Demand analysis - Types of demand - Law of demand - demand determinants - Exceptions - Elasticity of demand - definition - price - Income - cross elasticities of demand - significance - and Measurement - Demand forecasting - factors - methods.

Unit-II

Production Function:- Meaning of production function - Isoquants - Isocosts - The law of diminishing marginal Returns - Internal, external economies of scale
Cost concepts - fixed and variable costs - cost out put relationship - Break Even Analysis - Limitations Managerial uses.

Unit-III

Market Structures- Types of competitions - features of perfect competition - Monopoly - Monopolistic competition - price out put determination.
Capital Budgeting- Importance - Methods - Pay back method - Accounting Rate of Return method (ARR) and Net present value method (NPV) - (Simple Problems only)

Unit-IV

Types of Business Organizations- Formation of sole trader - partnership firm - Public and private limited companies - Features - Merits - demerits - differences -
Capital and its significance - Types of capital - Estimation of fixed and working capital requirements - sources of fixed and working capital.

Unit-V

Accountancy- Double entry system of Book keeping - Journal entries - Ledger - Trail Balance.
Final Accounts- Preparation of Trading account - Profit & Loss account - Balance sheet with adjustments (final accounts problem should be given)

Text Books

1. Managerial Economics- Varshiney and Maheswari
2. Business Organisation & Management- Y.K Bhushan
3. Accountancy- Shukla & Grewal

C++ WITH DATA STRUCTURES (CDS)
(for II B.Tech I- Sem ECE)

Contact Periods: (4L+1T) /week	Sessional Exam Marks : 30
End Exam : 3 hours	End Exam Marks : 70

Unit – I

Principles of Object Oriented Programming : A look at Procedure Oriented Programming, Object Oriented Programming Paradigm, Basic Concepts of OOP, Benefits of OOP, Object Oriented Languages.

Beginning with C++ : A simple C++ Program, An example with Class, Structure of C++ Program.

Unit – II

Tokens, Expressions and Control Structures : Tokens, Keywords, Identifiers and Constants, Basic Data Types, User-Defined Data Types, Derived Data Types, Dynamic Initialization of Variables, Operators in C++, Scope Resolution Operator, Member Dereferencing Operators, Expressions and their Types, Implicit Conversions, Operator Precedence.

Unit –III

Functions in C++ : The Main Function, Function Prototyping, Inline Functions, Function Overloading, Friend and Virtual Functions.

Classes and Objects : Specifying a Class, Defining Member Functions, **Constructors and Destructors :** Constructors, Parameterized Constructors, Multiple Constructors in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Copy Constructor, Destructors.

Unit – IV

Operator Overloading: Defining Operator Overloading, Overloading Unary Operators and Binary Operators, Overloading Binary Operators using Friends, Rules for Overloading Operators.

Data structures: Definition, classification , data structures and their representations, Arrays, operations on arrays, applications of Arrays, Linked List , Types of Linked List- single and double, Operations on Linked list.

Unit - V

Stacks: Operations on Stacks, implementation of stacks using arrays and linked list.

Queues: Operations on queues, implementation of queues using linked list, circular queue using arrays.

Searching and Sorting: Linear and Binary search, Insertion sort, Quick sort, Merge sort.

Text Books :

1. Object Oriented Programming with C++ - E.Balaguruswamy, 3rd Edition
2. An Introduction To Data Structures With Applications - Jean Paul Tremblay Paul G.Sorenson.
3. The C++ Programming Language by Bjarne Stroustrup, 3rd Edition

Reference Books:

1. The complete Reference of C++ - Herbert Schildt
2. Data structures using C++ - N.Kasiviswanath, Laxmi Publications(P) Ltd.

ANALOG CIRCUITS (AC)

(II B.Tech I Sem ECE)

Contact Periods: (4L+1T)/week — Sessional Exam Marks : 30
End Exam : 3 hours — End Exam Marks : 70

Unit I

Review of fundamental concepts of Semiconductors, Diodes and Transistors : Intrinsic and Extrinsic semiconductors, Hall effect, Injected minority carriers, continuity equation contact potential, P-n diode in Forward and Reverse bias, Fermi level diagram of a P-n diode, V-I characteristics, Transistor as an Amplifier, Ebers-Moll model, small signal low frequency, h-parameter model, CB, CC and CE Amplifier,voltage regulators.

Unit II

Multistage Transistor Amplifiers: Types of coupling – RC coupled, Direct coupled, analysis of two cascaded amplifier stages, approximate CE, CB and CC models, CE amplifier with emitter resistance, Darlington, Bootstrap and Cascode connections, frequency response of amplifier at low and high frequencies, step response of an amplifier, square wave testing, bandpass of cascaded stages.

Unit III

Transistor and FET at High Frequencies: hybrid pi model, hybrid pi conductance, capacitance's, the CE short circuit current gain, parameters f_β and f_T, current gain with resistive load, single stage CE transistor amplifier frequency response, gain-bandwidth product.CS amplifier at high frequencies and CD amplifier at high frequencies.

Unit IV

Feedback Amplifiers: Classification, feedback concept, transfer gain with feedback, general characteristics of negative feedback amplifiers- gain, bandwidth, input resistance, output resistance, method of analysis of feedback amplifier, analysis of feedback amplifiers.

Unit V

Large Signal Amplifiers: Classes of operation, class-A amplifiers (series-fed, transformer coupled, pushpull), class-B amplifiers (pushpull, complementary-symmetry type), crossover distortion and class AB operation, class-C amplifiers and efficiency,Tuned amplifiers.

Differential Amplifiers: Ideal differential amplifier, CMRR, emitter-coupled differential amplifier, differential amplifier supplied with constant current, practical considerations, transfer characteristics of differential amplifiers.

Text Books:

1. Integrated Electronics - Millman and Halkias - TMH

Reference Books:

1. Electronic Devices and Circuits - Bogart – Universal Book Stall
2. Microelectronics - Millman and Grabel - TMH
3. Semiconductor Devices and Circuits - Henry Zanger - Johnwiley.

ELECTROMAGNETICS (EM)
(For II B.Tech E.C.E – I.Sem)

Contact Periods: (4L+1T)/week	Sessional Exam Marks : 30
End Exam : 3 hours	End Exam Marks : 70

Unit-I

Co-ordinate Systems and Transformations: vector algebra, co-ordinate systems, Cartesian, cylindrical and spherical, vector field, transformation of vector functions from one co-ordinate system to other.

Electrostatic Fields: Coulomb's law, electric field intensity, field due to different charge distributions, Line charge, sheet charge and volume charge distributions. Electric flux and Flux density, Gauss's law and its application.

Unit-II

Energy and Potential: Divergence and its physical interpretation, divergence theorem. Maxwell's first equation in integral and point forms. Energy expended in moving a point charge in an electric field, line integral, potential difference and potential, potential field of a point charge and system of charges, potential gradient, dipole, energy density in the electrostatic field.

Unit-III

Conductors, Dielectrics and Capacitances: Current and current density, continuity of current, metallic conductors, method of images, nature of dielectric materials, boundary conditions for perfect dielectrics and conductors, capacitance-examples, Poisson's and Laplace equations-examples.

Unit-IV

Magneto static Fields: Biot-Savart's law, Ampere's circuital law, curl, Stokes theorem, magnetic flux and magnetic flux density, scalar and vector magnetic potentials, force on a moving charge, differential current element and force between two differential current elements, force and torque on closed circuit, magnetization and permeability, magnetic boundary conditions, energy in a magnetic field.

Unit-V

Time Varying Fields & Maxwell's Equations: Faraday's law, Maxwell's equations, displacement current.

Uniform Plane Wave: wave motion in free space, perfect, lossy dielectrics and good conductors. Poynting theorem, polarization, reflection of plane waves- normal and oblique incidence (perpendicular and parallel polarizations)

Text Books:

1. Engineering Electromagentics - Hayt.W.H , TMH, 7th Edition, 2006.
2. Engineering Electromagnetics – Sadiku, 3rd Edition, Oxford University press, 2003.
3. Electromagnetic field Theory and Transmission lines, G.S.N.Raju – Pearson, 2005

Reference Books:

1. Electromagnetic Waves and Radiating Systems -Jordan and Balmain - Pearson, 2nd edition. 2007
2. Electromagnetics- John.D.Kraus, McGH, 6th Edition, 1992

3. Elements of Engg. Electromagnetics- Nanapaneni Narayana Rao, Pearson, 6th Edition, 2006

SIGNALS AND SYSTEMS (SS)
(for II B.Tech II Sem ECE)

Contact Periods: (4L+1T)/Week	Sessional Exam Marks : 30
End Exam : 3 hours	End Exam Marks : 70

Unit-I

Introduction: Basic continuous and discrete time signals-systems and their properties - classification of signals-analogy between vector and signal - principles of least squares, Orthogonality and completeness – trigonometric and exponential Fourier series - convergence Direchlets conditions.

Unit-II

Signal Analysis: Spectrum and its significance – Fourier Transforms and properties - Fourier Transform of periodic signals - Energy and power spectral densities - Auto-correlation and cross correlation properties - Hilbert transform and properties - pre envelope _ band pass signals.

Unit-III

Signals Through Various Systems : Transmission of signals through discrete and continuous LTI systems – Unit impulse response, convolution integral, convolution as summation, graphical method of convolution, time domain behavior from pole zero plot, causality and stability.

Unit-IV

Laplace Transforms: Signal representation by continuous exponential. The direct and Inverse Laplace transform. Laplace transform of periodic signals. Laplace transform solution for electric circuits. system impulse response and definition of system transfer function.

Unit-V

Sampling: Sampling of continuous time signals (low pass). Aliasing, recovery of signals from samples, practical aspects of sampling – pulses of Finite duration, Flat top sampling.

Z-Transforms: ROC - inverse Z Transform - properties - pole zero plot - Unilateral Z Transforms.

Text Books:

1. Communication systems - Simon Haykin, - Wiley-Eastern , 2nd Edition, 1994.
2. Signals and Systems - Oppenheim AV and Willisky - Pearson, 2nd Edition,1997;
3. Communication Systems - B.P.Lathi - Wiley Eastern, 2003.

Reference Books:

1. Signals and Systems - Simon Haykin - Wiley-Eastern, 2003.
2. Signals and Systems - Nagarath –TMH, 2003.
3. Signals and systems-schuam's series-TMH.

NETWORKS AND TRANSMISSION LINES (NTL)
(for II B.Tech II Sem ECE)

Contact Periods: (4L+1T)/Week	Sessional Exam Marks : 30
End Exam : 3 hours	End Exam Marks : 70

Unit-I

Two Port Networks: Terminals and terminal pairs, driving point and transfer functions for two port networks- Z, Y, h, g, ABCD parameters, equivalence of two port networks. interconnection of two ports, Analysis of reciprocal networks.

Unit-II

Characteristics of Networks: Asymmetrical networks, image and iterative impedances, image transfer constant & iterative transfer constant. Symmetrical networks, characteristic impedance and propagation constant. Properties of L, T and PI sections. Design of attenuator. L section impedance matching networks.

Unit-III

Filters: Constant K filters, low pass, high pass, band pass, band stop filter designs, m-derived and composite filter designs. Equalisers.

Unit-IV

Transmission lines: properties of transmission lines, transmission line equations from source and load end. Finite and infinite lines. Velocity of propagation. Input impedance. Open and short circuited lines, distortionless line transmission,Attenuation.

Unit-V

Line at UHF: Properties of transmission lines at UHF, reflection coefficient, VSWR,standing waves, distribution of voltages and currents on lossless line, transmission line as a circuit element. Characteristics of half wave, quarter wave and1/8 wave lines. Smith chart and applications. transmission line matching. Single and double stub matching

Text Books:

1) Networks Lines and Fields - John D Ryder - Prentice Hall, 2nd Edition,
2) Network Analysis - Van Valkunberg - Pearson, 3rd Edition, 2006.
3) Network Theory – A.Sudhakar, Shyam Mohan – TMH,

Reference Books:

1) Networks and Transmission Lines – Umesh Sinha – Umesh Publications.
2) Transmission Lines and Networks – Johnson – McGrawHill
3) Network Theory & Filter Design - V K A Atre - 2ed, New Age International

PULSE & DIGITAL ELECTRONICS (PDE)
(for II B.Tech II Sem ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit I
Linear and Non Linear Wave Shaping: RC Integrator and Differentiator, response to step, pulse and square input. Clipping and Clamping Circuits, Clamping Circuit Theorem.

Unit II
Multivibrators: Switching characteristics of a transistor, design of a transistor switch, Design and analysis of Bistable, Monostable, Astable and Schmitt trigger circuits.

Unit III
Number Systems and Logic Gates: Binary, Octal, Decimal, Hexadecimal systems, conversion of number systems, weighted and non weighted codes, Digital Data Representation: Fixed - signed magnitude, 1's complement, 2's complement, floating point – biased exponent, binary arithmetic, Hamming code, error detection and correction.
Logic Gates and Boolean Algebra: OR, AND, NOT, NAND, NOR, EX-OR and EX-NOR gates, Boolean theorems, switching functions: types, sum of products, product of sum, canonical forms, minimization of Boolean functions using K-maps and tabulation methods.

Unit IV
Combinational Circuits: Binary adders and Subtractors using signed magnitude, 1's complement, 2's complement, carry look-ahead adders (fast adders), BCD adders and Subtractors, decoders, encoders, multiplexers, de-multiplexers, parity generator and checker, code conversion circuits, magnitude comparator.

Unit V
Sequential Circuits: Finite state model of sequential circuits, Flip-flops, shift registers, Asynchronous and Synchronous counters, ring and Johnson counters, design of non-binary counters, synthesis of synchronous sequential circuits, Mealy and Moore machines, Minimization of states,PLA,PLD.

Text Books:
1. Pulse, Digital and Switching Circuits– Millman and Taub, McGra-Hill.
2. Digital Logic and Computer Design Fundamentals – II Edition, -M. Moris Mano, Charles R.Kime – Pearson, 2nd Edition, 2001.
3. Switching and Finite Automata Theory – Zvi Kohavi – TMH
4. Modern Digital Electronics - R.P.Jain , 3rd edition – TMH, 2005

PROBABILITY AND STOCHASTIC PROCESS (PSP)
(for II B.Tech II Sem ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit -I

Probability Theory: Probability and axioms of probability, Total Probability, Baye's Theorem and Bernoulli's trials, Joint Probability and Conditional Probability.

Random Variables: Classifications of Random variables, Distribution and Density functions- Gaussian, Uniform, Exponential, Binomial, Poisson's, Rayleigh, Chi square. Conditional distributions and density functions.

Unit-II

Functions of single random variable: Expectations, Moments, variance and skew, chebyshev's inequality, Schwartz inequality, characteristic functions, moment generating function. Transformation of random variables.

Unit-III

Functions of two random variables: Joint distribution and density functions, Joint moments, conditional density, one and two functions of two random variables, central limit theorem, characteristic functions and normality.

Unit-IV

Random Processes: Definition, strict sense stationary, wide sense stationary, Time averages, Ensemble averages, Ergodicity, statistical independence, correlation functions and spectral density, white and colored noise.

Unit-V

Linear Systems with Random inputs: Linear system fundamentals, Random signal response of linear systems, system evaluation using Random noise, spectral characteristics of system response.

Text Books:

1. Probability, Random Variables and Random Signal Principles- Peyton Z. Peebles, TMH , 4th edition, 2001.
2. Probability, Random Variables and Stochastic Processes, Athanasios Papoulis and Unnikrishna Pillai, TMH, 4th Edition, 2002

Reference Books:

1. Probability and Random processes with applications to signal processing – Henry Stark and John W.Woods, Pearson, 3rd edition.
2. Communication Systems Analog & Digital – R.P.Singh and S.D. Sapre, TMH -1995.
3. Probability and Stochastic processes-Shaum's series-TMH.

ELECTRICAL TECHNOLOGY (ET)
(for II B.Tech II Sem. ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit -I
D.C Machines
Generators: Constructional features-single lap and wave windings- EMF equation-Methods of excitation-characteristics of shunt, series and compound generator.
Motors: principle of operation-torque equation-speed-torque characteristics of shunt, series and compound motors-losses and efficiency-testing-Swinburne's and brake test-speed control-3 point &4 point starters.

Unit-II
Transformers: Principle of operation-constructional features-useful and leakage fluxes-EMF equation – leakage reactance – vector diagram – equivalent circuit – voltage regulation – losses and efficiency – OC and SC tests – all day efficiency – parallel operation – auto transformers.

Unit-III
Polyphase Induction Motors: A.C windings – pitch factor and distribution factor – EMF equation – constructional features – principle of operation – slip-torque characteristics, equivalent circuit- circle diagram – losses and efficiency – methods of speed control – star-delta and rotor rheostat starters – applications.

Unit-IV
Synchronous Machines:
Alternators: Constructional features, silent pole and turbo alternators, concept of synchronous reactance – vector diagram – regulation – determination by synchronous impedance method – synchronizing the alternator to infinite bus bar.
Synchronous Motors: Principle of operation – V-Curves, predetermination- hunting and prevention. Applications.

Unit-V
Single Phase Motors:
Induction Motor: Construction – characteristics – starting split phase and shaded pole methods. single phase series motor.

Text Books:
1. Electrical Technology – Hughes - ELBS
2. Electrical Technology – H.Cotton - ELBS

Reference Books:
1. Performance and design of D.C.Machines – Clayton – Oxford & I.B.H
2. Performance and design of A.C Machines – M.G.Say - CBS

ELECTRONIC MEASUREMENTS AND INSTRUMENTATION (EMI)
(for II B.Tech II Sem ECE)

Contact Periods: 4L/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Measurement and Error: Introduction, static and dynamic characteristics of Instrumentation System, calibration, errors and their statistical analysis.
Introduction to electronic instruments, specification of an instrument, electronic voltmeters, ammeters and multimeters.

Unit-II

Analog Instruments: LCR Bridges, Q meter, function generators, signal generators, wave analyzers, harmonic distortion analyzer, spectrum analyzer.
Digital Instruments: Advantages, principle of operation of digital voltmeters, frequency meter, Universal counter.

Unit-III

Cathode Ray Oscilloscope : basic CRO operation, deflection sensitivity, cathode ray tube, time base circuits, vertical deflection systems, synchronization of sweep circuits, delay line, CRO probes, measurements with CRO, Lissajous figures, special purpose CRO s

Unit-IV

Transducers: Classification and selection of transducers, strain gauges, LVDT, temperature and photo electric transducers, digital transducers.

Unit-V

Analog and Digital Data Acquisition System : Introduction to data acquisition system, data logging, use of ADC, sample and hold circuit, multiplexers and demultiplexers in DAS, line drivers and receivers, interfacing transducers to electronic control and measuring systems.

Computer controlled Test Systems: Introduction, testing an audio amplifier, testing a radio receiver, instruments used in computer controlled instrumentation (Frequency counter, Spectrum analyzer only), IEEE – 488 electrical interface, digital control description.

Text Book:

1. Modern Electronic Instrumentation and Measurement Techniques – W.D.Cooper & A.D. Helfrick – Pearson, 2004.

Reference Books :

1. Electrical and Electronic measurements and Instrumentation – A.K.Sawhney - Dhanpat Rai & Sons
2. Electronic Measurement and Instrumentation – Oliver and Cage- McGH.

COMPUTER ORGANIZATION (CO)
(for III B.Tech I Sem ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit I

Register transfer and Micro-Operations: Register transfer, Bus and Memory transfers, Arithmetic, Logic and Shift micro-operations, Arithmetic logic shift unit.

Unit II

Basic computer organization and design – Instruction codes, Computer registers, computer instructions, timing and control, Instruction cycle, Memory reference instructions, Input /output and Interrupt, design of basic computer.

Micro-programmed control: control memory, address sequencing, micro-program example, design of control unit, micro-program sequencer.

Unit III

Central Processing Unit : General register organization, stack organization, Instruction formats, Addressing modes, data transfer and manipulation, program control.

Computer Arithmetic : Algorithms for fixed point and signed 2's complement binary arithmetic operations, floating point arithmetic operations.

Unit IV

Input/Output Organization : Peripheral devices, input/output interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA.

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

Unit V

Pipeline and Vector Processing: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC pipeline, vector processing and Array Processing,Multiprocessing.

Text Books:

1. Computer System Architecture – M.Morris Mano – 3rd Edition., Pearson, 1993.

Reference Books:

1. Computer Architecture and Organization – John P.Hayes – McGraw Hill
2. Computer Organization – Hemachar – 5th Edition– TMH, 2002

DIGITAL DESIGN THROUGH VHDL (VHDL)
(for III B.Tech I Sem ECE)

Contact Periods: (4L+1T)/Week	Sessional Exam Marks : 30
University Exam : 3 hours	University Exam Marks : 70

Unit I

Introduction to VHDL: History, VHDL terms, traditional design methods, traditional schematics, symbol versus entities, schematics versus architectures, component instantiation, behavioral descriptions, concurrent signal assignment, event scheduling, sequential statements, architecture selection, configuration statements.

Basic language elements: identifiers, data objects, data types, operators.

Unit II

Behavioral Modeling: entity declaration, architecture body, process statement, variable assignment statement, signal assignment statement, wait statement, if statement, case statement, null statement, loop statement, exit statement, next statement, assertion, report statement, examples. Multiple Processess. VHDL representations using behavioral modeling for Multiplexer, 4-bit adder, Priority encoder, decoders, one bit comparator, BCD to 7-segment decoder, 74381 ALU, flip-flop, 8-bit register, shift register, 4-bit counters.

Unit III

Dataflow Modeling: Concurrent signal assignment, concurrent vs sequential, Delta delay, multiple drivers, conditional signal assignment, Block statement. VHDL representations using Dataflow modeling for the examples referred in Unit II.

Unit IV

Structural Modeling: Component declarations, component instantiation, simple examples. Generic and configurations: Generics, configurations, configuration specification, declarations, conversion functions. VHDL representations for using structural modeling for the examples referred in Unit II.

Unit V

Subprograms, packages and Libraries: Subprograms, package declaration, package body, design file, libraries.

Model Simulation: Simulation, writing test bench, converting real and integer to time, dumpling results into a text file, reading vectors from a text file.

Modeling a Moore FSM, a Melay FSM, Design example on a simple processor, Reaction Timer.

Text Books:

1. VHDL – Douglas Perry, Tata McGraw Hill, 4th Edition, 2002
2. VHDL Primer by J.Bhaskar, Pearson, 2004, 3rd Edition.
3. Fundamentals of Digital Logic with VHDL Design – Stephen Brown, TMH, 2000

Reference Books:

1. VHDL analysis and modeling of digital systems by Zainalabedin Navabi – Mc.Graw Hill

ANALOG COMMUNICATIONS (ACM)
(for III B.Tech I Sem ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Amplitude Modulation: Need for Modulation, generation and demodulation of AM, Band width, power relations, generation and demodulation of DSB-SC, SSB modulation, coherent detection, vestigial side band modulation, frequency division multiplexing, comparison of various AM systems-problems.

Unit-II

Angle Modulation: Frequency Modulation and phase modulation, FM narrow band and wide band techniques, band width, generation of FM , direct and indirect FM, demodulation of FM, frequency and phase discrimination methods, pre-emphasis and De-emphasis circuits, threshold effect.

Unit-III

Pulse Modulation Schemes: Review of sampling theorem, generation and demodulation of PAM, PWM, and PPM, time division multiplexing, PCM, companding, band width, noise in PCM systems, Block diagrams of DPCM, DM, ADM transmitter, receiver.

Unit-IV

Noise: Various types of noise equivalent noise band width, noise figure, noise temperature, noise figure of cascaded stage amplifiers, noise in AM, FM, DSBSC and SSB.

Unit-V

Information theory: Information, entropy, rate of information and Information capacity, Shannon–Hartley law and its significance, Shannon–Fano and Huffman coding techniques, Channel capacity for Binary symmetric channel, Binary erase channel.

Text Books:

1. Communication Systems – S.S.Haykin (Wiley Eastern), 2nd Edition, 1994
2. Principles of communication systems - Taub and schilling, 2nd edition, TMH

Reference Books:

1. Electronic Communication systems – Kennedy – TMH,4th Edition, 2002
2. Modern Digital and Analog communication systems by B.P.Lathi, 3rd Edition, BPB,2002
3. Communication systems – A.B.Carlson, Mc.G.H.3rd Edition, 1986.

DIGITAL COMMUNICATIONS (DC)
(For III B.Tech I Sem ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Introduction: Elements of Digital Communication Systems, Sampling theorem, Quantization (uniform & nonuniform).

Baseband Data transmission: Baseband PAM and Duo-binary PAM systems, M-ary signalling schemes, Signal shaping,Eye diagrams ,Synchronization.

Unit-II

Error Control Codes: Types of transmission errors, need for error control coding: Linear block codes, Binary Cyclic codes, Convolutional codes, error detection and correction capabilities of block codes and convolutional codes.

Unit-III

Digital Communication techniques for coherent systems: Optimum receiver, description of ASK, FSK and PSK Systems(coherent), description of QPSK, MSK and QAM Schemes, determination of probability of errors, Probability of error for ASK, FSK and PSK schemes(coherent)

Unit-IV

Digital Communication techniques for Non coherent systems Description of Non-coherent reception of ASK and FSK Signals, description of in –coherent reception of PSK signal, determination of probability of occurrence of error, Probability of error in the received Non-coherent ASK and FSK signals.

Comparison of ASK, FSK and PSK Signaling Schemes in terms of bandwidth, error probability, signaling speed etc.,

Unit-V

Multiple Access Techniques: TDM and FDM systems, TDMA, FDMA, ALOHA, CSMA, CDMA for spread spectrum.

Text Books:

1. Digital and Analog Communication Systems – K. Sam Shanmugam – Wiley-India, 2006
2. Digital Communication - Simon Haykin – Wiley Eastern United, 2003.

Reference Books:

1. Digital communications – Proakis John G.- Mc-Graw Hill, 3rd edition, 2004
2. Principles of Communication Systems – Taub and Schilling, Mc-Graw Hill, 2nd edition, 1986

ANTENNAS AND WAVE PROPAGATION (AWP)
(for III B.Tech I Sem ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Antenna Basics: Potential functions and the electromagnetic field, potential functions for sinusoidal oscillations, radiation mechanism

Basic antenna parameters, patterns, patterns, beam area, radiation intensity, beam efficiency, directivity and gain, directivity and resolution, antenna apertures, effective height.

Unit-II

Electric Dipole and Linear Antenna: Electric dipoles, thin linear antennas, current distribution in a thin linear antenna, short electric dipole, fields of a short electric dipole, radiation resistance of short electric dipole, the thin linear antenna, far fields of a center fed dipole, half wave dipole, radiation resistance, quarter wave monopole.

Unit-III

Array of Point Sources: Point sources and their arrays.

Linear Array: BSA and EFA, parasitic array, point source, power pattern, radiation intensity, examples of power patterns, field patterns,Array of two isotropic point sources, pattern multiplication, linear array of n Isotropic point sources of equal amplitude and spacing (EFA and BSA), null directions, binomial array.

Unit-IV

Practical Antennas: Loop antenna, helical antenna, reflector antennas, Yagi Uda Antenna, Traveling Wave Antenna, rhombic antenna, horn,Antenna theorems.

Measurements: impedance, gain,Radiation pattern.

Unit-V

Radio Waves Propagation: Electromagnetic or Radio waves, fundamental equation for FRISS free space propagation, Modes of propagation, structure of atmosphere, sky wave propagation (neglecting earths magnetic field), Virtual Height, MUF, Skip distance.

Space wave propagation - Range of space wave propagation, effective earth radius, field strength of space wave propagation, Duct propagation

Text Books:

1. Antennas for all Applications – John D.Kraus,Ronald J. Marhefka –TMH, 3rd Edition
2. Electromagnetic and Radiating Systems- Jordan and Balmain – Pearson, 2nd Edition
3. Transmission and Wave Propagation – Glazier and Lamont – HMSO.

Reference Books:

1. Antennas and Wave Propagation - K.D. Prasad **–** Satyaprakashan Pub.
2. Antenna Theory: Analysis and Design, 3rd Edition- Wiley Publications-CONSTANTINE A. BALANIS.

INTEGRATED CIRCUITS AND APPLICATIONS (ICA)
(for III B.Tech I Sem ECE)

Contact Periods: (4L+1T)/Week	Sessional Exam Marks : 30
End Exam : 3 hours	End Exam Marks : 70

Unit I

Op-Amp Fundamentals: Differential amplifier concept, ideal characteristics, practical inverting and non-inverting op-amp, study of typical IC op-amp and its different stages, offset voltages and currents and offset balance, op-amp parameters, frequency response and compensation. specifications of op-amp. Summing amplifier, difference amplifier.

Unit II

Op-amp Applications : Current to voltage and voltage to current converters, integrators, differentiators, Instrumentation amplifier, clippers and clampers, precision AC to DC converters, Log & antilog amplifier, comparator, window detector, schmitt trigger, pulse, square and triangle wave generators, sample and hold circuits. Active filters (Butterworth).

Unit III

Timers & Waveform Generators: 555 Timer – astable, monostable modes – applications - 566 and 8038 waveform generators.

Phase Locked Loops : Lock and capture ranges, 565 PLL, PLL applications, AM detection, FM detection, FSK demodulation, frequency translation.

Unit IV

IC Regulators: General form of series Regulators, fixed voltage regulator, 723 regulator, switching regulators – step up, step down and inverting modes (IC UA 78S40)

D/A and A/D Converters : Weighted resistor, R-2R ladder type and inverted R-2R DACs, DAC IC 1408L, ADCs: Parallel comparator, counter, successive approximation and dual slope types, ADC 0801, DAC / ADC specifications.

Unit V

Logic Families: DTL, HTL, TTL, RTL, DCTL, ECL, MOS and CMOS circuits, comparison of logic families. TTL driving CMOS and CMOS driving TTL, CMOS bilateral switch. specifications of logic gates.

Text Books:

1. Linear Integrated Circuits – Roy Choudhury & Shail B.Jain, New Age Int. Pub.2006
2. Digital Logic and Computer Design – Moris Mano.

Reference Books:

1. Design with operational amplifier and analog integrated circuits by Sergion Franco – TMH
2. Digital systems principles and applications – Ronald J.Tocci, Neil S Widmor, Person, 8th Edition

DIGITAL SIGNAL PROCESSING (DSP)
(For III B.Tech II Sem ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Introduction to Discrete Time LTI Systems: Causality, stability, Linear constant coefficient Difference equations, Freq. domain description, Discrete Fourier series, Discrete Time Fourier Transform (DTF) and Discrete Fourier Transform(DFT), proprieties of DFT.

Unit-II

Fast Fourier Transform: Radix-2, Decimation in Time and Frequency algorithms, comparison of DFT & FFT computations, In-place computation, an bit reversal, Finite Word lengths in FFT algorithms, Realization of Digital Filters – Direct forum I & II cascade, parallel.

Unit-III

IIR Digital Filter Design: Butterworth and Chebyshev approximations, IIR filter design, mapping of differentials, Impulse invariants, Bit wise transform techniques, frequency transformations

Unit-IV

FIR Digital Filter Design: Characteristics of FIR digital filter, frequency response. Design of Digital Filter using Fourier Series method, Windowing techniques, Frequency Sampling technique, comparison of FIR & IIR filter. Realization of FIR filters.

Unit-V

Introduction to DSP Processors: Introduction to programmable DSP's, Multiplier and accumulator (MAC), Modified Bus structure and Memory access schemes, Multiple access memory on clip peripheries features of TMS 320C67XX processors, Internal architecture, addressing modes, external memory access, peripherals. _

Text Books:

1. Discrete Time Signal Processing - Allan V.Oppenhiem & Rouald W.Schafer – Pearson, 2nd Ed. 1989.
2. DSP A Practical Approach by Emmanuel C.Ifearchar, Barrie W.Jervis, Pearson, 2rd Edition, 2002.
3 DSP by S.Salivakanana, Avallavaraj, C.Gnanapriya, TMH, 2000

Reference Books:

1. DSP, Algorithms and applications – Proakis John G, Pearson, 3rd Edition, 2003.
2 Digital Signal Processing by P.Ramesh Babu, Scitech Publications, 3rd Edition, 2007.

LINEAR CONTROL SYSTEMS (LCS)
(for III B.Tech II Sem ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit -I

Equations and Models of Linear Systems: Basic elements and types of servomechanism, open-loop and closed-loop systems, control system components, servomotor, tachometer, synchros, position control systems, equations of electrical and mechanical systems, transfer functions and impulse response, block diagram representation and manipulation, signal flow graphs-mason's rule to determine overall system gain.

Unit-II

Feedback Characteristics of Control Systems: Feedback and non-feedback systems, effects of feedback, regenerative feedback, sensitivity.

Time Response: Types of input, transient response of second order system for step input, time-response specifications, steady state error and error constants, proportional, derivative and integral controls, stability of systems-Routh Hurwitz criterion, Relative stability.

Unit-III

Frequency Response: Co-relation between time and frequency response, polar plots, bode plots, frequency domain specifications, Mp and Wp for a second order system, relative stability-gain and phase margins, M and N circles, Nicholas charts, determination of Mp and Wp, Nyquist criterion for open loop stable system.

Unit-IV

Root Locus: Definition of Root Locus, construction Procedure, properties of typical systems analyzed by root locus techniques.

Compensation (Without Design): The necessity of compensation, series and parallel compensation. Realization of basic lead, Lag and lead-Lag compensatiors.

Unit-V

State Variable Analysis: Introduction, concepts of state, state variables and state model, state model of linear systems, state-space representation using phase variable and physical variables, solution of state equations. Concept of Controllability and Observability.

Text Books:

1. Control systems Engineering – Nagrath and Gopal , New Age
2. Automatic Control Systems – B.C.Kuo, Pearson
3. Modern control Engineerin – K. Ogata, Pearson
4. Control Systems – Naresh – K.Sinha, New Age

Reference Books:

1. Control Systems – Madan Gopal, TMH
2. Modern Conrtol systems - Dorf, Bishop – Addison Wesley
3. Feedback control systems - Shaum's out line series, TMH
4. Control Systems - R.C.Shukla, Dhanpat Rai

COMMUNICATION SYSTEMS (CS)
(for III B.Tech II Sem ECE)

Contact Periods: 5L/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Line Communications(Brief treatment): Principles of Telegraph signaling, teleprinter, principles of telex and facsimile telegraphy, automatic telephony, switching, electronic exchange. (digital electronic exchange)

Unit -II

AM & FM Transmitter and Receiver: Frequency allocations, AM transmitters (low level and high level), FM transmitter(direct, indirect and stereo),TRF receiver, Super-heterodyne receiver, sensitivity, selectivity and fidelity, choice of IF, local oscillator, image frequencies, tracking errors, AGC circuits.

Unit-III

T.V.Engg.: Basic TV system- Interlaced scanning , composite video signal, CCIR-B standards, TV cameras(Image Orthicon, Plumbicon, Vidicon), Picture tube and its characteristics, Monochrome transmitter and receiver, principles of colour TV, colour picture tubes, block diagrams of colour TV transmitter and receiver for PAL system.

Unit -IV

Satellite Communication System: Orbital satellites, Geostationary satellites, orbital patterns, look angles, orbital spacing and frequency allocation, link model, system parameters, link equations, station keeping, problems.

Unit -V

Spread Spectrum Communication Techniques: Introduction, principles, generation of pseudo random sequences, spread spectrum modulations, direct sequence spread spectrums, frequency hopping spread spectrum, processing gain and jamming margin, acquisition and tracking of direct sequence and frequency hopping signals.

Text Books:

1. Principles of Telephony –NN Biswas-JK pub.(Unit I)
2. Principles of Telegraphy- NN Biswas – JK pub.(Unit I)
3. Electronic communication systems- Kennedy-McGH (Unit II)
4. TV Engineering -A.M.Dhake –TMH (Unit III)
5. Advanced Electronic Communications Systems-Wayne Tomasi – 6th Edition, Pearson,2003 (Unit IV)
6. Digital Communications-Simon Haykin – Johnwiley (Unit V)

Reference Books:

1. Electronic Communications – Dennis Roddy and Collen-Pearson, 4th Edition, 1995 (Unit II)
2. Communication Engineering – Taub and Schilling-McGH

MICROWAVE ENGINEERING (MWE)
(for III B.Tech II Sem ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit – I

Guided Waves: Microwave frequencies and Uses, Waves between parallel conducting planes, TE, TM, TEM waves characteristics, velocity of propagation, group and phase velocity. Wave impedance, Attenuation in Parallel plate guides.

Unit – II

Waveguides: TE & TM waves in rectangular and circular wave guides, wave impedance, Attenuation and Q of wave guides, wave guide resonators, power handling capability, transmission line analogy.

Unit – III

Passive Microwave Devices: Terminations, attenuators, Phase changes, Introduction to scattering parameters, Unitary property, derivation of s-matrix for directional couples, E-plane, H-Plane, magic Tee, Hybrid ring, microwave propagation is ferrites, faraday rotation, circulators and Isolators,matched termination.

Unit – IV

Microwave Tubes: Velocity modulation, operation and performance of two cavity klystron, reflex klystron oscillator, TWT amplifier, magnetron, mode separation and applications.
Introduction to PIN diode, GUNN diode ,IMPATT,TRAPATT.

Unit – V

Microwave Measurements: Bolometric and Thermocouple methods of measurement of power, frequency attenuation, VSWR, impedance measurements and measurement of scattering parameters for 2,3 and 4 port devices. Principle of Microwave communication, Link design, LOS, Microwave Repeaters

Text Books:

1. Microwave Devices and Circuits – Samuel Y.Liao, Pearson, 3rd Edition, 1990
2. Microwave & Radar Engineering's – M.Kulkarni
3. EM fields, waves and Radiating Systems – EC Jordan and Balamain, Pearson

Reference Books:

1. Microwave Engineering and Applications – O.P.Goundhi – Progamon PR
2. Foundations for Microwave Engineering's – R.E.Collies, McGraw Hill.

MICROPROCESSORS THEORY (MPT)
(for III B.Tech II Sem ECE)

Contact Periods: (4L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit I

Introduction of 8 bit Microprocessor – 8085: Architecture and Organization of 8085 microprocessor, instruction set, addressing modes, instruction cycle, fetch and execute cycles.

Unit II

Introduction of 16 bit Microprocessor – 8086: 8086 CPU architecture, segmented memory, addressing modes. 8086 Instruction set, 8086 maximum mode and minimum mode.

Unit III

Assembly Language Programming of 8086: Assembler directives, Assembly language programming using MASM / TASM. Simple programs on Arithmetic, sorting, searching, code conversions, string manipulations etc. Procedures & Macros. Using DOS Int 21h Calls.

Unit IV

Memory and I/O Interfacing: Read/ write timing, SRAM and ROM interface requirements, interfacing of Static memory and dynamic memory.

I/O Interfacing: 8255(Programmable Peripheral Interface), 8255 applications – key board interfacing, display interfacing, stepper motor interfacing, printer interfacing, DAC interfacing , waveform generation and ADC interfacing

Unit V

Peripheral Interfacing: 8254(Programmable Timer / Counter), 8251(USART), 8257 (DMA Controller), 8259 (Programmable Interrupt Controller). Co-processor 8087 – architecture & interfacing.

Text Books:

1. Microprocessors Architecture, Programming & Applications with 8085/8080A- Gaonkar Ramesh. S, Penram International Edition.
2. Microprocessors and Interfacing Programming and Hardware – Douglas V.Hall – TMH, 2006.
3. Advanced Microprocessors and Peripherals – A K Ray, K M Bhurchandi – TMH, 2007

Reference Books:

1. The 8086/8088 Family: Design, Programming, and Interfacing – John Uffenbeck – PHI
2. The 8088 and 8086 Microprocessors – Walter A.Triebel, Avtar Singh – Pearson, 4th Edition, 2007
3. The Intel Microprocessors- Architecture, Programming and Interfacing – BarryB. Bray, 6th Edition, Pearson.

SOFTWARE ENGINEERING (SE)
(for III B.Tech II Sem ECE)

Contact Periods: 5L/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit- I

Introduction To Software Engineering And Process Models: The evolving role of software, changing nature of software, software myths.
Software Engineering-A layered technology, a process framework.
Process Models-The waterfall model, Incremental process models, Evolutionary process models and Unified process.

Unit-II

Software Requirement And Requirement Engineering Process: Functional and nonfunctional requirements, User requirements, System requirements, the software requirements document.
Requirement Engineering Process: Feasibility studies, Requirements elicitation and analysis, Requirement validation, Requirement Management.

Unit-III

Design-Design process and Design quality, Design concepts, Design Model.
Creating an Architectural Design-Software Architecture, Data Design, Architectural Styles & patterns Architectural design.

Unit-IV

Testing Strategies - A strategic approach to Software testing, test strategies for Conventional software, White Box Testing-Basis Path Testing, Control Structure Testing, Black Box Testing, Validation Testing, System Testing.
Metrics for Process & Products - Software Measurement, metrics for software quality.

Unit-V

Risk Management-Reactive vs Proactive risk strategies ,software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.
Quality Management-Quality Concepts, software quality assurance, software reviews, formal technical reviews, statistical Software quality assurance ,software reliability.

Text Books:

1.Software Engineering, A Practitioner's Approach -Roger S. Pressman 6th Edition, Mc Graw Hill International Edition.
2. Software Engineering - Sommerville, 7th edition, Pearson education.

Reference Books:

1. Software Engineering-K.K.Agarwal &Yogesh Singh ,New Age International Publishers.
2. Software Engineering-an Engineering approach,James F.Peters,Witold pedecz,John Wiely.

VLSI (VLSI)
(for IV B.Tech I Sem ECE)

Contact Periods: 4L /week	Sessional Exam Marks : 30
University Exam : 3 hours	University Exam Marks : 70

Unit – I

Introduction to MOS Technology : Introduction to IC technology, MOS technology and Related VLSI technology, Basic MOS transistors, Enhancement mode transistor action, Depletiom mode transistor action, NMOS fabrication, CMOS fabrication, thermal aspects of processing, BICMOS technology.

Electrical properties of MOS, BICMOS circuits : parameters of MOS circuits, Inverters, Aspects of Threshold voltage, Alternative forms of Pullup, circuit model, CMOS Inverter, Characteristics of npn Bipolar transistors, Latch up in CMOS and BICMOS circuits.

Unit – II

MOS Design Process : MOS layers, stic diagrams, nMOS, CMOS design style, Design rules and layout, layout diagrams.

Basic Circuits concepts : Sheet resistance, Sheet resistance concept applied to MOS transistors and inverters, area capacitances of layers, Standard unit of capacitance, area capacitance calculations, Delay unit, inverter delays.

Unit – III

Subsystem Design and Layout : Some architectural issues, switch logic, gate logic, other forms of CMOS logic, examples of structured design, parity generator, multiplexer, PLA, An illustration of design process.

Unit – IV

Scaling of MOS Circuits : scaling models and factors, scaling factors for device parameters, functional limitations to scaling, limits due to sub threshold currents, limits due to current density, design of ALU sub system.

Unit – V

Memory, Registers and Aspects of System Timing : system timing considerations, Dynamic shift register stage, one transistor dynamic RAM cell, one transistor dynamic memory cell, A pseudo static RAM / register cell, CAD tools for design and simulation, design flow and design cycle in the top down structured approach.

Text Book:

1. Basic VLSI design systems and circuits-Douglas A Pucknell, Karman Eslraghain- PHI , 3rd Edition

Reference Book :

1. Principles of CMOS VLSI design- Neil H.E.Weste and Kamran eshraghain Addison wesly – 2nd Edition
2. Analysis and Design of Digital Integrated Circuits – 3rd Edition – David A Hodges, Horace G Jackson, Resve A Saleh

OPTICAL COMMUNICATIONS (OC)
(for IV B.Tech I Sem ECE)

Contact Periods: 4L/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Overview Of Optical Communication: Introduction and Historical Background, elements of optical fiber communication, Advantages of Optical Fiber Communication, Applications of fiber optical communications.

Optical Fiber Waveguides: Nature of light, Basic optical laws and definitions, optical fiber modes and configurations, Mode theory of circular waveguides, Single, Multimode step index fibers, Fiber materials and fabrication.:

Unit-II

Signal Degradation In Optical Fibers: Attenuation-Absorption, scattering and bending losses in optical fibers, core and cladding losses, Signal distortion in optical wave guides, different types of dispersions, pulse broadening.

Unit-III

Optical Soures And Photodectors: LED's– structures, light source materials, internal quantum Efficiency, modulation capability, semiconductor laser diodes, Physical principle of PIN and APD, Noise in detectors.

Unit-IV

Optical Receiver And Digital Transmission Systems: Fundamental receiver operation, digital receiver performance calculation, preamplifier types, analog receivers, point-to point links, link power budget, Rise time budget, WDM.

Unit-V

Power Launching And Optical Fiber Measurements: source to fiber power launching – basics, fiber joints and splices, fiber connectors, Measurement of attenuation and dispersion.

Text Books:

1. Optical Fiber Communications- by Gerd Keiser, TMH, 3rd Edition, 2000
2. Optical Fiber communications principles and practice-by John M. Senior, Pearson, 2nd Edition, 2006.
3. Optical Communication Systems-by John Gowar, PHI, 2003

Reference Books:

1. Fiber Optic Communication- D.C. Agarwal – Wheeler Publications, 2nd Edition, 2002
2. Fiber Optic Communications Technology, Djafar K. Mynbaev, Pearson, 2001

EMBEDDED SYSTEMS DESIGN (ES)
(for IV B.Tech I Sem ECE)

Contact Periods : 4L/Week	Sessional Exam Marks : 30
University Exam : 3 hours	University Exam Marks : 70

Unit-I

Introduction: Embedded systems overview, design challenge, processor technology, IC technology, Design Technology, Trade-offs. Single purpose processors RT-level combinational logic, sequential logic (RT-level), custom single purpose processor design (RT-level), optimizing custom single purpose processors.

General Purpose Processors : Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – MicroControllers and Digital Signal Processors.

Unit-II

State Machine And Concurrent Process Models: Introduction, models Vs. languages, finite state machines with data path model (FSMD), using state machines, program state machine model (PSM), concurrent process model, concurrent processes, communication among processes, synchronization among processes, implementation, data flow model, real-time systems.

Unit-III

Introduction to MCS51 family: 8 Bit microcontrollers Architecture on chip peripherals instruction set, programming of Intel MCS51 family (8 bit) microcontroller.

Unit-IV

Interfacing: Inter facing of 8051 with LCD, ADC, sensors, stepper motor, key board, DAC, memory

Unit-V

PIC Microcontrollers: Overview and Features, Architecture Details of PIC 16C6X/7X, Instructions, addressing modes, I/O Ports, Interrupts, Timer, ADC. Features of 16F8XX series.

Text Books:

1. Embedded System Design – A Unified Hardware / Software Introduction – Frank Vahid, Tony D.Givargis, John Wiley, 2002.
2. The 8051 Microcontroller and Embedded Systems – Mazidi & Mazidi, Pearson, 2nd Edition, 2006
3. Microcontrollers – Ajay Deshmukh – TMH, 2005.

DIGITAL IMAGE PROCESSING (DIP)
(for IV B.Tech I Sem ECE)

Contact Periods: (3L+1T)/Week	Sessional Exam Marks : 30
University Exam : 3 hours	University Exam Marks : 70

Unit-I

Image Formation and Description : Digital Image, representation, Elements of digital image processing systems, sampling and quantization, Neighbors of pixels, connectivity, distance measures.

Unit -II

Image Transforms: The Discrete Fourier Transform, some properties of the two dimensional Fourier Transform, Walsh Transform, Hadamard Transform, Discrete Cosine Transform, Slant Transform and Hotelling Transform.

Unit-III

Image Enhancement: Spatial enhancement techniques-histogram equalization, histogram specification, local enhancement, frequency domain techniques-low pass, high pass and homomorphic filtering.

Unit -IV

Image Restoration: Degradation model, algebraic approach to restoration, inverse filtering, least mean square (wiener) filter, constrained least square restoration and interactive restoration.

Unit -V

Image Compression : Image redundancies Image compression models-the source encoder and decoder, the channel encoder and decoder, error free compression using variable length codes, Huffman coding, Airthmatic coding, Lempel-Ziv-Welch, Bit Plain coding, 1D,2D Run Length Coding, Loss less predictive coding, lossy compression using lossy predictive coding, transform coding, Wavelet coding.

Introduction to Image Segmentation: Detection of discontinuities, Edge linking and Boundary detection: Local processing, global processing using Haar Transform, Graphical & theoretical technique.

Text Books:

1. Digital Image Processing by R.C.Gonzalez and R.E.Woods – Pearson, 2002
2. Fundamentals of Digital Image Processing – A.K Jain.- Pearson -1989

Reference Books:

1. Digital Image Processing using MATLAB by R.C.Gonzalez and R.E.Woods – Pearson, 2002

ELECTIVES

MOBILE COMMUNICATIONS (MCN)
(Elective for IV B.Tech ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Introduction: Basic Cellular System, Operation of Cellular system, Hexagonal cells, Frequency reuse of channels, co-channel interference reduction. Cell splitting

Cell coverage: Incident, Reflection & Elevation angle, point to point modes, pathloss formula, pathloss from point to point prediction model, Mobile to Mobile propagation

Unit-II

Cellsite Antennas & Mobile Antennas: Antenna at cellsite, mobile antennas.

Frequency management & channel assignment: Frequency management, Frequency-spectrum utilization, set-up channels, channel assignment to cellsite & mobile units, fixed & non-fixed channel assignment.

Unit-III

Hand offs : why hand off(H.O), types of H.O, Delaying H.O, Queuing H.O., Initiation of H.O, Foreced, H.O, Intersystem H.O, Power difference H.O, Mobile assisted H.O, soft H.O

Switching & Traffic: Space & Time switching, Analog switching equipment for cellular mobile system, cellular digital switching equipment, MTSO inter connections.

Unit-IV

Introduction to Digital Mobile Telephony : Introduction to digital technology, ARQ techniques, stop and wait ARQ, selective reference mission with ARQ. Multiple access schemes.

Digital Cellular System: Global system for mobile communication (GSM), GSM architecture, layer modeling, Transmission, GSM channels & channel modes, Radio resources management, mobility management, communication management, Network management.

Unit-V

Intelligent Cell concept & applications: Intelligent cell concept, power-delivery intelligent cells, processing grain intelligent cells. Applications of intelligent cell concept.

Intelligent Network for wireless communication: Advanced intelligent network (AIN) & Its architecture. SS7 protocol model, AIN for mobile communication.

Text Books:

1. Mobile Communications Engineering Theory and Applications – Lee William C.Y., 2nd Edition, McGraw Hill, 1995.
2. Mobile Cellular Telecomunications Analog and Digital System – Lee William.C.Y. 2nd Edition, Mc Graw Hill, 1995.

Reference Books:

1. Mobile Communication Satellites – Legsdon Tom, McGraw Hill, 1995.
2. Mobile and Personal Communication Services and Systems – Pandya Raj, PHI, 2002.
3. Mobile Communications – Schiller Joden H, Pearson, 2003

INTRODUCTION TO OPERATING SYSTEMS (ITOS)
(Elective for IV B.Tech ECE)

Contact Periods: 4L/Week — Sessional Exam Marks : 30
End Exam : 3 hours — End Exam Marks : 70

Unit-I

Introduction: Concepts of operating systems – process, files, system calls, shell, operating system structure – monolithic layered systems, virtual machines and client –server model.

Unit-II

Memory Management: Preliminaries, Bare Machines, Resident Monitor, Swaping, Multiple partitions, paging and segmentation, combined systems.
Virtual Memory: overlays, demand paging, performance of demand paging, page replacement, virtual memory concepts, page replacement algorithms, allocating algorithms, thrashing.

Unit-III

File Systems: File concepts, File support, Access Methods, Allocation Methods, Directory Systems, File protection and implementation issues.
Dead Locks: Deadlock problem, deadlock characterization, deadlock prevention, deadlock avoidance, deadlock detection and deadlock recovery.

Unit-IV

Protection: Goals of protection, mechanisms and policies, domain of protection, access matrix, implementation of access matrix, dynamic protection structures, revocation, existing systems, languages – based protection, protection problems, security.

Unit-V

Distributed systems: Motivation, topology, communication, system type, file systems, mode of computation, event ordering, synchronization, deadlock handling, robustness, reaching agreement, election algorithms.

Text Books:

1. Operating System Concepts – Abraham Silberschatz, 6th Edition, John Wiley.
2. Modern Operating System – Tannenbaum, 2nd Edition, 2001, Pearson.

Reference Books:

1. Operating System Concepts – James L.Peterson, Abraham Silberschaz.

COMPUTER NETWORKS (CN)
(Elective for IV B.Tech ECE)

Contact Periods: 4L/Week — Sessional Exam Marks : 30
University Exam : 3 hours — University Exam Marks : 70

Unit-I

Introduction to data communication networks: Network services and architecture, Reference models: ISO-OSI reference model, TCP/IP reference model, Classes of data communication services: Broadband –ISDN and ATM networks.

Physical layer: Transmission media, data modems, RS-232 Interfaces, Switching and Multiplexing.

Unit-II

Data link layer:design issues, error detection and correction, Stop-and-go and sliding window error and flow control mechanisms, BISYNC and HDLC data link control protocols, LAN Standardization, ALOHA protocol, Introduction to IEEE standards-Media access control sublayer (specifications, frame structure), physical layer for: IEEE 802.3(CSMA/CD)standard, IEEE 802.4 Token bus standard, IEEE 802.5 Token ring standard.

Introduction to wireless LANs, networking and internetworking devices.

Unit-III

Network layer : Virtual circuit and datagram approach in subnets, Routing algorithms-shortest path routing, flooding, Hierarchical routing, broadcast routing, multicast routing and distance vector routing algorithms. Congestion control algorithms and deadlock, Network layer in Inernet and the ATM Networks.

Unit-IV

Transport layer- transport services, addressing, upward and downward multiplexing, TCP and UDP.

Session layer, Encryption, public key cryptography, data compression and syntax conversion.

Unit-V

Application layer: Domain Name System (DNS), FTAM services, MHS services, VTP. World Wide Web, Multimedia.

Text Books:

1. Computer Networks -Andrew S. Tanenbaum, Pearson, 4th Edition, 2002..
2. Data communications and Networking - Behrouz. A. Forouzan, 4th Edition - TMH

Reference Books:

1. Data and Computer Communications-William Stallings, 7th Edition, PHI.
2. Local Area Networks – Gerd Keiser – TMH
3. Communication and Network for the PC, 5th Edition – Churchill Jordan – PHI

NEURAL NETWORKS AND FUZZY LOGIC (NNFL)
(Elective for IV B.Tech ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
End Exam : 3 hours — End Exam Marks : 70

Unit-I

Biological Neural Network : Organisation of human brain, Neuron functions-cell body, Dendrites, Axon, Cell membrane, computers and human brains.
Artificial Neural Networks : Characteristics, single layer and multi-layer Artificial Neural Networks, Training: objective, supervised and unsupervised training, overview.
Perceptrons : perceptron representation, learning, training algorithm, advanced algorithms and applications.

Unit - II

Neural Dynamice : Counters propagation Networks: Introduction, Network structure, Normal operation, training the Kohonen and Grossberg layers, full counter propagation network, applications.
Statistical Methods : Training, applications, applications to non-linear optimisation problems, Back propagation and Cauchy training.

Unit - III

Hopfield Networks: Recurrent network configurations, applications.
Bi-directional Associative Memories: BAM structure, retrieving a stored association, encoding the associations, Memory capability, continuous, adaptive and competitive BAM.
Adaptive Resonance Theory: ART architecture and implementation training example, characteristics.

Unit - IV

Fuzzy sets and membership, classical sets, fuzzy sets, fuzzy set operations, properties of fuzzy sets lambda-cuts for fuzzy sets fuzzy logic
Fuzzy Relations: cardinality, operations, properties, fuzzy Cartesian product and composition, fuzzy tolerance and equivalence relations

Unit – V

Fuzzy measures:
Belief and plausibility, evidence theory, probability measures, possibility and necessity measures

Text Books:

1. Neural Computing, theory and practice - Phillip D. Wasserman – Van Nostrand Reinhold
2. Fuzzy Logic with Engg. Applications – Timothy Ross – TMH, (Unit IV & V).

Reference Books:

1. Fuzzy Set theory and its applications - H.J.Zimmerman -Allied Publishers
2 Fundamentals of Neural Networks, Architectures, Algorithms and Applications - Laurene Fausett - Pearson, 1994
3. Fuzzy Sets, Uncertainty and Information - George I Klir and Tina A. Folger –PHI,

ADVANCED MICROPROCESSORS (AMPR)
(Elective for IV B.Tech ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
End Exam : 3 hours — End Exam Marks : 70

Unit-I
The 80186 & 80286 Microprocessors:
80186: Block Diagram, Pin definitions
80286: Block diagram, pin definitions, Real address mode, Protected mode, New and enhanced instructions.

Unit-II
80386 and 80486 Microprocessors:
80386: Architecture, Pins and signals, Operating modes, Memory organization, Registers, New addressing modes, Memory management.
80486: Block diagram & Pin definitions.

Unit III
Pentium Processor: Salient features of Pentium, Architecture, branch prediction, MMX architecture, Pentium Pro and Pentium II.

Unit IV:
Pentium IV Microprocessor: Salient features of PIV, Block diagram, Hyperthreading in Pentium.

Unit V:
Advanced Peripherals: CRT Controller 8275, Floppy disc controller 8272, Keyboard and display controller 8279.

Text Books:

1. The Intel Microprocessor 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium Pro Processor Architecture, Programming and Interfacing – Barry B. Brey (PHI, 4th Edition).
2. Advanced Microprocessors & Peripherals – A.K.Roy & K M Bhuruchandi, Pearson

INDUSTRIAL AND POWER ELECTRONICS (IPE)
(Elective for IV B.Tech ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
End Exam : 3 hours — End Exam Marks : 70

Unit-1

Silicon Controlled Rectifiers : Characteristics, ratings, turn-on, turn-off mechanisms (SCR, Diac, Triac, LASER, GTO) gate characteristics and protection circuits.
Thyristor Firing Circuits : methods of turning on of a thyristor, principal features of firing circuits. simple R and RC triggering circuits, UJT pulse triggering circuits.

Unit-II

High Current Converters : Review of a single phase rectifier, polyphase rectifiers using silicon diodes, single phase and polyphase controlled rectifiers using SCRs with resistive and inductive loads, transformer utilisation factor, free wheeling diode operation , effects of source inductance.

Unit-III
Methods of Commutation & DC Choppers : class A, B, C, D & E and F types of commutation-basic principle of chopper- types of chopper circuits, voltage current commutated D.C. choppers and Morgan's chopper.

Unit -IV
Inverters : series, parallel and bridge inverters, single phase and three phase inverters- Mc-Murray inverter and Mc-Murray Bedford inverter, current source inverter.

Unit-V
Phase Controlled Cyclo-Converter : Single phase and three phase cyclo-converters, circulating and non circulating current modes of operation.
Speed Control : Speed control of DC motors using converters and choppers- speed control of induction motors using inverters and cyclo-converters, slip power recovery scheme. (simple treatment only)

Text Books:
1. An Introduction to Thyristors and their Applications - M.Ramamoorthy.-EWP
2. Power Electronics - Dr.P.S. Bhimbra - Khanna Pub.,
3. Industrial Electronics - Chute and Chute - McGH

Reference Books:
1.Thyristor Engineering – Burde - Khanna Pub.,
2.Thyristorised Power Controllers - G.K. Dubey, S.R. Doradia, A.Joshi, A.M.K.Sinha - Wiley Eastern.
3.Power Electronics- Williams - ELBS.
4.Principles of Inverter Circuits - B.D.Bedford and R.G.Hoft - John Wiley.
5.Thyristorised Converters and Cyclo-Converters - B.R.Pelly.
6.Semiconductor Controlled Rectifiers - F.E. Gentry and Etal - PHI.

RADAR ENGINEERING (RE)
(Elective For IV B.Tech. E.C.E)

Contact Periods : 4L/Week
End Exam : 3 hours

Sessional Exam Marks : 30
End Exam Marks : 70

Unit-I

Introduction to Radar: Description of basic radar system and its elements, radar equation, radar block diagram and operation, radar frequencies, application of radar.

The Radar Equation: predictions of range performance, minimum detectable signal, receiver-noise and Signal to noise ratio. Probability of detection and false alarm, radar cross-section of target. Transmitter power, Pulse repetition frequency and range ambiguities.

Unit-II

CW and FMCW Radar: Doppler effect, CW radar, FM CW radar, multiple frequency CW radar.

Unit –III

MTI and Pulse Doppler Radar: Description of operation, MTI radar with power amplifier transmitter, MTI radar with power oscillator transmitter, delay line cancelers, blind speeds, multiple or staggered PRFs, MTI radar using range gated Doppler filters, limitations to MTI performance, non-coherent MTI, pulse Doppler radar.

Unit-IV

Tracking Radar: Tracking with radar, sequential lobbing, conical scan, monopulse amplitude comparison and phase comparison tracking radar's, tracking in range, acquisition, comparison of tracking radars.

Unit-V

Radar Antennas: antenna parameters, parabolic reflector antennas, cassigrain antennas.

Radar receivers, Displays and duplexers: Radar receiver, noise figure, low noise front ends, A-Scope , B-Scope and PPI radar displays, duplexers and receiver protectors.

Text Book:

1) Skolnik: Introduction to radar systems.3rd edition TMH

BIOMEDICAL INSTRUMENTATION (BMI)
(Elective for IV B.Tech ECE)

Contact Periods: 4L/Week — Sessional Exam Marks : 30
End Exam : 3 hours — End Exam Marks : 70

Unit -1

Introduction to Biomedical Instrumentation: Bioelectric-electrodes and physiological transducers: The age of biomedical engineering, development of biomedical instrumentation, biometrics, introduction to the man-instrument system, components of the man-instrument system, physiological system of the body.

Recording electrodes, electrodes of ECG, microelectrodes pressure, blood flow, temperature transducers, pulse and respiration sensors.

Unit -II

Recording And Monitoring Instruments: Electrocardiograph, phono-cardiograph, electroencephalograph, electromyograph. Oscilloscope for biomedical measurement cardioscope, multichannel displays non-fade display systems. Blood pressure, temperature, respiration rate measurements. Cardiotocograph, methods of monitoring fetal heart rate, fetal heart rate measurement. Interfacing computer with Medical instrumentation and other equipment, computer aided ECG analysis, computerized cathterisation laboratory, computerised patient monitoring system.

Unit -III

Patient Safety, Measurement And Analysis Techniques : Physiological effects of electrical current, shock hazards from electrical equipment, leakage currents, method of accident prevention.

Ultrasonic blood flowmeters, Laser Doppler flow-meters, Coulter counter, automatic recognition and differential counting of cells. Function of the kidneys, artificial kidney.

Unit -IV

Biotelemetry And Modern Imaging Systems: Introduction to biotelemetry, physiological parameters adaptable to biotelemetry, the components of biotelemery systems, implantable units, applications of telemetry in patient care. X-ray machine, X-ray computer topography.

Physics of ultrasonic waves, medical ultrasound, A-scan, echocardiograph (M-Mode), B-scanner, real-time ultrasonic imaging system, display devices for ultrasonic imaging, biological effects of ultrasound.

Unit-V

Therapeutic Equipment: Cardiac pacemakers: external, implantable, programmable pacemakers, performance aspects of implantable pacemakers, power sources for implantable pacemakers, leads and electrodes.

Cardiac Defibrillators: DC-defibrillator, implantable defibrillators, and defibrillator analyzer. Laser application in Biomedical field.

Text Books:

1. Biomedical Instrumentation and Measurements – Leslie Cromwell, Fred J. Weibell, Erich A. Pfeiffer - PHI (1991).
2. Hand book of Biomedical Instrumentation – RS Khandpur - TMH (1991).

Reference Books:

1. Transducers of Biomedical Instruments: Principles and applications – Cobbold, R.S.C. John Wiley
2. Introduction to Biomedical Instrumentation – S.K. Guha.

MICROWAVE DEVICES AND INTEGRATED CIRCUITS (MIC)
(Elective for IV B.Tech ECE)

Contact Periods: (3L+1T)/Week — Sessional Exam Marks : 30
End Exam : 3 hours — End Exam Marks : 70

Unit-I

Microwave Transistors And Tunnel Diodes: Microwave bipolar transistors, microwave tunnel diodes, their physical structure, operation principles, characteristics.

Microwave Field Effect Transistors: JFET, metal semiconductor field effect transistors, high electron mobility transistors, MOSFETs, MOS transistors, memory devices and CCDs.

Unit -II

Transferred Electreon Devices: gunn effect diodes, Ridley-Watkin Hilsum theory, modes of separation, LSA diodes, InP and CdTe diodes, microwave generation amplification.

Unit-III

Avalanche Transit Time Devices: Read diode, IMPATT diodes, TRAPATT diodes, BARITT diodes, parametric devices, Manley Rowe power relations, parametric amplifiers.

Unit-IV

Microwave Linear Beam Tubes (O Type): Conventional vacuum triodes, tetrodes and pentodes, klystrons, multi cavity klystron amplifiers, reflex klystrons, helix travelling wave tubes, coupled cavity travelling wave tubes.

Micro Wave Crossed Field Tubes (M Type): Magnetron oscillators, forward wave crossed field amplifier, backward wave crossed field amplifier, backward wave crossed field oscillator.

Unit-V

Strip Lines And Microwave Integrated Circuits: Micro strip lines and coplanar strip lines, shielded strip lines, characteristic impedance and losses of above Substrates, conductor, dielectric and resistive materials monolithic microwave integrated circuit growth, fabrication techniques, MOSFET fabrication, thin film formulation, hybrid integrated circuit fabrication.

Text Books:

1.Foundation of Microwave engineering – R.E. Collins
2.Microwave devices and circuits –Samuel Y.Liao - PHI
3.Microwaves- K.C. Gupta -Wiley Eastern Ltd.

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