2007-2008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD

B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

**I YEAR
COURSE STRUCTURE**

Code	Subject	T	P/D	C
	English	2+1	-	4
	Mathematics - I	3+1	-	6
	Mathematical Methods	3+1	-	6
	Applied Physics	2+1	-	4
	C Programming and Data Structures	3+1	-	6
	Network Analysis	2+1	-	4
	Electronic Devices and Circuits	3+1	-	6
	Engineering Drawing	-	3	4
	Computer Programming Lab.	-	3	4
	IT Workshop	-	3	4
	Electronic Devices and Circuits Lab	-	3	4
	English Language Communication Skills Lab.	-	3	4
	Total	25	15	56

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

II Year   **I Semester**

COURSE STRUCTURE

Code	Subject	T	P	C
	Mathematics - III	4+1*	-	4
	Probability Theory and Stochastic Processes	4+1*	-	4
	Environmental Studies	4+1*	-	4
	Signals and Systems	4+1*	-	4
	Electrical Technology	4+1*	-	4
	Electronic Circuit Analysis	4+1*	-	4
	Electronic Circuits Lab.	-	3	2
	Electrical Technology Lab.	-	3	2
		30	6	28

II YEAR II Semester

Code	Subject	T	P	C
	Pulse and Digital Circuits	4+1*	-	4
	Control Systems	4+1*	-	4
	Object Oriented Programming	4+1*	-	4
	Switching Theory and Logic Design	4+1*	-	4
	EM Waves and Transmission Lines	4+1*	-	4
	Analog Communications	4+1*	-	4
	Analog Communications Lab.	-	3	2
	Pulse and Digital Circuits Lab.	-	3	2
		30	6	28

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

III Year   **I Semester**

COURSE STRUCTURE

Code	Subject	T	P	C
	Managerial Economics and Financial Analysis	4+1*	-	4
	Computer Organization	4+1*	-	4
	Linear IC Applications	4+1*	-	4
	Digital IC Applications	4+1*	-	4
	Antennas and Wave Propagation	4+1*	-	4
	Digital Communications	4+1*	-	4
	Digital Communications Lab.	-	3	2
	IC Applications and ECAD Lab.	-	3	2
		30	6	28

III YEAR   **II Semester**

Code	Subject	T	P	C
	Management Science	4+1*	-	4
	Telecommunication Switching Systems	4+1*	-	4
	Digital Signal Processing	4+1*	-	4
	VLSI Design	4+1*	-	4
	Microwave Engineering	4+1*	-	4
	Microprocessors and Interfacing	4+1*	-	4
	Electronic Computer Aided Design Lab.	-	3	2
	Advanced English Communication Skills Lab	-	3	2
		30	6	28

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B.TECH. ELECTRONICS AND COMMUNICATION ENGINEERING

IV Year			I Semester

COURSE STRUCTURE

Code	Subject	T	P	C
	Computer Networks	4+1*	-	4
	Electronic Measurements & Instrumentation	4+1*	-	4
	Cellular and Mobile Communications	4+1*	-	4
	Radar Systems	4+1*	-	4
	Elective-I	4+1*	-	4
	Micro Controllers and Applications			
	Television Engineering			
	Operating Systems			
	Elective-II	4+1*	-	4
	Digital Image Processing			
	Satellite Communications			
	Data Base Management Systems			
	Microwave and Optical Communications Lab.	-	3	2
	Digital Signal Processing Lab	-	3	2
		30	6	28

IV Year			II Semester

COURSE STRUCTURE

Code	Subject	T	P	C
	Optical Communications	4+1*	-	4
	Elective-III	4+1*	-	4
	Embedded and Real Time Systems			
	Bio-Medical Instrumentation			
	Digital Design Through Verilog			
	Elective-IV	4+1*	-	4
	Wireless Communications and Networks			
	DSP Processors and Architectures			
	Artificial Neural Networks			
	Industry Oriented Mini Project	-	-	2
	Seminar	-	-	2
	Project Work			10
	Comprehensive Viva	-	-	2
		15	-	28

Note :   All End Examinations (Theory and Practical) are of three hours duration.
* - Tutorial   T – Theory   P – Practical   C – Credits   D - Drawing

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I Year B.Tech. ECE	T	P	C
	2+1*	0	4

ENGLISH

1. INTRODUCTION :

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competence of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure by the students. Hence, it is suggested that they read it on their own with topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section , as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.*.. However, the stress in this syllabus is on skill development and practice of language skills.*

2. OBJECTIVES:

a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
b. To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.
c. To develop the study skills and communication skills in formal and informal situations.

3. SYLLABUS :

Listening Skills:

Objectives

1.   To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2.   To equip students with necessary training in listening so that can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

 • Listening for general content
 • Listening to fill up information
 • Intensive listening
 • Listening for specific information

Speaking Skills :

Objectives

1.   To make students aware of the role of speaking in English and its contribution to their success.
2.   To enable students to express themselves fluently and appropriately in social and professional contexts.

 • Oral practice
 • Describing objects/situations/people
 • Role play – Individual/Group activities (Using exercises from all the nine units of the prescribed text: *Learning English : A Communicative Approach*.)
 • Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1.   To develop an awareness in the students about the significance of silent reading and comprehension.
2.   To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.

• Skimming the text
• Understanding the gist of an argument
• Identifying the topic sentence
• Inferring lexical and contextual meaning
• Understanding discourse features
• Recognizing coherence/sequencing of sentences

NOTE : *The students will be trained in reading skills using the prescribed text for detailed study. They will be examined in reading and answering questions using 'unseen' passages which may be taken from the non-detailed text or other authentic texts, such as magazines/newspaper articles.*

Writing Skills :
Objectives
1.   To develop an awareness in the students about writing as an exact and formal skill
2.   To equip them with the components of different forms of writing, beginning with the lower order ones.

• Writing sentences
• Use of appropriate vocabulary
• Paragraph writing
• Coherence and cohesiveness
• Narration / description
• Note Making
• Formal and informal letter writing
• Editing a passage

4. TEXTBOOKS PRESCRIBED:
In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into **Eight Units**, are prescribed:

For Detailed study
1.   **LEARNING ENGLISH:** *A Communicative Approach*, Hyderabad: Orient Longman, 2006. (Six Selected Lessons)
For Non-detailed study
2.   **WINGS OF FIRE:** *An Autobiography – APJ Abdul Kalam*, Abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004.

A. STUDY MATERIAL:
Unit –I
1.   Astronomy from LEARNING ENGLISH: *A Communicative Approach,* Orient Longman, 2005.
2.   Chapters 1-4 **from** Wings of Fire**:** An Autobiography **– APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd.,2004**

Unit –II
3.   Information Technology   **from** LEARNING ENGLISH: *A Communicative Approach,* **Orient Longman, 2005.**
4.   Chapters 5-8 **from** Wings of Fire**:** An Autobiography **– APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd.,2004**

Unit –III
5.   Humour **from** LEARNING ENGLISH: *A Communicative Approach,* **Orient Longman, 2005.**
6.   Chapters 9-12 **from** Wings of Fire**:** An Autobiography **– APJ Abdul Kalam, an abridged version with Exercises., Universities Press (India) Pvt. Ltd.,2004**

Unit –IV
7.   Environment **from** LEARNING ENGLISH: *A Communicative Approach,* **Orient Longman, 2005.**
8.   Chapters 13-16 **from** Wings of Fire**:** An Autobiography **– APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd.,2004**

Unit –V
9.   Inspiration **from** LEARNING ENGLISH: *A Communicative Approach,* **Orient Longman, 2005.**
10. Chapters 17-20 **from** Wings of Fire**:** An Autobiography **– APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd.,2004.**

Unit – VI
11. Human Interest **from** LEARNING ENGLISH: *A Communicative Approach,* **Orient Longman, 2005.**

12. Chapters 21-24 **from** Wings of Fire**:** An Autobiography **– APJ Abdul Kalam, an abridged version with Exercises, Universities Press (India) Pvt. Ltd., 2004.**

* Exercises from the lessons not prescribed shall also be used for classroom tasks.

Unit – VII
   Exercises on
   Reading and Writing Skills
   Reading Comprehension
   Situational dialogues
   Letter writing
   Essay writing
Unit – VIII
   Practice Exercises on Remedial Grammar covering
   Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions, Tense and aspect
   Vocabulary development covering
   Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

REFERENCES :
1. **Strengthen Your English,** Bhaskaran & Horsburgh, Oxford University Press
2. **Basic Communication Skills for Technology**, Andrea J Rutherfoord, Pearson Education Asia.
3. **Murphy's English Grammar with CD,** Murphy, Cambridge University Press
4. **English Skills for Technical Students** by Orient Longman
5. **Everyday Dialogues in English** by Robert J. Dixson, Prentice-Hall of India Ltd., 2006.
6. **English For Technical Communication**, Vol. 1 & 2, by K. R. Lakshmi Narayanan, Sci tech. Publications.
7. **A Hand book of English for Engineers & Technologists** by Dr. P. Eliah,   B. S. Publications.
8. **Developing Communication Skills** by Krishna Mohan & Meera Benerji (Macmillan)
9. **Speaking and Writing for Effective Business Communication,** Francis Soundararaj, MacMillan India Ltd., 2007.
10. **The Oxford Guide to Writing and Speaking,** John Seely, Oxford

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I Year B.Tech. ECE	T	P	C
	3+1*	0	6

MATHEMATICS – I

UNIT – I

Differential equations of first order and first degree – exact, linear and Bernoulli. Applications to Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

UNIT – II

Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^{ax}, Sin ax, cos ax, polynomials in x, e^{ax} V(x), xV(x), method of variation of parameters.

UNIT – III

Rolle's Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – Generalized Mean Value theorem (all theorems without proof) Functions of several variables – Functional dependence-Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints

UNIT – IV

Radius, Centre and Circle of Curvature – Evolutes and Envelopes Curve tracing – Cartesian , polar and Parametric curves.

UNIT – V

Applications of integration to lengths, volumes and surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals – change of variables – change of order of integration.

UNIT – VI

Sequences – series – Convergences and divergence – Ratio test – Comparison test – Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence

UNIT – VII

Vector Calculus: Gradient- Divergence- Curl and their related properties of sums- products- Laplacian and second order operators. Vector Integration - Line integral – work done – Potential function – area- surface and volume integrals Vector integral theorems: Green's theorem-Stoke's and Gauss's Divergence Theorem (With out proof). Verification of Green's - Stoke's and Gauss's Theorems.

UNIT – VIII

Laplace transform of standard functions – Inverse transform – first shifting Theorem, Transforms of derivatives and integrals – Unit step function – second shifting theorem – Dirac's delta function – Convolution theorem – Periodic function - Differentiation and integration of transforms-Application of Laplace transforms to ordinary differential equations Partial fractions-Heaviside's Partial fraction expansion theorem.

Text Books:
1. A text Book of Engineering Mathematics, Vol-1 T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A text Book of Engineering Mathematics, C. Sankaraiah, V. G. S. Book Links.
3. A text Book of Engineering Mathematics, Shahnaz Bathul, Right Publishers.
4. A text Book of Engineering Mathematics, P. Nageshwara Rao, Y. Narasimhulu & N. Prabhakar Rao, Deepthi Publications.

References:
1. A text Book of Engineering Mathematics, B. V. Raman, Tata Mc Graw Hill.
2. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.
3. A text Book of Engineering Mathematics, Thamson Book Collection.

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MATHEMATICAL METHODS

UNIT – I

Matrices and Linear systems of equations: Elementary row transformations-Rank-Echelon form, Normal form – Solution of Linear Systems – Direct Methods- LU Decomposition- LU Decomposition from Gauss Elimination –Solution of Tridiagonal Systems-Solution of Linear Systems

UNIT – II

Eigen values, eigen vectors – properties – Cayley-Hamilton Theorem - Inverse and powers of a matrix by Cayley-Hamilton theorem – Diagonolization of matrix. Calculation of powers of matrix – Modal and spectral matrices.

UNIT – III

Real matrices – Symmetric, skew - symmetric, orthogonal, Linear Transformation – Orthogonal Transformation. Complex matrices: Hermitian, Skew-Hermitian and Unitary – Eigen values and eigen vectors of complex matrices and their properties. Quadratic forms- Reduction of quadratic form to canonical form – Rank - Positive, negative definite - semi definite - index - signature - Sylvester law.

UNIT – IV

. Solution of Algebraic and Transcendental Equations: Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method.

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations and separation of symbols-Differences of a polynomial-Newton's formulae for interpolation – Central difference interpolation Formulae – Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

UNIT – V

Curve fitting: Fitting a straight line –Second degree curve-exponentional curve-power curve by method of least squares. Numerical Differentiation and Integration– Trapezoidal rule – Simpson's 1/3 Rule –Simpson's 3/8 Rule.

UNIT – VI

Numerical solution of Ordinary Differential equations: Solution by Taylor's series-Picard's Method of successive Approximations-Euler's Method-Runge-Kutta Methods –Predictor-Corrector Methods- Adams-Moulton Method –Milne's Method.

UNIT – VII

Fourier Series: Determination of Fourier coefficients – Fourier series – even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions. Fourier integral theorem (only statement)– Fourier sine and cosine integrals. Fourier transform – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – VIII

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations. Method of separation of variables. z-transform – inverse z-transform - properties – Damping rule – Shifting rule – Initial and final value theorems. Convolution theorem – Solution of difference equation by z-transforms.

Text Books:
1. Mathematical Methods, T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. Mathematical Methods, C. Sankaraiah, V. G. S. Book Links.
3. A text book of Mathematical Methods, V. Ravindranath, A. Vijayalaxmi, Himalaya Publishers.
4. A text book of Mathematical Methods, Shahnaz Bathul, Right Publisshers.

References:
1. A text Book of Engineering Mathematics, B. V. Raman, Tata Mc Graw Hill.
2. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.

3. Numerical Methods for Scientific and Engineering Computation, M. K. Jain, S. R. K. Iyengar & R. K. Jain, New Age International Publishers.
4. Elementary Numerical Analysis, Aitkinson & Han, Wiely India, 3rd Edition, 2006

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I Year B.Tech. ECE

	T	P	C
	2+1*	0	4

APPLIED PHYSICS

UNIT I

BONDING IN SOLIDS : Introduction - Types of bonding in solids - Estimation of cohesive energy – Madelung constant.

CRYSTAL STRUCTURES AND X-RAY DIFFRACTION: Introduction -Space lattice - Basis - Unit cell - Lattice parameter - Bravais lattices – Crystal systems -   Structure and packing fractions of Simple cubic - Body centered cubic – Face centered cubic crystals - Directions and planes in crystals – Miller indices - Separation between successive [h k l] planes - Diffraction of X-rays by crystal planes - Bragg's law - Laue method - Powder method.

UNIT II

PRINCIPLES OF QUANTUM MECHANICS: Waves and particles - Planck's quantum theory – de Broglie hypothesis – Matter waves - Davisson and Germer experiment – G. P. Thomson experiment – Heisenberg uncertainty principle - Schrödinger's time independent wave equation - Physical significance of the wave function - Particle in one dimensional potential box.

UNIT III

ELECTRON THEORY OF METALS: Classical free electron theory - Mean free path - Relaxation time and drift velocity - Quantum free electron theory - Fermi-Dirac distribution (analytical) and its dependence on temparature – Fermi energy – Electron scattering and resistance.

BAND THEORY OF SOLIDS: Bloch theorem - Kronig-Penney model (qualitative treatment) - Origin of energy band formation in solids – Classification of materials into conductors, semi conductors & insulators - Concept of effective mass of an electron.

UNIT IV
DIELECTRIC PROPERTIES: Introduction - Dielectric constant - Electronic, ionic and orientational polarizations - Internal fields in solids – Clausius - Mossotti equation – Dielectrics in alternating fields – Frequency dependence of the polarizability - Ferro and Piezo electricity.

MAGNETIC PROPERTIES : Permeability - Magnetization - Origin of magnetic moment – Classification of magnetic materials - Dia, para and ferro magnetism - Hysteresis curve - Soft and hard magnetic materials.
UNIT V

SEMICONDUCTORS : Introduction - Intrinsic semiconductor and carrier concentration – Equation for conductivity - Extrinsic semiconductor and carrier concentration - Drift and diffusion - Einstein's equation - Hall effect – Direct & indirect band gap semiconductors.

SUPERCONDUCTIVITY: General properties - Meissner effect - Penetration depth - Type I and Type II superconductors - Flux quantization – DC and AC Josephson effect –BCS Theory - Applications of superconductors.

UNIT VI

LASERS: Introduction - Characteristics of Lasers - Spontaneous and stimulated emission of radiation - Einstein's coefficients - Population inversion - Ruby laser - Helium-Neon Laser – CO_2 laser -Semiconductor Laser – Applications of lasers.

UNIT VII
FIBER OPTICS AND HOLOGRAPHY: Introduction - Principle of optical fiber - Acceptance angle and acceptance cone - Numerical aperture – Types of optical fibers and refractive index profiles – Attenuation in optical fibers - Application of optical fibers – Basic principles of holography – Construction and reconstruction of image on hologram – Applications of holography.

UNIT VIII
SCIENCE & TECHNOLOGY OF NANOMATERIALS: Introduction to Nano materials - Basic principles of Nanoscience & Technology – Fabrication of nano materials – Physical & chemical properties of nanomaterials – Carbon nanotubes – Applications of nanotechnology.

TEXTBOOKS:
1. Applied Physics 2nd edition by Dr. P. Appala Naidu & Dr. M. Chandra Shekar, V.G.S. Book links.
2. Introduction to Solid State Physics by C. Kittel ; Wiley Eastern Ltd.
3. Nanotechnology by Mark Ratner and Daniel Ratner; Pearson Education.

REFERENCES:
1. Materials Science and Engineering by V. Raghavan; Prentice-Hall India.
2. Materials Science by M. Arumugam; Anuradha Agencies.
3. Solid State Physics by N.W. Ashcroft & N. David Merwin; Thomson Learning.
4. Materials Science by M.S.Vijaya & G. Rangarajan; Tata McGraw Hill.
5. Solid State Physics by P.K. Palanisamy; Scitech Publications (India) Pvt. Ltd.
6. Nano Materials by A.K. Bandyopadhyay, New Age International Publishers.
7. Applied Physics by P.K.Mittal; I.K. International.
8. Applied Physics by K. Vijay Kumar & T. Sreekanth; S. Chand & Company Ltd.

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I Year B.Tech. ECE

	T	P	C
	3+1*	0	6

C PROGRAMMING AND DATA STRUCTURES

UNIT - I

Algorithm / pseudo code, flowchart, program development steps, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation.

Input-output statements, statements and blocks, if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels, programming examples.

UNIT - II

Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example c programs.

UNIT - III

Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional and multi-dimensional arrays, applications of arrays. pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, c program examples.

UNIT - IV

Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bitfields, C program examples.

UNIT - V

Input and output – concept of a file, text files and binary files, streams, standard I/o, Formatted I/o, file I/o operations, error handling, C program examples.

UNIT - VI

Searching – Linear and binary search methods, sorting – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

UNIT – VII

Introduction to data structures, singly linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation.

UNIT - VIII

Trees- Binary tress, terminology, representation, traversals, graphs- terminology, representation, graph traversals (dfs & bfs)

TEXT BOOKS :
1. Computer science, A structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.
2. DataStructures Using C – A.S.Tanenbaum, Y. Langsam, and M.J. Augenstein, PHI/Pearson education.

REFERENCES :
1. C& Data structures – P. Padmanabham, B.S. Publications.
2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
3. C Programming with problem solving, J.A. Jones & K. Harrow, dreamtech Press
4. Programming in C – Stephen G. Kochan, III Edition, Pearson Eductaion.

5. Data Structures and Program Design in C, R.Kruse, C.L. Tondo, BP Leung, Shashi M, Second Edition, Pearson Education.

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I Year B.Tech. ECE	**T**	**P**	**C**
	2+1*	**0**	**4**

NETWORK ANALYSIS

UNIT – I Introduction to Electrical Circuits

Circuit Concept – R-L-C parameters – Voltage and Current sources – Independent and dependent sources- Source transformation – Voltage – Current relationship for passive elements – Kirchoff's laws – network reduction techniques – series, parallel, series parallel, star-to-delta or delta-to-star transformation.

UNIT – II   A.C Circuits - I

R.M.S and Average values and form factor for different periodic wave forms, Steady state analysis of R, L and C (in series, parallel and series parallel combinations) with sinusoidal excitation – Concept of self and mutual inductances – co-efficient of coupling series circuit analysis with mutual inductance.

UNIT – III   A.C Circuits - II

Resonance – series, parallel circuits, concept of band width and Q factor.
Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Calculations of active and reactive power.

UNIT – IV   Network topology

Definitions – Graph – Tree, Basic cutset and Basic Tieset matrices for planar networks – Loop and Nodal methods of analysis of Networks with independent and dependent voltage and current sources - Duality & Dual networks.

UNIT – V   Network Theorems

Tellegens, Superposition, Reciprocity, Thevinin's, Norton's, Max Power Transfer
theorem. Milliman's Theorem – Statement and proofs problem solving using dependent and independent sources for d.c and a.c excitation.

UNIT – VI   Two-port networks

Z,Y, ABCD, h-parameters – Conversion of one parameter to another parameter – condition for reciprocity and symmetry – 2 port network connections in series, parallel and cascaded – problem solving.

UNIT – VII   Transient Analysis

Transient response of R-L, R-C, R-L-C circuits (Series combinations only) for d.c. and sinusoidal excitations – Initial conditions - Solution using differential equation approach and Laplace transform methods of solutions.

UNIT – VIII   Filters

L.P, H.P, B.P, B.E, Prototype filters design – M-derived filters of L.P. and H.P.- Composite filter design of L.P. and H.P design of various symmetrical attenuators.

TEXT BOOKS :

1. Network Analysis – ME Van Valkenburg, Prentice Hall of India, 3rd Edition, 2000.
2. Networks, Lines and Fields - JD Ryder, PHI, 2nd Edition, 1999.

REFERENCES :

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, McGraw Hill, 5th Edition, 1993.
2. Network Analysis – N.C.Jagan and C.Lakshminarayana, B.S. Publications, 2006.
3. Electric Circuits – J.Edminister and M.Nahvi – Schaum's Outlines, TMH, 1999.
4. Electrical circuits by A.Chakarborthy, Dhanpath Rai & Co.,

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	3+1*	0	6

ELECTRONIC DEVICES AND CIRCUITS

UNIT-I
ELECTRON DYNAMICS AND CRO: Motion of charged particles in electric and magnetic fields. Simple problems involving electric and magnetic fields only. Electrostatic and magnetic focusing. Principles of CRT, deflection sensitivity (Electrostatic and magnetic deflection), Parallel Electric and Magnetic fields, Perpendicular Electric and Magnetic fields.

UNIT- II
JUNCTION DIODE CHARACTERISTICS : Review of semi conductor Physics – n and p –type semi conductors, Mass Action Law, Continuity Equation, Hall Effect, Fermi level in intrinsic and extrinsic semiconductors, Open-circuited p-n junction, The p-n junction Energy band diagram of PN diode, PN diode as as a rectifier (forward bias and reverse bias), The current components in p-n diode, Law of junction, Diode equation, Volt-ampere characteristics of p-n diode, Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Step graded junction, Breakdown Mechanisms in Semi Conductor (Avalanche and Zener breakdown) Diodes, Zener diode characteristics, Characteristics of Tunnel Diode with the help of energy band diagrams, Varactar Diode, LED, LCD. And photo diode

UNIT- III
RECTIFIERS, FILTERS AND REGULATORS : Half wave rectifier, ripple factor, full wave rectifier, Harmonic components in a rectifier circuit, Inductor filter, Capacitor filter, L- section filter, Π- section filter, Multiple L-section and Multiple Πsection filter, and comparison of various filter circuits in terms of ripple factors, Simple circuit of a regulator using zener diode, Series and Shunt voltage regulators

UNIT- IV
TRANSISTOR and FET CHARACTERISTICS : Junction transistor, Transistor current components, Transistor as an amplifier, Transistor construction, Detailed study of currents in a transistor, Transistor alpha, Input and Output characteristics of transistor in Common Base, Common Emitter, and Common collector configurations, Relation between Alpha and Beta, typical transistor junction voltage values, JFET characteristics (Qualitative and Quantitative discussion), Small signal model of JFET, MOSFET characterisitics (Enhancement and depletion mode), Symbols of MOSFET, Comparison of Transistors, Introduction to SCR and UJT.

UNIT-V
BIASING AND STABILISATION : BJT biasing, DC equivalent model, criteria for fixing operating point, Fixed bias, Collector to base bias, Self bias techniques for stabilization, Stabilization factors, (S, S$^{'}$, S$^{''}$), Compensation techniques, (Compensation against variation in V_{BE}, I_{co},) Thermal run away, Thermal stability,

UNIT- VI
AMPLIFIERS : Small signal low frequency transistor amplifier circuits: h-parameter representation of a transistor, Analysis of single stage transistor amplifier using h-parameters: voltage gain, current gain, Input impedance and Output impedance. Comparison of transistor configurations in terms of A_I , R_i , A_v , R_o,

UNIT- VII
FEEDBACK AMPLIFIERS : Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on input and output characteristics, Voltage series, voltage shunt, current series, and current shunt feedback amplifiers with discrete components and their analysis

UNIT-VIII
OSCILLATORS : Condition for oscillations. RC-phase shift oscillators with Transistor and FET, Hartley and Colpitts oscillators, Wein bridge oscillator, Crystal oscillators, Frequency and amplitude stability of oscillators,

TEXT BOOKS :

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1. Electronic Devices and Circuits – J.Millman, C.C.Halkias, and Satyabratha Jit Tata McGraw Hill, 2nd Ed., 2007.
2. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition,2006.

REFERENCES :

1. Electronic Devices and Circuits – T.F. Bogart Jr., J.S.Beasley and G.Rico, Pearson Education, 6th edition, 2004.
2. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
3. Microelectronics – Millman and Grabel, Tata McGraw Hill, 1988.
4. Electronic Devices and Circuits – Dr. K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.
5. Electronic Devices and Circuits- Prof GS N Raju I K International Publishing House Pvt .Ltd 2006

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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	0	3	4

ENGINEERING DRAWING

UNIT – I

Introduction to engineering graphics – construction of ellipse, parabola and hyperbola – cylindrical curves.

UNIT – II

Orthographic projections of points, lines and planes – axis inclined to one planes and inclined to both the planes.

UNIT – III
Orthographic projections of solids :
Cylinder, cone, prism, pyramid and sphere positions and axis inclined to both the planes.

UNIT – IV

Isomeric projections of lines, planes and simple solids

UNIT – V

Conversion of orthographic views into isometric views and vice-versa.

TEXT BOOKS :
1. Engineering drawings By N.D.Bhatt
2. Engineering graphics By K.L. Narayana & P.Kannayya

REFERENCES:-
1. Engineering drawing and graphics: Venugopal/ New age
2. Engineering drawing : Johle / TMH

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COMPUTER PROGRAMMING LAB

Objectives:
- To make the student learn a programming language.
- To teach the student to write programs in C solve the problems
- To Introduce the student to simple linear and non linear data structures such as lists, stacks, queues, trees and graphs.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week l.
a) Write a C program to find the sum of individual digits of a positive integer.
b) A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2.
a) Write a C program to calculate the following Sum:
    $Sum = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$
b) Write a C program toe find the roots of a quadratic equation.

Week 3
a) Write C programs that use both recursive and non-recursive functions
    i) To find the factorial of a given integer.
    ii) To find the GCD (greatest common divisor) of two given integers.
    iii) To solve Towers of Hanoi problem.

Week 4
a) The total distance travelled by vehicle in 't' seconds is given by distance $= ut + 1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec^2). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
b) Write a C program, which takes two integer operands and one operator form the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, % and use Switch Statement)

Week 5
a) Write a C program to find both the larges and smallest number in a list of integers.
b) Write a C program that uses functions to perform the following:
    i) Addition of Two Matrices
    ii) Multiplication of Two Matrices

Week 6
a) Write a C program that uses functions to perform the following operations:
    i) To insert a sub-string in to given main string from a given position.
    ii) To delete n Characters from a given position in a given string.
b) Write a C program to determine if the given string is a palindrome or not

Week 7
a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
b) Write a C program to count the lines, words and characters in a given text.

Week 8
a) Write a C program to generate Pascal's triangle.
b) Write a C program to construct a pyramid of numbers.

Week 9
Write a C program to read in two numbers, x and n, and then compute the sum of this geometric
progression:
$1+x+x^2+x^3+\ldots\ldots\ldots+x^n$
For example: if n is 3 and x is 5, then the program computes 1+5+25+125.
Print x, n, the sum
Perform error checking. For example, the formula does not make sense for negative exponents – if n is less
than 0. Have your program print an error message if n<0, then go back and read in the next pair of numbers
of without computing the sum. Are any values of x also illegal ? If so, test for them too.

Week 10
a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits
after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's
complement of a binary number.
b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11
Write a C program that uses functions to perform the following operations:
        i) Reading a complex number
        ii) Writing a complex number
        iii) Addition of two complex numbers
        iv) Multiplication of two complex numbers
(Note: represent complex number using a structure.)

Week 12
a) Write a C program which copies one file to another.
b) Write a C program to reverse the first n characters in a file.
(Note: The file name and n are specified on the command line.)

Week 13
Write a C program that uses functions to perform the following operations on singly linked list.:
        i) Creation ii) Insertion   iii) Deletion   iv) Traversal

Week 14
Write a C program that uses functions to perform the following operations on doubly linked list.:
        i) Creation ii) Insertion   iii) Deletion   iv) Traversal in both ways

Week 15
Write C programs that implement stack (its operations) using
        i) Arrays   ii) Pointers

Week 16
Write C programs that implement Queue (its operations) using
        i) Arrays   ii) Pointers

Week 17
Write a C program that uses Stack operations to perform the following:
        i) Converting infix expression into postfix expression
        ii) Evaluating the postfix expression

Week 18
Write a C program that uses functions to perform the following:
        i) Creating a Binary Tree of integers
        ii) Traversing the above binary tree in preorder, inorder and postorder.

Week 19
Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :
        i) Linear search   ii) Binary search

Week 20
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
        i) Bubble sort   ii) Quick sort

Week 21
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
        i) Insertion sort ii) Merge sort

Week 22
Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Week 23
Write C programs to implement the linear regression and polynomial regression algorithms.

Week 24
Write C programs to implement Trapezoidal and Simpson methods.

Text Books
1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications
2. Data Structures: A pseudo code approach with C, second edition R.F. Gilberg and B.A. Forouzan
3. Programming in C, P.Dey & M. Ghosh, Oxford Univ.Press.
4. C and Data Structures, E Balaguruswamy, TMH publications.

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IT WORKSHOP

Objectives :
The IT Workshop for engineers is a 6 training lab course spread over 90 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel, Power Point and Publisher.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows , Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered.

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets, power point presentations and personal web sites using the Microsoft suite of office tools and LaTeX.

PC Hardware

Week 1 – Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 5 – Task 5 : Several mini tasks would be that covers Basic commands in Linux and Basic system administration in Linux which includes: Basic Linux commands in bash, Create hard and symbolic links, Text processing, Using wildcards

Week 6 – Task 6 : Hardware Troubleshooting : Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 7 – Task 7 : Software Troubleshooting : Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Week 8 – Task 8 : The test consists of various systems with Hardware / Software related troubles, Formatted disks without operating systems.

Internet & World Wide Web

Week 9 - Task 1 : **Orientation & Connectivity Boot Camp :** Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 10 - Task 2 : Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 11 - Task 3 : **Search Engines & Netiquette :** Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors.

Week 12 - Task 4 : Cyber Hygiene : Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install an anti virus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Week 13 Module Test A test which simulates all of the above tasks would be crafted and given to the students.

LaTeX and Word
Week 14 – Word Orientation : The mentor needs to give an overview of LaTeX and Microsoft/ equivalent (FOSS) tool word : Importance of LaTeX and MS/ equivalent (FOSS) tool Word as word Processors, Details of the four tasks and features that would be covered in each, Using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter in word.
Task 1 : Using LaTeX and word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Week 15 - Task 2 : Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes.

Week 16 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

Week 17 - Task 4 : Creating a Feedback form - Features to be covered- Forms, Text Fields, Inserting objects, Mail Merge in Word.

Week 18 - LaTeX and Word Module Test - Replicate the given document inclusive of all features

Excel
Week 19 - Excel Orientation : The mentor needs to tell the importance of MS/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered in each. Using Excel –
Accessing, overview of toolbars, saving excel files, Using help and resources
Task 1 : Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Week 20 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std.deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Week 21 - Task 3 : Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

Week 22 - Task 4 : Cricket Score Card - Features to be covered:-Pivot Tables, Interactive Buttons, Importing Data, Data Protection, Data Validation

Week 23 – Excel Module Test - Replicate the given document inclusive of all features

LaTeX and MS/equivalent (FOSS) tool Power Point
Week 24 - Task1 : Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows in both LaTeX and Powerpoint.

Week 25 - Task 2 : Second week helps students in making their presentations interactive.Topic covered during this week includes : Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 26 - Task 3 : Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes :- Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

Week 27 - Task 4 : Entire week concentrates on presentation part of LaTeX and power point. Topic covered during this week includes -Using Auto content wizard, Slide Transition, Custom Animation, Auto Rehearsing

Week 28 - Task 5 : Power point test would be conducted. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Publisher

Week 29 : Help students in preparing their personal website using Microsoft/ equivalent (FOSS) tool publisher. Topic covered during this week includes - Publisher Orientation, Using Templates, Layouts, Inserting text objects, Editing text objects, Inserting Tables, Working with menu objects, Inserting pages, Hyper linking, Renaming, deleting, modifying pages, Hosting website.

REFERENCES :

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
2. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech
3. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)
5. LaTeX Companion – Leslie Lamport, PHI/Pearson.
6. All LaTeX and others related material is available at
(a) www.sssolutions.in and
(b) www.sontisoftsolutions.org

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ELECTRONIC DEVICES AND CIRCUITS LAB

PART A : (Only for viva voce Examination)

ELECTRONIC WORKSHOP PRACTICE (in 6 lab sessions) :

1. Identification, Specifications, Testing of R, L, C Components (Colour Codes), Potentiometers, Switches (SPDT, DPDT, and DIP), Coils, Gang Condensers, Relays, Bread Boards.
2. Identification, Specifications and Testing of Active Devices, Diodes, BJTs, Lowpower JFETs, MOSFETs, Power Transistors, LEDs, LCDs, Optoelectronic Devices, SCR, UJT, DIACs, TRIACs, Linear and Digital ICs.
3. Soldering practice – Simple Circuits using active and passive components.
4. Single layer and Multi layer PCBs (Identification and Utility).
5. Study and operation of
   • Multimeters (Analog and Digital)
   • Function Generator
   • Regulated Power Supplies
      1. Study and Operation of CRO.

PART B : (For Laboratory examination – Minimum of 16 experiments)

1. PN Junction diode characteristics   A. Forward bias B. Reverse bias.
2. Zener diode characteristics
3. Transistor CB characteristics (Input and Output)
4. Transistor CE characteristics (Input and Output)
5. Rectifier without filters (Full wave & Half wave)
6. Rectifier with filters (Full wave & Half wave)
7. FET characteristics
8. Measurement of h parameters of transistor in CB, CE, CC configurations
9. CE Amplifier
10. CC Amplifier (Emitter Follower).
11. Single stage R-C coupled Amplifier.
12. FET amplifier (Common Source)
13. Wien Bridge Oscillator
14. RC Phase Shift Oscillator
15. Feed back amplifier (Current Series).
16. Feed back amplifier (Voltage Series).
17. Hartley Oscillator.
18. Colpitts Oscillator.
19. SCR characteristics.

PART C:

Equipment required for Laboratories:

1. Regulated Power supplies (RPS)   -   0-30v
2. CROs   -   0-20M Hz.
3. Function Generators   -   0-1 M Hz.
4. Multimeters
5. Decade Resitance Boxes/Rheostats
6. Decade Capacitance Boxes
7. Micro Ammeters (Analog or Digital) -   0-20 µA, 0-50µA, 0-100µA, 0-200µA
8. Voltmeters (Analog or Digital)   -   0-50V, 0-100V, 0-250V
9. Electronic Components   -   Resistors, Capacitors, BJTs, LCDs, SCRs, UJTs, FETs, LEDs, MOSFETs,diodes(ge&sitype),transistors(npn & pnp type)

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ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives:
1. **To expose the students to a variety of self-instructional, learner-friendly modes of language learning.**
2. **To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such GRE, TOEFL, GMAT etc.**
3. **To enable them to learn better pronunciation through stress on word accent, intonation, and rhythm.**
4. **To train them to use language effectively to face interviews, group discussions, public speaking.**
5. **To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.**

SYLLABUS :

The following course content is prescribed for the **English Language Laboratory** sessions:
1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
4. Oral Presentations- Prepared and Extempore.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
9. Telephoning Skills.
10. Giving Directions.

Minimum Requirement:

The English Language Lab shall have two parts:
   i)   **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
   ii)   **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:
   i)   P – IV Processor
      a)   Speed – 2.8 GHZ
      b)   RAM – 512 MB Minimum
      c)   Hard Disk – 80 GB
   ii)   Headphones of High quality

Suggested Software:
• Cambridge Advanced Learners' English Dictionary with CD.
• The Rosetta Stone English Library
• Clarity Pronunciation Power – Part I
• Mastering English in Vocabulary, Grammar, Spellings, Composition
• Dorling Kindersley series of Grammar, Punctuation, Composition etc.
• Language in Use, Foundation Books Pvt Ltd with CD.
• Oxford Advanced Learner's Compass, 7th Edition
• Learning to Speak English - 4 CDs
• Microsoft Encarta with CD
• Murphy's English Grammar, Cambridge with CD
▪ English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):
   1. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
   2. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.

3. **Spoken English**- R. K. Bansal and J. B. Harrison, Orient Longman 2006 Edn.
4. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
5. **Speaking English Effectively** by Krishna Mohan & NP Singh (Macmillan)
6. **A Practical Course in English Pronunciation**, (with two Audio cassettes) by J. Sethi, Kamlesh Sadanand & D.V. Jindal, Prentice-Hall of India Pvt. Ltd., New Delhi.
7. **A text book of English Phonetics for Indian Students** by T.Balasubramanian (Macmillan)
8. **English Skills for Technical Students,** WBSCTE with British Council, OL

DISTRIBUTION AND WEIGHTAGE OF MARKS
English Language Laboratory Practical Paper:
1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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MATHEMATICS – III

UNIT – I
Special functions: Gamma and Beta Functions – Their properties – evaluation of improper integrals. Bessel functions – properties – Recurrence relations – Orthogonality. Legendre polynomials – Properties – Rodrigue's formula – Recurrence relations – Orthogonality.

UNIT-II
Functions of a complex variable – Continuity – Differentiability – Analyticity – Properties – Cauchy-Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions – Milne – Thompson method.

UNIT-III

Elementary functions: Exponential, trigonometric, hyperbolic functions and their properties – General power Z^C (c is complex), principal value.

UNIT-IV
Complex integration: Line integral – evaluation along a path and by indefinite integration – Cauchy's integral theorem – Cauchy's integral formula – Generalized integral formula.

UNIT-V
Complex power series: Radius of convergence – Expansion in Taylor's series, Maclaurin's series and Laurent series. Singular point –Isolated singular point – pole of order m – essential singularity.

UNIT-VI

Residue – Evaluation of residue by formula and by Laurent series - Residue theorem.
Evaluation of integrals of the type

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_{c}^{c+2\pi} f(\cos\theta, \sin\theta)d\theta$

(c) $\int_{-\infty}^{\infty} e^{imx} f(x)dx$ (d) Integrals by identation.

UNIT-VII

Argument principle – Rouche's theorem – determination of number of zeros of complex polynomials - Maximum Modulus principle - Fundamental theorem of Algebra, Liouville's Theorem.

UNIT-VIII
Conformal mapping: Transformation by e^z, lnz, z^2, z^n (n positive integer), Sin z, cos z,   z + a/z. Translation, rotation, inversion and bilinear transformation – fixed point – cross ratio – properties – invariance of circles and cross ratio – determination of bilinear transformation mapping 3 given points .

Text Books:

1. A text Book of Engineering Mathematics, Vol-III T. K. V. Iyengar, B. Krishna Gandhi and Others, S. Chand & Company.
2. A text Book of Engineering Mathematics, C. Sankaraiah, V. G. S. Book Links.
3. A text Book of Engineering Mathematics, Shahnaz Bathul, Prentice Hall of India.
4. A text Book of Engineering Mathematics, P. Nageshwara Rao, Y. Narasimhulu & N. Prabhakar Rao, Deepthi Publications.

References:

1. A text Book of Engineering Mathematics, B. V. Raman, Tata Mc Graw Hill.
2. Advanced Engineering Mathematics, Irvin Kreyszig, Wiley India Pvt. Ltd.

3. A text Book of Engineering Mathematics, Thamson Book Collection.

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PROBABILITY THEORY AND STOCHASTIC PROCESSES

UNIT I
PROBABILITY : Probability introduced through Sets and Relative Frequency: Experiments and Sample Spaces, Discrete and Continuous Sample Spaces, Events, Probability Definitions and Axioms, Mathematical Model of Experiments, Probability as a Relative Frequency, Joint Probability, Conditional Probability, Total Probability, Bayes' Theorem, Independent Events:

UNIT II
THE RANDOM VARIABLE : Definition of a Random Variable, Conditions for a Function to be a Random Variable, Discrete and Continuous, Mixed Random Variable, Distribution and Density functions, Properties, Binomial, Poisson, Uniform, Gaussian, Exponential, Rayleigh, Conditional Distribution, Methods of defining Conditioning Event, Conditional Density, Properties.

UNIT III
OPERATION ON ONE RANDOM VARIABLE – EXPECTATIONS : Introduction, Expected Value of a Random Variable, Function of a Random Variable, Moments about the Origin, Central Moments, Variance and Skew, Chebychev's Inequality, Characteristic Function, Moment Generating Function, Transformations of a Random Variable: Monotonic Transformations for a Continuous Random Variable, Nonmonotonic Transformations of Continuous Random Variable, Transformation of a Discrete Random Variable.

UNIT IV
MULTIPLE RANDOM VARIABLES : Vector Random Variables, Joint Distribution Function, Properties of Joint Distribution, Marginal Distribution Functions, Conditional Distribution and Density – Point Conditioning, Conditional Distribution and Density – Interval conditioning, Statistical Independence, Sum of Two Random Variables, Sum of Several Random Variables, Central Limit Theorem, (Proof not expected). Unequal Distribution, Equal Distributions.

UNIT V
OPERATIONS ON MULTIPLE RANDOM VARIABLES : Expected Value of a Function of Random Variables: Joint Moments about the Origin, Joint Central Moments, Joint Characteristic Functions, Jointly Gaussian Random Variables: Two Random Variables case, N Random Variable case, Properties, Transformations of Multiple Random Variables, Linear Transformations of Gaussian Random Variables.

UNIT VI
RANDOM PROCESSES – TEMPORAL CHARACTERISTICS : The Random Process Concept, Classification of Processes, Deterministic and Nondeterministic Processes, Distribution and Density Functions, concept of Stationarity and Statistical Independence. First-Order Stationary Processes, Second-Order and Wide-Sense Stationarity, (N-Order) and Strict-Sense Stationarity, Time Averages and Ergodicity, Mean-Ergodic Processes, Correlation-Ergodic Processes, Autocorrelation Function and Its Properties, Cross-Correlation Function and Its Properties, Covariance Functions, Gaussian Random Processes, Poisson Random Process.

UNIT VII
RANDOM PROCESSES – SPECTRAL CHARACTERISTICS : The Power Spectrum: Properties, Relationship between Power Spectrum and Autocorrelation Function, The Cross-Power Density Spectrum, Properties, Relationship between Cross-Power Spectrum and Cross-Correlation Function.

UNIT VIII
LINEAR SYSTEMS WITH RANDOM INPUTS : Random Signal Response of Linear Systems: System Response – Convolution, Mean and Mean-squared Value of System Response, autocorrelation Function of Response, Cross-Correlation Functions of Input and Output, Spectral Characteristics of System Response: Power Density Spectrum of Response, Cross-Power Density Spectrums of Input and Output, Band pass, Band-Limited and Narrowband Processes, Properties, Modeling of Noise Sources: Resistive (Thermal) Noise Source, Arbitrary Noise Sources, Effective Noise Temperature, Average Noise Figures, Average Noise Figure of cascaded networks.

TEXT BOOKS :

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

REFERENCES :

1. Communication Systems Analog & Digital – R.P. Singh and S.D. Sapre, TMH, 1995.
2. Probability and Random Processes with Application to Signal Processing – Henry Stark and John W. Woods, Pearson Education, 3rd Edition.
3. Probability Methods of Signal and System Analysis. George R. Cooper, Clave D. MC Gillem, Oxford, 3rd Edition, 1999.
4. Statistical Theory of Communication - S.P. Eugene Xavier, New Age Publications, 2003.
5. Signals, Systems & Communications - B.P. Lathi, B.S. Publications, 2003.

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ENVIRONMENTAL STUDIES

UNIT - I
Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

UNIT - II
Natural Resources : Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food res ources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. – Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III
Ecosystems : Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:
    a. Forest ecosystem
    b. Grassland ecosystem
    c. Desert ecosystem
    d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - IV
Biodiversity and its conservation : Introduction - Definition: genetic, species and ecosystem diversity. Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a megadiversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, manwildlife conflicts. - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Exsitu conservation of biodiversity.

UNIT - V
Environmental Pollution : Definition, Cause, effects and control measures of :
    a. Air pollution
    b. Water pollution
    c. Soil pollution
    d. Marine pollution
    e. Noise pollution
    f. Thermal pollution
    g. Nuclear hazards

Solid waste Management : Causes, effects and control measures of urban and industrial wastes. – Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - VI
Social Issues and the Environment : From Unsustainable to Sustainable development -Urban problems related to energy -Water conservation, rain water harvesting, watershed management -Resettlement and rehabilitation of people; its problems and concerns. Case Studies -Environmental ethics: Issues and possible solutions. -Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case Studies. -Wasteland reclamation. -Consumerism and waste products. –Environment Protection Act. -Air (Prevention and Control of Pollution) Act. -Water (Prevention and control of Pollution) Act

-Wildlife Protection Act -Forest Conservation Act -Issues involved in enforcement of environmental legislation. -Public awareness.

UNIT - VII
Human Population and the Environment : Population growth, variation among nations. Population explosion - Family Welfare Programme. -Environment and human health. -Human Rights. -Value Education. -HIV/AIDS. -Women and Child Welfare. -Role of information Technology in Environment and human health. -Case Studies.

UNIT - VIII
Field work : Visit to a local area to document environmental assets River /forest grassland/hill/mountain - Visit to a local polluted site-Urban/Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystems-pond, river, hill slopes, etc.

TEXT BOOK:
1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE:

1 Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.

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SIGNALS AND SYSTEMS

UNIT I
SIGNAL ANALYSIS : Analogy between vectors and signals, Orthogonal signal space, Signal approximation using orthogonal functions, Mean square error, Closed or complete set of orthogonal functions, Orthogonality in complex functions, Exponential and sinusoidal signals, Concepts of Impulse function, Unit step function, Signum function.

UNIT II
FOURIER SERIES REPRESENTATION OF PERIODIC SIGNALS : Representation of Fourier series, Continuous time periodic signals, properties of Fourier series, Dirichlet's conditions, Trigonometric Fourier series and Exponential Fourier series, Complex Fourier spectrum

UNIT III
FOURIER TRANSFORMS : Deriving Fourier transform from Fourier series, Fourier transform of arbitrary signal, Fourier transform of standard signals, Fourier transform of periodic signals, properties of Fourier transforms, Fourier transforms involving impulse function and Signum function. Introduction to Hilbert Transform.

UNIT IV
SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS : Linear system, impulse response, Response of a linear system, Linear time invariant (LTI) system, Linear time variant (LTV) system, Transfer function of a LTI system. Filter characteristics of linear systems. Distortion less transmission through a system, Signal bandwidth, system bandwidth, Ideal LPF, HPF and BPF characteristics, Causality and Poly-Wiener criterion for physical realization, relationship between bandwidth and rise time.

UNIT V
CONVOLUTION AND CORRELATION OF SIGNALS : Concept of convolution in time domain and frequency domain, Graphical representation of convolution, Convolution property of Fourier transforms. Cross correlation and auto correlation of functions, properties of correlation function, Energy density spectrum, Parseval's theorem, Power density spectrum, Relation between auto correlation function and energy/power spectral density function.Relation between convolution and correlation, Detection of periodic signals in the presence of noise by correlation, Extraction of signal from noise by filtering.

UNIT VI
SAMPLING : Sampling theorem – Graphical and analytical proof for Band Limited Signals, impulse sampling, Natural and Flat top Sampling, Reconstruction of signal from its samples, effect of under sampling – Aliasing, Introduction to Band Pass sampling.

UNIT VII
LAPLACE TRANSFORMS : Review of Laplace transforms, Partial fraction expansion, Inverse Laplace transform, Concept of region of convergence (ROC) for Laplace transforms, constraints on ROC for various classes of signals, Properties of L.T's relation between L.T's, and F.T. of a signal. Laplace transform of certain signals using waveform synthesis.

UNIT VIII
Z–TRANSFORMS : Fundamental difference between continuous and discrete time signals, discrete time signal representation using complex exponential and sinusoidal components, Periodicity of discrete time usingcomplex exponential signal, Concept of Z- Transform of a discrete sequence. Distinction between Laplace, Fourier and Z transforms. Region of convergence in Z-Transform, constraints on ROC for various classes of signals, Inverse Z-transform, properties of Z-transforms.

TEXT BOOKS :
1. Signals, Systems & Communications - B.P. Lathi, BS Publications, 2003.
2. Signals and Systems - A.V. Oppenheim, A.S. Willsky and S.H. Nawab, PHI, 2nd Edn.

REFERENCES :
1. Signals & Systems - Simon Haykin and Van Veen,Wiley, 2nd Edition.
2. Network Analysis - M.E. Van Valkenburg, PHI Publications, 3rd Edn., 2000.
3. Fundamentals of Signals and Systems Michel J. Robert, MGH International Edition, 2008.

4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education.3rd Edition, 2004.

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ELECTRICAL TECHNOLOGY

UNIT I
DC MACHINES : Principle of operation of DC Machines- EMF equation – Types of generators – Magnetization and load characteristics of DC generators

UNIT II
D.C. MOTORS : DC Motors – Types of DC Motors – Characteristics of DC motors – 3-point starters for DC shunt motor – Losses and efficiency – Swinburne's test – Speed control of DC shunt motor – Flux and Armature voltage control methods.

UNIT III
TRANSFORMERS : Principle of operation of single phase transformer – types – Constructional features – Phasor diagram on No Load and Load – Equivalent circuit

UNIT IV
PERFORMANCE OF TRANSFORMERS : Losses and Efficiency of transformer and Regulation – OC and SC tests – Predetermination of efficiency and regulation (Simple Problems).

UNIT V
THREE PHASE INDUCTION MOTOR : Principle of operation of three-phase induction motors –Slip ring and Squirrel cage motors – Slip-Torque characteristics – Efficiency calculation – Starting methods.

UNIT VI
ALTERNATORS : Alternators – Constructional features – Principle of operation – Types - EMF Equation – Distribution and Coil span factors – Predetermination of regulation by Synchronous Impedance Method – OC and SC tests.

UNIT VII
SINGLE PHASE INDUCTION MOTORS : Principle of operation - Shaded pole motors – Capacitor motors, AC servomotor, AC tachometers, Synchros, Stepper Motors – Characteristics.

UNIT VIII
ELECTRICAL INSTRUMENTS : Basic Principles of indicating instruments – Moving Coil and Moving iron Instruments (Ammeters and Voltmeters)

TEXT BOOKS :
  1. Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.
  2. Basic Electrical Engineering - T.K. Nagasarkar and M.S.Sukhija, Oxford University Press, 2005

REFERENCES :
  1. Principles of Electrical Engineering - V.K Mehta, S.Chand Publications.
  2. Theory and Problems of basic electrical engineering - I.J. Nagarath amd D.P Kothari, PHI Publications
  3. Essentials of Electrical and Computer Engineering - David V. Kerns, JR. J. David Irwin

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ELECTRONIC CIRCUITS ANALYSIS

UNIT I : SINGLE STAGE AMPLIFIERS : Review, Small Signal Analysis of Junction Transistor, Frequency response of Common Emitter Amplifier, Common Base Amplifier, Common Collector Amplifier, JFET Amplifiers, Common Drain (CD) Amplifier, Common Gate Amplifier, Gain Band Width Product.

UNIT II : MULTI STAGE AMPLIFIERS : Multi Stage Amplifiers Methods of Inter Stage Coupling, n – Stage Cascaded Amplifier, Equivalent Circuits, Miller's Theorem, Frequency Effects, Amplifier Analysis, High Input Resistance Transistor Circuits. Cascode – Transistor Configuration, CE-CC Amplifiers, Two Stage RC Coupled JFET amplifier (in Common Source (CS) configuration), Difference Amplifier.

UNIT III : HIGH FREQUENCY TRANSISTOR CIRCUTS : Transistor at High Frequencies, Hybrid-Common Emitter Tranconductance Model, Determination of Hybrid- Conductances, Variation of Hybrid Parameters with |IC|, |VCE| and Temperature. The Parameters f_t, expression for f_b, Current Gain with Resistance Load, CE Short Circuit Current Gain, Hybrid– pi) Parameters, Measurement of f_t, Variation of Hybrid – Parameters with Voltage, Current and Temperature, Design of High frequency Amplifier.

UNIT IV : POWER AMPLIFIERS : Class A Power Amplifier, Maximum Value of Efficiency of Class A Amplifier, Transformer Coupled Amplifier, Transformer Coupled Audio Amplifier, Push Pull Amplifier, Complimentary Symmetry Circuits (Transformer Less Class B Power Amplifier), Phase Inverters, Class D Operation, Class S Operation, Heat Sinks.

UNIT V : TUNED AMPLIFIERS - I : Single Tuned Capacitive Coupled Amplifier, Tapped Single Tuned Capacitance Coupled Amplifier, Single Tuned Transformer Coupled or Inductively Coupled Amplifier, CE Double Tuned Amplifier, Application of Tuned Amplifiers.

UNIT VI : TUNED AMPLIFIERS - II : Stagger Tuning, Stability Considerations, Tuned Class B and Class C Amplifiers, Wideband Amplifiers, Tuned Amplifiers.

UNIT VII : VOLTAGE REGULATORS : Terminology, Basic Regulator Circuit, Short Circuit Protection, Current Limiting, Specifications of Voltage Regulator Circuits, Voltage Multipliers.

UNIT VIII : SWITCHING AND IC VOLTAGE REGULATORS : IC 723 Voltage Regulators and Three Terminal IC regulators, DC to DC Converter, Switching Regulators, Voltage Multipliers, UPS, SMPS.

TEXT BOOKS :
1. Integrated Electronics – J. Millman and C.C. Halkias, Mc Graw-Hill, 1972.
2. Electronic Devices and Circuits, Theodore F. Bogart Jr., J.S. Beasley and G. Rico, Pearson Edition, 6th Edition, 2004.

REFERENCES :
1. Electronic Devices and Circuits Theory – Robert L. Boylestad and Louis Nashelsky, Pearson/Prentice Hall,9th Edition,2006.
2. Micro Electronic Circuits – Sedra A.S. and K.C. Smith, Oxford University Press, 5th ed.
3. Micro Electronic Circuits: Analysis and Design – M.H. Rashid, Thomson PWS Publ., 1999.
4. Principles of Electronic Circuits – S.G.Burns and P.R.Bond, Galgotia Publications, 2nd Edn.., 1998.
5. Electronic Circuit Analysis and Design – Donald A. Neaman, Mc Graw Hill.
6. Electronic Circuit Analysis – K. Lal Kishore, BS Publications, 2004.

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ELECTRONIC CIRCUITS LAB

List of Experiments (Twelve experiments to be done) :
I) Design and Simulation in Simulation Laboratory using Multisim OR Pspice OR Equivalent Simulation Software. (Any Six):
1. Common Emitter and Common Source amplifier
2. Two Stage RC Coupled Amplifier
3. Current shunt and Feedback Amplifier
4. Cascade Amplifier
5. Wien Bridge Oscillator using Transistors
6. RC Phase Shift Oscillator using Transistors
7. Class A Power Amplifier (Transformer less)
8. Class B Complementary Symmetry Amplifier
9. High Frequency Common base (BJT) / Common gate(JFET) Amplifier.

II) Testing in the Hardware Laboratory (Six Experiments : 3 + 3) :
A) Any Three circuits simulated in Simulation laboratory
B) Any Three of the following
1. Class A Power Amplifier (with transformer load)
2. Class B Power Amplifier
3. Single Tuned Voltage Amplifier
4. Series Voltage Regulator
5. Shunt Voltage Regulator

Equipments required for Laboratories:
1. For software simultation of Electronic circuits
   i) Computer Systems with latest specifications
   ii) Connected in Lan (Optional)
   iii) Operating system (Windows XP)
   iv) Simulations software (Multisim/TINAPRO) Package

2. For Hardware simulations of Electronic Circuits
   i) RPSs
   ii) CROs
   iii) Functions Generators
   iv) Multimeters
   v) Components

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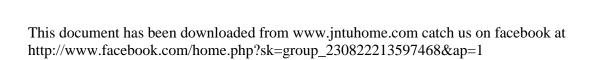| II Year B.Tech. ECE. I-Sem	T	P	C
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ELECTRICAL TECHNOLOGY LAB

PART – A

1. Serial and Parallel Resonance – Timing, Resonant frequency, Bandwidth and Q-factor determination for RLC network.
2. Time response of first order RC/RL network for periodic non-sinusoidal inputs – time constant and steady state error determination.
3. Two port network parameters – Z-Y Parameters, chain matrix and analytical verification.
4. Verification of Superposition and Reciprocity theorems.
5. Verification of maximum power transfer theorem. Verification on DC, verification on AC with Resistive and Reactive loads.
6. Experimental determination of Thevenin's and Norton's equivalent circuits and verification by direct test.

PART – B

1. Magnetization characteristics of D.C. Shunt generator. Determination of critical field resistance.
2. Swinburne's Test on DC shunt machine (Predetermination of efficiency of a given DC Shunt machine working as motor and generator).
3. Brake test on DC shunt motor. Determination of performance characteristics.
4. OC & SC tests on Single-phase transformer (Predetermination of efficiency and regulation at given power factors and determination of equivalent circuit).
5. Brake test on 3-phase Induction motor (performance characteristics).
6. Regulation of alternator by synchronous impedance method.

Note: Any **TEN** of the above experiments are to be conducted

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PULSE AND DIGITAL CIRCUITS

UNIT I
LINEAR WAVESHAPING : High pass, low pass RC circuits, their response for sinusoidal, step, pulse, square and ramp inputs. RC network as differentiator and integrator, attenuators, its applications in CRO probe, RL and RLC circuits and their response for step input, Ringing circuit.

UNIT II
NON-LINEAR WAVE SHAPING : Diode clippers, Transistor clippers, clipping at two independent levels, Transfer characteristics of clippers, Emitter coupled clipper, Comparators, applications of voltage comparators, clamping operation, clamping circuits using diode with different inputs, Clamping circuit theorem, practical clamping circuits, effect of diode characteristics on clamping voltage, Transfer characteristics of clampers.

UNIT III
SWITCHING CHARACTERISTICS OF DEVICES : Diode as a switch, piecewise linear diode characteristics, Transistor as a switch, Break down voltage consideration of transistor, saturation parameters of Transistor and their variation with temperature, Design of transistor switch, transistor-switching times.

UNIT IV
MULTIVIBRATORS : Analysis and Design of Bistable, Monostable, Astable Multivibrators and Schmitt trigger using transistors.

UNIT V
TIME BASE GENERATORS : General features of a time base signal, methods of generating time base waveform, Miller and Bootstrap time base generators – basic principles, Transistor miller time base generator, Transistor Bootstrap time base generator, Current time base generators.

UNIT VI
SYNCHRONIZATION AND FREQUENCY DIVISION : Principles of Synchronization, Frequency division in sweep circuit, Astable relaxation circuits, Monostable relaxation circuits, Synchronization of a sweep circuit with symmetrical signals, Sine wave frequency division with a sweep circuit.

UNIT VII
SAMPLING GATES : Basic operating principles of sampling gates, Unidirectional and Bi-directional sampling gates, Reduction of pedestal in gate circuits, Applications of sampling gates.

UNIT VIII
REALIZATION OF LOGIC GATES USING DIODES & TRANSISTORS : AND, OR gates using Diodes, Resistor, Transistor Logic, Diode Transistor Logic.

TEXT BOOKS :
1. Pulse, Digital and Switching Waveforms - J. Millman and H. Taub, McGraw-Hill, 1991.
2. Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .

REFERENCES :
1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

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CONTROL SYSTEMS

Objective :

In this course it is aimed to introduce to the students the principles and applications of control systems in every day life. The basic concepts of block diagram reduction, time domain analysis solutions to time invariant systems and also deals with the different aspects of stability analysis of systems in frequency domain and time domain.

UNIT – I INTRODUCTION

Concepts of Control Systems- Open Loop and closed loop control systems and their differences- Different examples of control systems- Classification of control systems, Feed-Back Characteristics, Effects of feedback.
Mathematical models – Differential equations, Impulse Response and transfer functions - Translational and Rotational mechanical systems

UNIT II TRANSFER FUNCTION REPRESENTATION

Transfer Function of DC Servo motor - AC Servo motor- Synchro transmitter and Receiver, Block diagram representation of systems considering electrical systems as examples -Block diagram algebra – Representation by Signal flow graph - Reduction using mason's gain formula.

UNIT-III TIME RESPONSE ANALYSIS

Standard test signals - Time response of first order systems – Characteristic Equation of Feedback control systems, Transient response of second order systems - Time domain specifications – Steady state response - Steady state errors and error constants – Effects of proportional derivative, proportional integral systems.

UNIT – IV STABILITY ANALYSIS IN S-DOMAIN

The concept of stability – Routh's stability criterion – qualitative stability and conditional stability – limitations of Routh's stability

Root Locus Technique:

The root locus concept - construction of root loci-effects of adding poles and zeros to G(s)H(s) on the root loci.

UNIT – V FREQUENCY RESPONSE ANALYSIS

Introduction, Frequency domain specifications-Bode diagrams-Determination of Frequency domain specifications and transfer function from the Bode Diagram-Phase margin and Gain margin-Stability Analysis from Bode Plots.

UNIT – VI STABILITY ANALYSIS IN FREQUENCY DOMAIN

Polar Plots, Nyquist Plots Stability Analysis.

UNIT – VII CLASSICAL CONTROL DESIGN TECHNIQUES

Compensation techniques – Lag, Lead, Lead-Lag Controllers design in frequency Domain, PID Controllers.

UNIT – VIII State Space Analysis of Continuous Systems

Concepts of state, state variables and state model, derivation of state models from block diagrams, Diagonalization- Solving the Time invariant state Equations- State Transition Matrix and it's Properties – Concepts of Controllability and Observability

TEXT BOOKS:
1. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.,
2. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International
   (P) Limited, Publishers, 2nd edition.

REFERENCE BOOKS:
1. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.
2. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.
3. Control Systems Engg. by NISE 3rd Edition – John wiley

4. " Modelling & Control Of Dynamic Systems" by Narciso F. Macia George J. Thaler, Thomson Publishers.

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OBJECT ORIENTED PROGRAMMING

UNIT-I
Introduction : Creation of Java, importance of Java to internet, byte code, Java buzzwords, OOP Principles, Encapsulation, Inheritance and Polymorphism, data types, variables, declaring variables, dynamic initialization, scope and life time of variables, arrays, operators, control statements, type conversion and casting, compiling and running of simple Java program.

UNIT-II
Classes and Objects : Concepts of classes and objects, class fundamentals Declaring objects, assigning object reference variables, introducing methods,constructors, usage of static with data and methods, usage of final with data, access control, this key word, garbage collection, overloading methods and constructors, parameter passing – call by value, recursion,nested classes and inner classes, exploring the String class.

UNIT-III
Inheritance : Basic concepts, member access rules, usage of super key word, forms of inheritance, method overriding, abstract classes, dynamic method dispatch, using final with inheritance, the Object class.

UNIT-IV
Packages and Interfaces : Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages, differences between classes and interfaces, defining an interface, implementing interface, applying interfaces, variables in interface and extending interfaces.

UNIT-V
Exception Handling and Multithreading : Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes, Concepts of Multithreading, differences between process and thread, thread life cycle,creating multiple threads using Thread class, Runnable interface, Synchronization, thread priorities, inter thread communication, daemon threads,deadlocks, thread groups.

UNIT-VI
Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.
AWT : Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics.

UNIT-VII
AWT Controls : Buttons, Labels, Text fields, Text area, Check boxes, Check box groups, Lists, Choice, Scrollbars, Menus, Layout Managers – Flow, Border,Grid, Card and Gridbag.

Swing – JApplet, JFrame and JComponent, Icons and Labels, Handling threading issues, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables. Applets – Concepts of Applets, differences between applets and applications,life cycle of an applet, types of applets, creating applets, passing parameters to applets.

UNIT-VIII
Networking and Java Library : Basics of Networking, Inetaddress, TCP/IP sockets, Datagrams, URL, URL connection, String handling, java.util, java.io and java.net packages.

TEXT BOOKS :
  1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi.
  2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.
REFERENCES :
  1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI
  2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.

3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. Beginning in Java 2, Iver Horton, Wrox Publications.
5. Java, Somasundaram, Jaico.

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SWITCHING THEORY AND LOGIC DESIGN

UNIT I

NUMBER SYSTEMS & CODES : Philosophy of number systems – complement representation of negative numbers-binary arithmetic-binary codes-error detecting & error correcting codes –hamming codes.

UNIT II

BOOLEAN ALGEBRA AND SWITCHING FUNCTIONS : Fundamental postulates of Boolean Algebra - Basic theorems and properties - switching functions–Canonical and Standard forms-Algebraic simplification digital logic gates, properties of XOR gates –universal gates-Multilevel NAND/NOR realizations.

UNIT III

MINIMIZATION OF SWITCHING FUNCTIONS : Map method, Prime implicants, Don't care combinations, Minimal SOP and POS forms, Tabular Method, Prime –Implicant chart, simplification rules.

UNIT IV

COMBINATIONAL LOGIC DESIGN

Design using conventional logic gates, Encoder, Decoder, Multiplexer, De-Multiplexer, Modular design using IC chips, MUX Realization of switching functions Parity bit generator, Code-converters, Hazards and hazard free realizations.

UNIT V

PROGRAMMABLE LOGIC DEVICES, THRESHOLD LOGIC : Basic PLD's-ROM, PROM, PLA, PLD Realization of Switching functions using PLD's. Capabilities and limitations of Threshold gate, Synthesis of Threshold functions, Multigate Synthesis.

UNIT VI

SEQUENTIAL CIRCUITS - I : Classification of sequential circuits (Synchronous, Asynchronous, Pulse mode, Level mode with examples) Basic flip-flops-Triggering and excitation tables. Steps in synchronous sequential circuit design. Design of modulo-N Ring & Shift counters, Serial binary adder,sequence detector.

UNIT VII

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

UNIT VIII

ALGOROTHIMIC STATE MACHINES : Salient features of the ASM chart-Simple examples-System design using data path and control subsystems-control implementations-examples of Weighing machine and Binary multiplier.

TEXTBOOKS :
   1. Switching & Finite Automata theory – Zvi Kohavi, TMH,2nd Edition.
   2. Digital Design – Morris Mano, PHI, 3rd Edition, 2006.

REFERENCES :
   1. An Engineering Approach To Digital Design – Fletcher, PHI. Digital Logic – Application and Design – John M. Yarbrough, Thomson.
   2. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.
   3. Digital Logic Applications and Design – John M. Yarbrough, Thomson Publications, 2006.

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EM WAVES AND TRANSMISSION LINES

Review of Coordinate Systems, Vector Calculus :
UNIT I
ELECTROSTATICS: Coulomb's Law, Electric Field Intensity – Fields due to Different Charge Distributions, Electric Flux Density, Gauss Law and Applications, Electric Potential, Relations Between E and V, Maxwell's Two Equations for Electrostatic Fields, Energy Density, Related Problems. Convection and Conduction Currents, Dielectric Constant, Isotropic and Homogeneous Dielectrics, Continuity Equation, Relaxation Time, Poisson's and Laplace's Equations; Capacitance – Parallel Plate, Coaxial, Spherical Capacitors, Related Problems.

UNIT II
Magneto Statics : Biot-Savart Law, Ampere's Circuital Law and Applications, Magnetic Flux Density, Maxwell's Two Equations for Magnetostatic Fields, Magnetic Scalar and Vector Potentials, Forces due to Magnetic Fields, Ampere's Force Law, Inductances and Magnetic Energy. Related Problems.

UNIT III
Maxwell's Equations (Time Varying Fields): Faraday's Law and Transformer emf, Inconsistency of Ampere's Law and Displacement Current Density, Maxwell's Equations in Different Final Forms and Word Statements. Conditions at a Boundary Surface : Dielectric-Dielectric and Dielectric-Conductor Interfaces. Related Problems .

UNIT IV
EM Wave Characteristics - I: Wave Equations for Conducting and Perfect Dielectric Media, Uniform Plane Waves – Definition, All Relations Between E & H. Sinusoidal Variations. Wave Propagtion in Lossless and Conducting Media. Conductors & Dielectrics – Characterization, Wave Propagation in Good Conductors and Good Dielectrics. Polarization. Related Problems.

UNIT V
EM Wave Characteristics – II: Reflection and Refraction of Plane Waves – Normal and Oblique Incidences, for both Perfect Conductor and Perfect Dielectrics, Brewster Angle, Critical Angle and Total Internal Reflection, Surface Impedance. Poynting Vector and Poynting Theorem – Applications, Power Loss in a Plane Conductor. Related Problems.

UNIT V
Guided Waves : Parallel Plane Waveguides: Introduction, TE, TM, TEM Modes - Concepts and Analysis, Cut-off Frequencies, Velocities, Wavelengths, Wave Impedances. Attenuations Factor – Expression for TEM Case. Related Problems.

UNIT VII
Transmission Lines - I : Types, Parameters, Transmission Line Equations, Primary & Secondary Constants, Expressions for Characteristic Impedance, Propagation Constant, Phase and Group Velocities, Infinite Line Concepts, Losslessness/Low Loss Characterization, Distortion – Condition for Distortionlessness and Minimum Attenuation, Loading - Types of Loading. Related Problems.

UNIT VIII
Transmission Lines – II : Input Impedance Relations, SC and OC Lines, Reflection Coefficient, VSWR. UHF Lines as Circuit Elements; λ/4, λ/2, λ/8 Lines – Impedance Transformations. Smith Chart – Configuration and Applications, Single and Double Stub Matching. Related Problems.

TEXT BOOKS :
  1. Elements of Electromagnetic – Matthew N.O. Sadiku, Oxford Univ. Press, 3rd ed., 2001.
  2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd Edition, 2000.

REFERENCES :
  1. Engineering Electromagnetics – Nathan Ida, Springer (India) Pvt. Ltd., New Delhi, 2nd ed., 2005.
  2. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
  3. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed.,1999.

4. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech. India Publications), New Delhi, 2001.

5.. Electromagnetic Field Theory and Transmission Lines – G.S.N. Raju, Pearson Edn. Pte. Ltd., 2005.

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ANALOG COMMUNICATIONS

UNIT I
INTRODUCTION : Introduction to communication system, Need for modulation, Frequency Division Multiplexing , Amplitude Modulation, Definition, Time domain and frequency domain description, single tone modulation, power relations in AM waves, Generation of AM waves, square law Modulator, Switching modulator, Detection of AM Waves; Square law detector, Envelope detector.

UNIT II
DSB MODULATION : Double side band suppressed carrier modulators, time domain and frequency domain description, Generation of DSBSC Waves, Balanced Modulators, Ring Modulator, Coherent detection of DSB-SC Modulated waves, COSTAS Loop.

UNIT III
SSB MODULATION : Frequency domain description, Frequency discrimination method for generation of AM SSB Modulated Wave, Time domain description, Phase discrimination method for generating AM SSB Modulated waves. Demodulation of SSB Waves, Vestigial side band modulation: Frequency description, Generation of VSB Modulated wave, Time domain description, Envelope detection of a VSB Wave pulse Carrier, Comparison of AM Techniques, Applications of different AM Systems.

UNIT IV
ANGLE MODULATION : Basic concepts, Frequency Modulation: Single tone frequency modulation, Spectrum Analysis of Sinusoidal FM Wave, Narrow band FM, Wide band FM, Constant Average Power, Transmission bandwidth of FM Wave - Generation of FM Waves, Direct FM, Detection of FM Waves: Balanced Frequency discriminator, Zero crossing detector, Phase locked loop, Comparison of FM & AM.

UNIT V
NOISE : Noise in Analog communication System, Noise in DSB& SSB System Noise in AM System, Noise in Angle Modulation System, Threshold effect in Angle Modulation System, Pre-emphasis & de-emphasis

UNIT VI
TRANSMITTERS : Radio Transmitter - Classification of Transmitter, AM Transmitter, Effect of feed back on performance of AM Transmitter, FM Transmitter – Variable reactance type and phase modulated FM Transmitter, frequency stability in FM Transmitter.

UNIT VII
RECEIVERS : Radio Receiver - Receiver Types - Tuned radio frequency receiver, Superhetrodyne receiver, RF section and Characteristics - Frequency changing and tracking, Intermediate frequency, AGC, FM Receiver, Comparison with AM Receiver, Amplitude limiting.

UNIT VIII
PULSE MODULATION : Time Divison Multiplexing, Types of Pulse modulation, PAM (Single polarity, double polarity) PWM: Generation & demodulation of PWM, PPM, Generation and demodulation of PPM

TEXTBOOKS :
1. Principles of Communication Systems – H Taub & D. Schilling, Gautam Sahe, TMH, 2007 3rd Edition.
2. Communication Systems – B.P. Lathi, BS Publication, 2006.

REFERENCES :
1. Principles of Communication Systems - Simon Haykin, John Wiley, 2nd Ed.,.
2. Electronics & Communication System – George Kennedy and Bernard Davis, TMH 2004.
3. Communication Systems Second Edition – R.P. Singh, SP Sapre, TMH, 2007.
4. Fundamentals of Communication Systems - John G. Proakis, Masond, Salehi PEA, 2006.

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ANALOG COMMUNICATIONS LAB

Minimum 12 experiments should be conducted :
1. Amplitude modulation and demodulation.
2. Diode detector characteristics.
3. Frequency modulation and demodulation.
4. Balanced modulator.
5. Pre-emphasis & de-emphasis.
6. Characteristics of mixer.
7. Digital Phase detector.
8. Phase locked loop.
9. Synchronous detector.
10. SSB system.
11. Spectral analysis of AM and FM signals using spectrum analyzer.
12. Squelch Circuit.
13. Frequency Synthesiser.
14. AGC Characteristics.

Equipment required for Laboratories:
1. RPS - 0 – 30 V
2. CRO - 0 – 20 M Hz.
3. Function Generators - 0 – 1 M Hz
4. RF Generators - 0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Analog Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.
9. Spectrum Analyzer - 60 M Hz.

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PULSE AND DIGITAL CIRCUITS LAB

Minimum Twelve experiments to be conducted:

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch.
5. Study of Logic Gates & Some applications.
6. Study of Flip-Flops & some applications.
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.

Equipment required for Laboratories:

1. RPS   -   0 – 30 V
2. CRO   -   0 – 20 M Hz.
3. Function Generators   -   0 – 1 M Hz
4. Components
5. Multi Meters

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MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

UNIT I
INTRODUCTION TO MANAGERIAL ECONOMICS : Definition, Nature and Scope Managerial Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

UNIT II
ELASTICITY OF DEMAND : Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting**).**

UNIT III
THEORY OF PRODUCTION AND COST ANALYSIS : Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Production function, Laws of Returns, Internal and External Economies of Scale.
Cost Analysis : Cost concepts, Opportunity cost, Fixed Vs.Variable costs, Explicit costs Vs.Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-termination of Break-Even Point (simple problems)-Managerial Significance and limitations of BEA.

UNIT IV
INTRODUCTION TO MARKETS & PRICING STRATEGIES : Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. Pricing Strategies

UNIT V
BUSINESS & NEW ECONOMIC ENVIRONMENT : Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT VI
CAPITAL AND CAPITAL BUDGETING : Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. Nature and scope of capital budgeting, features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

UNIT VII
INTRODUCTION TO FINANCIAL ACCOUNTING : Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VIII
FINANCIAL ANALYSIS THROUGH RATIOS : Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt-Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXTBOOKS :
  1. Managerial Economics and Financial Analysis – Aryasri, TMH,2/E, 2005.
  2. Managerial Economics - Varshney & Maheswari, Sultan Chand, 2003.
REFERENCES :
  1. Financial Accounting for Management - Ambrish Gupta, Pearson Education, New Delhi, 2004.
  2. Financial Accounting - Schaum's Outlines, Shim &Siegel,TMH, 2/E,2004
  3. Production and Operations Management – Chary, TMH, 3/e, 2004.
  4. Managerial Economics In a Global Economy - Domnick Salvatore, Thomson, 4th Edition 2003.
  5. Financial Accounting—A Managerial Perspective – Narayanaswamy, PHI, 2005
  6. Managerial Economics - Peterson & Lewis, Pearson Education, 4th Edition, 2004
  7. Managerial Economics& Financial Analysis - Raghunatha Reddy & Narasimhachary, Scitech, 2005.
  8. Financial Accounting - S.N.Maheswari & S.K. Maheswari, Vikas, 2005.

9. Managerial Economics:Analysis, Problems and Cases - Truet and Truet, Wiley, 2004.
10. Managerial Economics – Dwived, Vikas, 6th Ed.,2002
11. Managerial Economics - Yogesh Maheswari, PHI, 2nd Ed., 2nd Ed. 2005.

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COMPUTER ORGANIZATION

UNIT-I
BASIC STRUCTURE OF COMPUTERS: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers.

Data types, Complements, Data Representation. Fixed Point Representation. Floating – Point Representation. Error Detection codes.

UNIT-II
REGISTER TRANSFER LANGUAGE AND MICROOPERATIONS: Register Transfer language. Register Transfer, Bus and memory transfer, Arithmetic Mircro operatiaons, logic micro operations, shift micro operations, Arithmetic logic shift unit. Instruction codes. Computer Registers Computer instructions – Instruction cycle. Memory – Reference Instructions. Input – Output and Interrupt.
CENTRAL PROCESSING UNIT - Stack organization. Instruction formats. Addressing modes. DATA Transfer and manipulation. Program control. Reduced Instruction set computer

UNIT-III
MICRO PROGRAMMED CONTROL: Control memory, Address sequencing, micro program example, Design of control unit-Hard wired control. Micro programmed control

UNIT-IV
COMPUTER ARITHMETIC : Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit, Decimal Arithmetic operations.

UNIT-V
THE MEMORY SYSTEM : Memory Hierarchy, Main memory, Auxiliary memory, Associative memory, Cache memory, Virtual memory, Memory management hardware

UNIT-VI
INPUT-OUTPUT ORGANIZATION : Peripheral Devices, Input-Output Interface, Asynchronous data transfer Modes of Transfer, Priority Interrupt, Direct memory Access, Input –Output Processor (IOP), Serial communication;

UNIT-VII
PIPELINE AND VECTOR PROCESSING: Parallel Processing, Pipelining, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

UNIT-VIII
MULTI PROCESSORS: Characteristics of Multiprocessors, Interconnection Structures, Interprocessor Arbitration. Interprocessor Communication and Synchronization, Cache Coherance.

TEXT BOOKS:
  1. Computer System Architecture – M.Moris Mano, IIIrd Edition, PHI / Pearson, 2006.
  2. Computer Organization – Car Hamacher, Zvonks Vranesic, Safwat Zaky, V Edition, McGraw Hill, 2002.

REFERENCE:
  1. Computer Organization and Architecture – William Stallings Seventh Edition, PHI/Pearson, 2006.
  2. Computer Architecture and Organization – John P. Hayes, Mc Graw Hill International editions, 1998.

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LINEAR IC APPLICATIONS

UNIT I
INTEGRATED CIRCUITS : Differential Amplifier- DC and AC analysis of Dual input Balanced output Configuration, Properties of other differential amplifier configuration (Dual Input Unbalanced Output, Single Ended Input – Balanced/ Unbalanced Output), DC Coupling and Cascade Differential Amplifier Stages, Level translator.

UNIT II
Characteristics of OP-Amps, Integrated circuits-Types, Classification, Package Types and temperature ranges, Power supplies, Op-amp Block Diagram, ideal and practical Op-amp specifications, DC and AC characteristics, 741 op-amp & its features, FET input. Op-Amps,Op-Amp parameters & Measurement, Input & Out put Off set voltages & currents, slew rates, CMRR, PSRR, drift, Frequency Compensation technique.

UNIT III
LINEAR APPLICATIONS OF OP- AMPS : Inverting and Non-inverting amplifier, Integrator and differentiator, Difference amplifier, Instrumentation amplifier, AC amplifier, V to I, I to V converters, Buffers.

UNIT IV
NON-LINEAR APPLICATIONS OF OP- AMPS : Non- Linear function generation, Comparators, Multivibrators, Triangular and Square wave generators, Log and Anti log amplifiers, Precision rectifiers.

UNIT V
OSCILLATORS AND WAVEFORM GENERAGTORS : Introduction, Butter worth filters – 1st order, 2nd order LPF, HPF filters. Band pass, Band reject and all pass filters. Applications of VCO (566).

UNIT VI
TIMERS & PHASE LOCKED LOOPS : Introduction to 555 timer, functional diagram, Monostable and Astable operations and applications, Schmitt Trigger. PLL - introduction, block schematic, principles and description of individual blocks, 565 PLL, Applications of PLL – frequency multiplication, frequency translation, AM, FM & FSK demodulators.

UNIT VII
D to A & A to D CONVERTERS : Introduction, basic DAC techniques, weighted resistor DAC, R-2R ladder DAC, inverted R-2R DAC, and IC 1408 DAC, Different types of ADCs - parallel comparator type ADC, counter type ADC, successive approximation ADC and dual slope ADC. DAC and ADC Specifications, Specifications AD 574 (12 bit ADC).

UNIT VIII
ANALOG MULTIPLIERS AND MODULATORS : Four Quadrant multiplier, balanced modulator, IC 1496, Applications of analog switches and Multiplexers, Sample & Hold amplifiers.

TEXT BOOKS :
1. Linear Integrated Circuits – D. Roy Chowdhury, New Age International (p) Ltd, 2nd Edition,2003.
2. Op-Amps & Linear ICs - Ramakanth A. Gayakwad, PHI,1987.

REFERENCES :
1. Design with Operational Amplifiers & Analog Integrated Circuits - Sergio Franco, McGraw Hill, 1988.
2. Operational Amplifiers & Linear Integrated Circuits–R.F.Coughlin & Fredrick Driscoll, PHI, 6th Edition.
3. Micro Electronics – Millman, McGraw Hill,1988.
4. Operational Amplifiers – C.G. Clayton, Butterworth & Company Publ. Ltd./ Elsevier, 1971.

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DIGITAL IC APPLICATIONS

UNIT I
CMOS LOGIC : Introduction to logic families, CMOS logic, CMOS steady state electrical behavior, CMOS dynamic electrical behavior, CMOS logic families.

UNIT II
BIPOLAR LOGIC AND INTERFACING : Bipolar logic, Transistor logic, TTL families, CMOS/TTL interfacing, low voltage CMOS logic and interfacing, Emitter coupled logic, Comparison of logic families, Familiarity with standard 74XX and CMOS 40XX series-ICs – Specifications.

UNIT III
THE VHDL HARDWARE DESCRIPTION LANGUAGE : Design flow, program structure, types and constants, functions and procedures, libraries and packages.

UNIT IV
THE VHDL DESIGN ELEMENTS : Structural design elements, data flow design elements, behavioral design elements, time dimension and simulation synthesis.

UNIT V
COMBINATIONAL LOGIC DESIGN : Decoders, encoders, three state devices, multiplexers and demultiplexers, Code Converters, EX-OR gates and parity circuits, comparators, adders & subtractors, ALUs, Combinational multipliers. VHDL modes for the above ICs.

UNIT VI
DESIGN EXAMPLES (USING VHDL) : Design examples (using VHDL) - Barrel shifter, comparators, floating-point encoder, dual parity encoder.

UNIT VII
SEQUENTIAL LOGIC DESIGN : Latches and flip-flops, PLDs, counters, shift register, and their VHDL models, synchronous design methodology, impediments to synchronous design.

UNIT VIII
MEMORIES : ROMs : Internal structure, 2D-decoding commercial types, timing and applications. Static RAM: Internal structure, SRAM timing, standard SRAMS, synchronous SRAMS.
Dynamic RAM : Internal structure, timing, synchronous DRAMs. Familiarity with Component Data Sheets – Cypress CY6116,CY7C1006, Specifications.

TEXT BOOKS :
  1. Digital Design Principles & Practices – John F. Wakerly, PHI/ Pearson Education Asia, 3rd Ed., 2005.
  2. VHDL Primer – J. Bhasker, Pearson Education/ PHI,3rd Edition.

REFERENCES :
  1. Digital System Design Using VHDL – Charles H. Roth Jr., PWS Publications,1998.
  2. Introduction to Logic Design – Alan B. Marcovitz,TMH,2nd Edition,2005.
  3. Fundamentals of Digital Logic with Verilog Design – Stephen Brown, Zvonko Vransesic, TMH, 2003.
  4. Cypress Semiconductors Data Book(Download from website).
  5. Fundamentals of Digital Logic with VHDL Design – Stephen Borwn and Zvonko Vramesic, McGraw Hill,2nd Edition.,2005.
  6. Linear Integrated Circuit Applications by K. Lal kishore, Pearson Educations 2005

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ANTENNAS AND WAVE PROPAGATION

UNIT I

ANTENNA FUNDAMENTALS : Introduction, Radiation Mechanism – single wire, 2 wire, dipoles, Current Distribution on a thin wire antenna . Antenna Parameters] - Radiation Patterns, Patterns in Principal Planes, Main Lobe and Side Lobes, Beamwidths, Beam Area, Radiation Intensity, Beam Efficiency, Directivty, Gain and Resolution, Antenna Apertures, Aperture Efficiency, Effective Hight. Related Problems.

UNIT II

Thin Linear Wire Antennas: Retarded Potentials, Radiation from Small Electric Dipole, Quarterwave Monopole and Halfwave Dipole – Current Distributions, Evaluation of Field Components, Power Radiated, Radiation Resistance, Beamwidths, Directivity, Effective Area and Effective Hight. Natural current distributions, fields and patterns of Thin Linear Center-fed Antennas of different lengths, Radiation Resistance at a point which is not current maximum. Antenna Theorems – Applicability and Proofs for equivalence of directional characteristics, Loop Antennas : Small Loops - Field Components, Comparison of far fields of small loop and short dipole, Concept of short magnetic dipole, D and Rr relations for small loops.

UNIT III

ANTENNA ARRAYS : 2 element arrays – different cases, Principle of Pattern Multiplication, N element Uniform Linear Arrays – Broadside, Endfire Arrays, EFA with Increased Directivity, Derivation of their characteristics and comparison; Concept of Scanning Arrays. Directivity Relations (no derivations). Related Problems. Binomial Arrays, Effects of Uniform and Non-uniform Amplitude Distributions, Design Relations.

UNIT IV

NON-RESONANT RADIATORS : Introduction, Travelling wave radiators – basic concepts, Longwire antennas – field strength calculations and patterns, V-antennas, Rhombic Antennas and Design Relations, Broadband Antennas: Helical Antennas – Significance, Geometry, basic properties; Design considerations for monofilar helical antennas in Axial Mode and Normal Modes (Qualitative Treatment).

UNIT V

VHF, UHF AND MICROWAVE ANTENNAS - I : Arrays with Parasitic Elements, Yagi - Uda Arrays, Folded Dipoles & their characteristics. Reflector Antennas : Flat Sheet and Corner Reflectors. Paraboloidal Reflectors – Geometry, characteristics,types of feeds, F/D Ratio, Spill Over, Back Lobes, Aperture Blocking, Off-set Feeds, Cassegrainian Feeds].

UNIT VI

VHF, UHF AND MICROWAVE ANTENNAS - II : Horn Antennas – Types, Optimum Horns, Design Characteristics of Pyramidal Horns; Lens Antennas – Geometry, Features, Dielectric Lenses and Zoning, Applications. Antenna Measurements – Patterns Required, Set Up, Distance Criterion, Directivity and Gain Measurements (Comparison, Absolute and 3-Antenna Methods).

UNIT VII

WAVE PROPAGATION - I: Concepts of Propagation – frequency ranges and types of propagations. Ground Wave Propagation–Characteristics, Parameters, Wave Tilt, Flat and Spherical Earth Considerations. Sky Wave Propagation – Formation of Ionospheric Layers and their Characteristics, Mechanism of Reflection and Refraction, Critical Frequency, MUF & Skip Distance – Calculations for flat and spherical earth cases, Optimum Frequency, LUHF, Virtual Height, Ionospheric Abnormalities, Ionospheric Absorption.

UNIT VIII

WAVE PROPAGATION – II: Fundamental Equation for Free-Space Propagation, Basic Transmission Loss Calculations. Space Wave Propagation – Mechanism, LOS and Radio Horizon. Tropospheric Wave Propagation – Radius of Curvature of path, Effective Earth's Radius, Effect of Earth's Curvature, Field Strength Calculations, M-curves and Duct Propagation, Tropospheric Scattering.

TEXT BOOKS :

1. Antennas for All Applications – John D. Kraus and Ronald J. Marhefka, TMHl, 3rd Edn., 2003.
2. Electromagnetic Waves and Radiating Systems – E.C. Jordan and K.G. Balmain, PHI, 2nd ed., 2000.

REFERENCES :
1. Antenna Theory - C.A. Balanis, John Wiley & Sons, 2nd ed., 2001.
2. Antennas and Wave Propagation – K.D. Prasad, Satya Prakashan, Tech India Publications, New Delhi, 2001.
3. Transmission and Propagation – E.V.D. Glazier and H.R.L. Lamont, The Services Text Book of Radio, vol. 5, Standard Publishers Distributors, Delhi.
4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th edition, 1955.
5. Antennas – John D. Kraus, McGraw-Hill, SECOND EDITION, 1988.

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DIGITAL COMMUNICATIONS

UNIT I
PULSE DIGITAL MODULATION : Elements of digital communication systems, advantages of digital communication systems, Elements of PCM: Sampling, Quantization & Coding, Quantization error, Compading in PCM systems. Differential PCM systems (DPCM).

UNIT II
DELTA MODULATION : Delta modulation, its draw backs, adaptive delta modulation, comparison of PCM and DM systems, noise in PCM and DM systems.

UNIT III
DIGITAL MODULATION TECHNIQUES : Introduction, ASK, FSK, PSK, DPSK, DEPSK, QPSK, M-ary PSK, ASK, FSK, similarity of BFSK and BPSK.

UNIT IV
DATA TRANSMISSION : Base band signal receiver, probability of error, the optimum filter, matched filter, probability of error using matched filter, coherent reception, non-coherent detection of FSK, calculation of error probability of ASK, BPSK, BFSK,QPSK.

UNIT V
INFORMATION THEORY : Discrete messages, concept of amount of information and its properties. Average information, Entropy and its properties. Information rate, Mutual information and its properties,

UNIT VI
SOURCE CODING : Introductions, Advantages, Shannon's theorem, Shanon-Fano coding, Huffman coding, efficiency calculations, channel capacity of discrete and analog Channels, capacity of a Gaussian channel, bandwidth –S/N trade off.

UNIT VII
LINEAR BLOCK CODES : Introduction, Matrix description of Linear Block codes, Error detection and error correction capabilities of Linear block codes, Hamming codes, Binary cyclic codes, Algebraic structure, encoding, syndrome calculation, BCH Codes.

UNIT VIII
CONVOLUTION CODES : Introduction, encoding of convolution codes, time domain approach, transform domain approach. Graphical approach: state, tree and trellis diagram decoding using Viterbi algorithm.

TEXT BOOKS :
1. Digital communications - Simon Haykin, John Wiley, 2005
2. Principles of Communication Systems – H. Taub and D. Schilling, TMH, 2003

REFERENCES :
1. Digital and Analog Communication Systems - Sam Shanmugam, John Wiley, 2005.
2. Digital Communications – John Proakis, TMH, 1983. Communication Systems Analog & Digital – Singh & Sapre, TMH, 2004.
3. Modern Analog and Digital Communication – B.P.Lathi, Oxford reprint, 3rd edition, 2004.

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DIGITAL COMMUNICATIONS LAB

1. Pulse Amplitude Modulation and demodulation.
2. Pulse Width Modulation and demodulation.
3. Pulse Position Modulation and demodulation.
4. Sampling Theorem – verification.
5. Time division multiplexing.
6. Pulse code modulation.
7. Differential pulse code modulation.
8. Delta modulation.
9. Frequency shift keying.
10. Phase shift keying .
11. Differential phase shift keying.

Equipment required for Laboratories:
1. RPS   -   0 – 30 V
2. CRO   -   0 – 20 M Hz.
3. Function Generators   -   0 – 1 M Hz
4. RF Generators   -   0 – 1000 M Hz./0 – 100 M Hz.
5. Multimeters
6. Lab Experimental kits for Digital Communication
7. Components
8. Radio Receiver/TV Receiver Demo kits or Trainees.

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IC APPLICATIONS AND ECAD LAB

Minimum Twelve Experiments to be conducted : (Six from each part A & B)

Part A (IC Application Lab):

1. OP AMP Applications – Adder, Subtractor, Comparator Circuits.
2. Active Filter Applications – LPF, HPF (first order)
3. Function Generator using OP AMPs.
4. IC 555 Timer – Monostable and Astable Operation Circuit.
5. IC 566 – VCO Applications.
6. Voltage Regulator using IC 723.
7. 4 bit DAC using OP AMP.

Part B (ECAD Lab):

Simulate the internal structure of the following Digital IC's using VHDL / VERILOG and verify the operations of the Digital IC's (Hardware) in the Laboratory

1. D Flip-Flop 7474
2. Decade counter-7490
3. shift registers-7495 7
4. 3-8 Decoder -74138
5. 4 bit Comparator-7485
6. 8 x 1 Multiplexer -74151 and 2x4 Demultiplexer-74155
7. RAM (16x4)-74189 (Read and Write operations)

Equipment required for Laboratories:

1. RPS
2. CRO
3. Function Generator
4. Multi Meters
5. IC Trainer Kits (Optional)
6. Bread Boards
7. Components:- IC741, IC555, IC566, IC1496, IC723, 7805, 7809, 7912 and other essential components.
8. Analog IC Tester

For Software Simulation

1 Computer Systems
2 LAN Connection (Optional)
3 Operating Systems
4 VHDL/ VERILOG
5 FPGAS/CPLDS (Download Tools)

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MANAGEMENT SCIENCE

UNIT I
Introduction to Management : Concepts of Management and organization- nature, importance and Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Mayo's Hawthorne Experiments, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

UNIT II
Designing Organisational Structures : Basic concepts related to Organisation - Departmentation and Decentralisation, Types of mechanistic and organic structures of organisation (Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure) and their merits, demerits and suitability.

UNIT IIII
Operations Management : Principles and Types of Plant Layout-Methods of production (Job, batch and Mass Production), Work Study -Basic procedure involved in Method Study and Work Measurement-Statistical Quality Control: chart, R chart, *c* chart, *p* chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

UNIT IV
Materials Management : Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.
Marketing **:** Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle, Channels of distribution

UNIT V
Human Resources Management (HRM) : Concepts of HRM, HRD and Personnel Management and Industrial Relations (PMIR), HRM vs.PMIR, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

UNIT VI
Project Management (PERT/CPM) : Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given time, Project Cost Analysis, Project Crashing. (simple problems)

UNIT VII
Strategic Management : Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

UNIT VIII
Contemporary Management Practices : Basic concepts of MIS, End User Computing, Materials Requirement Planning (MRP), Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Supply Chain Management, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

TEXT BOOKS :
1. Aryasri: *Management Science*, TMH, 2004.
2. Stoner, Freeman, Gilbert, *Management*, 6th Ed, Pearson Education, New Delhi, 2004.

REFERENCES :
1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2005
2. Koontz & Weihrich: *Essentials of Management*, 6/e, TMH, 2005

3. Thomas N.Duening & John M.Ivancevich *Management—Principles and Guidelines,* Biztantra,2003.

4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2004.

5. Memoria & S.V.Gauker, *Personnel Management*, Himalaya, 25/e, 2005

6. Samuel C.Certo: *Modern Management*, 9/e, PHI, 2005

7. Schermerhorn, Capling, Poole & Wiesner: *Management*, Wiley, 2002.

8. Parnell: Strategic Management, Biztantra,2003.

9. Lawrence R Jauch, R.Gupta &William F.Glueck:Business Policy and Strategic Management, Frank Bros.2005.

10. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2005.

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TELECOMMUNICATION SWITCHING SYSTEMS

UNIT I
TELECOMMUNICATION SWITCHING SYSTEMS : Introduction, Elements of switching systems, switching network configuration, principles of cross bar switching.

UNIT II
Electronic space division switching, Time division switching, Combination switching.

UNIT III
TELEPHONE NETWORKS : Subscriber loop systems, switching hierarchy and routing, transmission plan, numbering plan, charging plans.

UNIT IV
SIGNALING TECHNIQUES : In channel signaling, common channel signaling. Network traffic load and parameters, grade of service and blocking probability.

UNIT V
DATA COMMUNICATION NETWORKS : Introduction, network architecture, layered network architecture, protocols, data communications hardware, data communication circuits.

UNIT VI
Public switched data networks, connection oriented & connection less service, Circuit Switching, packet switching and virtual circuit switching concepts, OSI reference model, LAN, WAN, MAN & Internet. Repeaters, Bridges, Routers and gate ways.

UNIT VII
INTEGRATED SERVICES DIGITAL NETWORK (ISDN) : Introduction, motivation, ISDN architecture, ISDN interfaces, functional grouping, reference points, protocol architecture, signaling, numbering, addressing, BISDN.

UNIT VIII
DSL Technology: ADSL, Cable Modem, Traditional Cable Networks, HFC Networks, Sharing, CM & CMTS and DOCSIS.
SONET: Devices, Frame, Frame Transmission, Synchronous Transport Signals, STS I, Virtual Tributaries and Higher rate of service.

TEXT BOOKS :
 1. Tele communication switching system and networks - Thyagarajan Viswanath, PHI, 2000.
 2. Advanced electronic communications systems - Wayne Tomasi, PHI, 2004.

REFERENCES :
 1. Digital telephony - J. Bellamy, John Wiley, 2nd edition, 2001.
 2. Data Communications & Networks - Achyut. S.Godbole, TMH, 2004.
 3. Principles of Communication Systems – H. Taub & D. Schilling , TMH, 2nd Edition, 2003.
 4. Data Communication & Networking - B.A. Forouzan, TMH, 3rd Edition, 2004.
 5. Telecommunication switching, Traffic and Networks - J E Flood, Pearson Education, 2002.

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DIGITAL SIGNAL PROCESSING

UNIT I
INTRODUCTION: Introduction to Digital Signal Processing: Discrete time signals & sequences, linear shift invariant systems, stability, and causality. Linear constant coefficient difference equations. Frequency domain representation of discrete time signals and systems.

UNIT II
DISCRETE FOURIER SERIES: Properties of discrete Fourier series, DFS representation of periodic sequences, Discrete Fourier transforms: Properties of DFT, linear convolution of sequences using DFT, Computation of DFT. Relation between Z-transform and DFS

UNIT III
FAST FOURIER TRANSFORMS: Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency FFT Algorithms, Inverse FFT, and FFT for composite N

UNIT IV
REALIZATION OF DIGITAL FILTERS: Review of Z-transforms, Applications of Z – transforms, solution of difference equations of digital filters, Block diagram representation of linear constant-coefficient difference equations, Basic structures of IIR systems, Transposed forms, Basic structures of FIR systems, System function,

UNIT V
IIR DIGITAL FILTERS: Analog filter approximations – Butter worth and Chebyshev, Design of IIR Digital filters from analog filters, Design Examples: Analog-Digital transformations

UNIT VI
FIR DIGITAL FILTERS : Characteristics of FIR Digital Filters, frequency response. Design of FIR Digital Filters using Window Techniques, Frequency Sampling technique, Comparison of IIR & FIR filters.

UNIT VII
MULTIRATE DIGITAL SIGNAL PROCESSING: Decimation, interpolation, sampling rate conversion, Implementation of sampling rate conversion.

UNIT VIII
INTRODUCTION TO DSP PROCESSORS: Introduction to programmable DSPs: Multiplier and Multiplier Accumulator (MAC), Modified Bus Structures and Memory Access schemes in DSPs Multiple access memory, multiport memory, VLSI Architecture, Pipelining, Special addressing modes, On-Chip Peripherals.

Architecture of TMS 320C5X- Introduction, Bus Structure, Central Arithmetic Logic Unit, Auxiliary Registrar, Index Registrar, Auxiliary Registger Compare Register, Block Move Address Register, Parallel Logic Unit, Memory mapped registers, program controller, Some flags in the status registers, On- chip registers, On-chip peripherals

TEXT BOOKS:
1. Digital Signal Processing, Principles, Algorithms, and Applications: John G. Proakis, Dimitris G. Manolakis,
   Pearson Education / PHI, 2007.
2. Discrete Time Signal Processing – A.V.Oppenheim and R.W. Schaffer, PHI
3. Digital Signal Processors – Architecture, Programming and Applications,, B.Venkataramani, M. Bhaskar, TATA McGraw Hill, 2002

Reference Books:
1. Digital Signal Processing: Andreas Antoniou, TATA McGraw Hill , 2006
2. Digital Signal Processing: MH Hayes, Schaum's Outlines, TATA Mc-Graw Hill, 2007.
3. DSP Primer - C. Britton Rorabaugh, Tata McGraw Hill, 2005.
4. Fundamentals of Digital Signal Processing using Matlab – Robert J. Schilling, Sandra L. Harris, Thomson, 2007.
5. Digital Signal Processing – Alan V. Oppenheim, Ronald W. Schafer, PHI Ed., 2006

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VLSI DESIGN

UNIT I

INTRODUCTION : Introduction to IC Technology – MOS, PMOS, NMOS, CMOS & BiCMOS technologies- Oxidation, Lithography, Diffusion, Ion implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors.

UNIT II

BASIC ELECTRICAL PROPERTIES : Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, figure of merit ωo; Pass transistor, NMOS Inverter, Various pull ups, CMOS Inverter analysis and design, Bi-CMOS Inverters.

UNIT III

VLSI CIRCUIT DESIGN PROCESSES : VLSI Design Flow, MOS Layers, Stick Diagrams, Design Rules and Layout, 2 μm CMOS Design rules for wires, Contacts and Transistors Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling.

UNIT IV

GATE LEVEL DESIGN : Logic Gates and Other complex gates, Switch logic, Alternate gate circuits, Basic circuit concepts, Sheet Resistance RS and its concept to MOS, Area Capacitance Units, Calculations - τ- Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

UNIT V

SUBSYSTEM DESIGN : Subsystem Design, Shifters, Adders, ALUs, Multipliers, Parity generators, Comparators, Zero/One Detectors, Counters, High Density Memory Elements.

UNIT VI

SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN : PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT VII

VHDL SYNTHESIS : VHDL Synthesis, Circuit Design Flow, Circuit Synthesis, Simulation, Layout, Design capture tools, Design Verification Tools, Test Principles.

UNIT VIII

CMOS TESTING : CMOS Testing, Need for testing, Test Principles, Design Strategies for test, Chiplevel Test Techniques, System-level Test Techniques, Layout Design for improved Testability.

TEXTBOOKS :
1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Dougles and A. Pucknell, PHI, 2005 Edition.
2. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 1999.

REFERENCES :
1. Chip Design for Submicron VLSI: CMOS Layout & Simulation, - John P. Uyemura, Thomson Learning.
2. Introduction to VLSI Circuits and Systems - John .P. Uyemura, JohnWiley, 2003.
3. Digital Integrated Circuits - John M. Rabaey, PHI, EEE, 1997.
4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
5. VLSI Technology – S.M. SZE, 2nd Edition, TMH, 2003.

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MICROWAVE ENGINEERING

UNIT I
MICROWAVE TRANSMISSION LINES: Introduction, Microwave Spectrum and Bands, Applications of Microwaves. *Rectangular Waveguides – TE/TM mode analysis, Expressions for Fields, Characteristic Equation and Cut-off Frequencies, Filter Characteristics, Dominant and Degenerate Modes, Sketches of TE and TM mode fields in the cross-section, Mode Characteristics – Phase and Group Velocities, Wavelengths and Impedance Relations; Power Transmission and Power Losses in Rectangular Guide. Related Problems.*

UNIT II
CIRCULAR WAVEGUIDES: Introduction, Nature of Fields, Characteristic Equation, Dominant and Degenerate Modes. Impossibility of TEM mode. Microstrip Lines– Introduction, Zo Relations, Effective Dielectric Constant, Losses, Q factor. Cavity Resonators– Introduction, Rectangular and Cylindrical Cavities, Dominant Modes and Resonant Frequencies, Q factor and Coupling Coefficients. Related Problems.

UNIT III
WAVEGUIDE COMPONENTS AND APPLICATIONS - I : Coupling Mechanisms – Probe, Loop, Aperture types. Waveguide Discontinuities – Waveguide irises, Tuning Screws and Posts, Matched Loads. Waveguide Attenuators – Resistive Card, Rotary Vane types; Waveguide Phase Shifters – Dielectric, Rotary Vane types. Waveguide Multiport Junctions – E plane and H plane Tees, Magic Tee, Hybrid Ring; Directional Couplers – 2 Hole, Bethe Hole types.

UNIT IV
WAVEGUIDE COMPONENTS AND APPLICATIONS - II : Ferrites– Composition and Characteristics, Faraday Rotation; Ferrite Components – Gyrator, Isolator, Circulator. Scattering Matrix– Significance, Formulation and Properties. S Matrix Calculations for – 2 port Junction, E plane and H plane Tees, Magic Tee, Directional Coupler, Circulator and Isolator. Related Problems.

UNIT V
MICROWAVE TUBES – I: Limitations and Losses of conventional tubes at microwave frequencies. Microwave tubes – O type and M type classifications. O-type tubes : 2 Cavity Klystrons – Structure, Reentrant Cavities, Velocity Modulation Process and Applegate Diagram, Bunching Process and Small Signal Theory – Expressions for o/p Power and Efficiency. Reflex Klystrons – Structure, Applegate Diagram and Principle of working, Mathematical Theory of Bunching, Power Output, Efficiency, Electronic Admittance; Oscillating Modes and o/p Characteristics, Electronic and Mechanical Tuning. Related Problems.

UNIT VI
HELIX TWTS: Significance, Types and Characteristics of Slow Wave Structures; Structure of TWT and Amplification Process (qualitative treatment), Suppression of Oscillations, Nature of the four Propagation Constants, Gain Considerations.

M-type Tubes
Introduction, Cross-field effects, Magnetrons – Different Types, 8-Cavity Cylindrical Travelling Wave Magnetron – Hull Cut-off and Hartree Conditions, Modes of Resonance and PI-Mode Operation, Separation of PI-Mode, o/p characteristics.

UNIT VII
MICROWAVE SOLID STATE DEVICES: Introduction, Classification, Applications. TEDs – Introduction, Gunn Diode – Principle, RWH Theory, Characteristics, Basic Modes of Operation, Oscillation Modes. Avalanche Transit Time Devices – Introduction, IMPATT and TRAPATT Diodes – Principle of Operation and Characteristics.

UNIT VIII
MICROWAVE MEASUREMENTS: Description of Microwave Bench – Different Blocks and their Features, Precautions; Microwave Power Measurement – Bolometer Method. Measurement of Attenuation, Frequency, VSWR, Cavity Q. Impedance Measurements.

TEXT BOOKS :
   1. Microwave Devices and Circuits – Samuel Y. Liao, PHI, 3rd Edition,1994.
   2. Microwave Principles – Herbert J. Reich, J.G. Skalnik, P.F. Ordung and H.L. Krauss, CBS Publishers and Distributors, New Delhi, 2004.

REFERENCES :
   1. Foundations for Microwave Engineering – R.E. Collin, IEEE Press, John Wiley, 2nd Edition, 2002.
   2. Microwave Circuits and Passive Devices – M.L. Sisodia and G.S.Raghuvanshi, Wiley Eastern Ltd., New Age International Publishers Ltd., 1995.
   3. Microwave Engineering Passive Circuits – Peter A. Rizzi, PHI, 1999.
   4. Electronic and Radio Engineering – F.E. Terman, McGraw-Hill, 4th ed., 1955.
   5. Elements of Microwave Engineering – R. Chatterjee, Affiliated East-West Press Pvt. Ltd., New Delhi, 1988.
   6. Micro Wave and Radar Engineering – M. Kulkarni, Umesh Publications, 1998.

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MICROPROCESSORS AND INTERFACING

UNIT-I
An over view of 8085, Architecture of 8086 Microprocessor. Special functions of General purpose registers. 8086 flag register and function of 8086 Flags. Addressing modes of 8086. Instruction set of 8086. Assembler directives, simple programs, procedures, and macros.

UNIT-II
Assembly language programs involving logical, Branch & Call instructions, sorting, evaluation of arithmetic expressions, string manipulation.

UNIT-III
Pin diagram of 8086-Minimum mode and maximum mode of operation. Timing diagram. Memory interfacing to 8086 (Static RAM & EPROM). Need for DMA. DMA data transfer Method. Interfacing with 8237/8257.

UNIT-IV
8255 PPI – various modes of operation and interfacing to 8086. Interfacing Keyboard, Displays, 8279 Stepper Motor and actuators. D/A and A/D converter interfacing.

UNIT-V
Interrupt structure of 8086. Vector interrupt table. Interrupt service routines. Introduction to DOS and BIOS interrupts. 8259 PIC Architecture and interfacing cascading of interrupt controller and its importance.

UNIT-VI
Serial data transfer schemes. Asynchronous and Synchronous data transfer schemes. 8251 USART architecture and interfacing. TTL to RS 232C and RS232C to TTL conversion. Sample program of serial data transfer. Introduction to High-speed serial communications standards, USB.

UNIT-VII
Advanced Micro Processors - Introduction to 80286, Salient Features of 80386, Real and Protected Mode Segmentation & Paging, Salient Features of Pentium, Branch Prediction, Overview of RISC Processors.

UNIT-VIII
8051 Microcontroller Architecture, Register set of 8051, Modes of timer operation, Serial port operation, Interrupt structure of 8051, Memory and I/O interfacing of 8051.

TEXT BOOKS :
1. Advanced microprocessor and Peripherals - A.K.Ray and K.M.Bhurchandi, TMH, 2000.
2. Micro Controllers – Deshmukh, Tata McGraw Hill Edition.

REFERENCES :
1. Micro Processors & Interfacing – Douglas U. Hall, 2007.
2. The 8088 and 8086 Micro Processors – PHI, 4th Edition, 2003.
3. Micro Computer System 8086/8088 Family Architecture, Programming and Design - By Liu and GA Gibson, PHI, 2nd Ed.,

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MICROPROCESSORS AND INTERFACING LAB

I. Microprocessor 8086 :
1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing :
1. 8259 – Interrupt Controller : Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display : Write a small program to display a string of characters.
3. 8255 – PPI : Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART : Write a program in ALP to establish Communication between two processors.

III. Microcontroller 8051
1. Reading and Writing on a parallel port.
2. Timer in different modes.
3. Serial communication implementation.

Equipment required for Laboratories:
1. 8086 µP Kits
2. 8051 Micro Controller kits
3. Interfaces/peripheral subsystems
   - i) 8259 PIC
   - **ii)** 8279-KB/Display
   - **iii)** 8255 PPI
   - **iv)** 8251 USART

4. ADC Interface
5. DAC Interface
6. Traffic Controller Interface
7. Elevator Interface

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ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English - starting a conversation – responding appropriately and relevantly – using the right body language – role play in different situations.
- Vocabulary building – synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- Group Discussion – dynamics of group discussion , intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.
- Resume' writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.
- Technical Report writing – Types of formats and styles, subject matter – organization, clarity, coherence and style, planning, data-collection, tools, analysis.

4. Minimum Requirement:

The English Language Lab shall have two parts:

- i) **The Computer aided Language Lab** for 60 students with 60 systems, one master console, LAN facility and English language software for self- study by learners.
- ii) **The Communication Skills Lab** with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo –audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- iii) P – IV Processor
  - a) Speed – 2.8 GHZ
  - b) RAM – 512 MB Minimum
  - c) Hard Disk – 80 GB
- iv) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:
- **Clarity Pronunciation Power** – part II
- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
  - ➢ **Preparing for being Interviewed,**
  - ➢ **Positive Thinking,**
  - ➢ **Interviewing Skills,**
  - ➢ **Telephone Skills,**
  - ➢ **Time Management**
  - ➢ **Team Building,**
  - ➢ **Decision making**

- **English in Mind**, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:
1. **Effective Technical Communication**, M. Ashraf Rizvi, Tata Mc. Graw-Hill Publishing Company Ltd.
2. **A Course in English communication** by Madhavi Apte, Prentice-Hall of India, 2007.
3. **Communication Skills** by Leena Sen, Prentice-Hall of India, 2005.
4. **Academic Writing- A Practical guide for students** by Stephen Bailey, Rontledge Falmer, London & New York, 2004.
5. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
6. **Body Language- Your Success Mantra** by Dr. Shalini Verma, S. Chand, 2006.
7. **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice**, New Age International (P) Ltd., Publishers, New Delhi.
8. Books on **TOEFL/GRE/GMAT/CAT** by Barron's/cup
9. **IELTS series with CDs** by Cambridge University Press.
10. **Technical Report Writing Today** by Daniel G. Riordan & Steven E. Pauley, Biztantra Publishers, 2005.
11. **Basic Communication Skills for Technology** by Andra J. Rutherford, 2nd Edition, Pearson Education, 2007.
12. **Communication Skills for Engineers** by Sunita Mishra & C. Muralikrishna, Pearson Education, 2007.
13. **Objective English** by Edgar Thorpe & Showick Thorpe, 2nd edition, Pearson Education, 2007.
14. **Cambridge Preparation for the TOEFL** Test by Jolene Gear & Robert Gear, 4th Edition.
15. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press.

DISTRIBUTION AND WEIGHTAGE OF MARKS:
Advanced Communication Skills Lab Practicals:
1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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COMPUTER NETWORKS

UNIT – I
Introduction : OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks ,Arpanet, Internet, Network Topologies WAN, LAN, MAN.

UNIT - II
Physical Layer : Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications; Narrow band, broad band ISDN and ATM.

UNIT - III
Data link layer : Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM.

UNIT - IV
Medium Access sub layer : ALOHA, MAC addresses, Carrier sense multiple access. IEEE 802.X Standard Ethernet, wireless LANS. Bridges,

UNIT - V
Network Layer : Virtual circuit and Datagram subnets-Routing algorithm shortest path routing, Flooding, Hierarchical routing, Broad cast, Multi cast, distance vector routing.

UNIT – VI
Dynamic routing – Broadcast routing. Rotary for mobility. Congestion, Control Algorithms – General Principles – of Congestion prevension policies. Internet working: The Network layer in the internet and in the ATM Networks.

UNIT –VII
Transport Layer: Transport Services, Connection management, TCP and UDP protocols; ATM AAL Layer Protocol.

UNIT – VIII
Application Layer – Network Security, Domain name system, SNMP, Electronic Mail; the World WEB, Multi Media.

TEXT BOOKS :
1. Computer Networks — Andrew S Tanenbaum,4th Edition. Pearson Education/PHI
2. Data Communications and Networking – Behrouz A. Forouzan.Third Edition TMH.

REFERENCES :
1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education.
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson.

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ELECTRONIC MEASUREMENTS AND INSTRUMENTATION

UNIT I

Performance characteristics of instruments, Static characteristics, Accuracy, Resolution, Precision, Expected value, Error, Sensitivity. Errors in Measurement, Dynamic Characteristics-speed of response, Fidelity, Lag and Dynamic error. DC Voltmeters- Multirange, Range extension/Solid state and differential voltmeters, AC voltmeters- multi range, range extension, shunt. Thermocouple type RF ammeter, Ohmmeters series type, shunt type, Multimeter for Voltage, Current and resistance measurements.

UNIT II

Signal Generator- fixed and variable, AF oscillators, Standard and AF sine and square wave signal generators, Function Generators, Square pulse, Random noise, sweep, Arbitrary waveform.

UNIT III

Wave Analyzers, Haromonic Distortion Analyzers, Spectrum Analyzers, Digital Fourier Analyzers.

UNIT IV

Oscilloscopes CRT features, vertical amplifiers, horizontal deflection system, sweep, trigger pulse, delay line, sync selector circuits, simple CRO, triggered sweep CRO, Dual beam CRO, Measurement of amplitude and frequency.

UNIT V

Dual trace oscilloscope, sampling oscilloscope, storage oscilloscope, digital readout oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type, Frequency counter, Time and Period measurement.

UNIT VI

AC Bridges Measurement of inductance- Maxwell's bridge, Anderson bridge. Measurement of capacitance - Schearing Bridge. Wheat stone bridge. Wien Bridge, Errors and precautions in using bridges. Q-meter.

UNIT VII

Transducers- active & passive transducers : Resistance, Capacitance, inductance; Strain gauges, LVDT, Piezo Electric transducers, Resistance Thermometers, Thermocouples, Thermistors, Sensistors.

UNIT VIII

Measurement of physical parameters force, pressure, velocity, humidity, moisture, speed, proximity and displacement. Data acquisition systems.

TEXTBOOKS :
   1. Electronic instrumentation, second edition - H.S.Kalsi, Tata McGraw Hill, 2004.
   2. Modern Electronic Instrumentation and Measurement Techniques – A.D. Helfrick and W.D. Cooper, PHI, 5th Edition, 2002.

REFERENCES :
   1. Electronic Instrumentation & Measurements - David A. Bell, PHI, 2nd Edition, 2003.
   2. Electronic Test Instruments, Analog and Digital Measurements - Robert A.Witte, Pearson Education, 2nd Ed., 2004.
   3. Electronic Measurements & Instrumentations by K. Lal Kishore, Pearson Education - 2005.

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CELLULAR AND MOBILE COMMUNICATIONS

UNIT I
CELLULAR MOBILE RADIO SYSTEMS : Introduction to Cellular Mobile System, Performance criteria, uniqueness of mobile radio environment, operation of cellular systems, Hexagonal shaped cells, Analog and Digital Cellular systems.

UNIT II
ELEMENTS OF CELLULAR RADIO SYSTEM DESIGN : General description of the problem, concept of frequency channels, Co-channel Interference Reduction Factor, desired C/I from a normal case in a omni directional Antenna system, Cell splitting, consideration of the components of Cellular system.

UNIT III
INTERFERENCE : Introduction to Co-Channel Interference, real time Co-Channel interference, Co-Channel measurement, design of Antenna system, Antenna parameters and their effects, diversity receiver, non-co-channel interference-different types.

UNIT IV
CELL COVERAGE FOR SIGNAL AND TRAFFIC : Signal reflections in flat and hilly terrain, effect of human made structures, phase difference between direct and reflected paths, constant standard deviation, straight line path loss slope, general formula for mobile propagation over water and flat open area, near and long distance propagation antenna height gain, form of a point to point model.

UNIT V
CELL SITE AND MOBILE ANTENNAS : Sum and difference patterns and their synthesis, omni directional antennas, directional antennas for interference reduction, space diversity antennas, umbrella pattern antennas, minimum separation of cell site antennas, high gain antennas.

UNIT VI
FREQUENCY MANAGEMENT AND CHANNEL ASSIGNMENT : Numbering and grouping, setup access and paging channels channel assignments to cell sites and mobile units, channel sharing and borrowing, sectorization, overlaid cells, non fixed channel assignment.

UNIT VII
Handoff, dropped calls and cell splitting, types of handoff, handoff invitation, delaying handoff, forced handoff, mobile assigned handoff. Intersystem handoff, cell splitting, micro cells, vehicle locating methods, dropped call rates and their evaluation.

UNIT VIII
DIGITAL CELLULAR NETWORKS : GSM architecture, GSM channels, multiplex access scheme , TDMA, CDMA.

TEXTBOOKS :
1. Mobile Cellular Telecommunications – W.C.Y. Lee, Tata McGraw Hill, 2rd Edn., 2006.
2. Principles of Mobile Communications – Gordon L. Stuber, Springer International 2nd Edition, 2007.

REFERENCES :
1. Wireless Communications - Theodore. S. Rapport, Pearson education, 2nd Edn., 2002.
2. Wireless and Mobile Communications – Lee McGraw Hills, 3rd Edition, 2006.
3. Wireless Communication and Networking – Jon W. Mark and Weihua Zhqung, PHI, 2005.
4. Wireless Communication Technology – R. Blake, Thompson Asia Pvt. Ltd., 2004.

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RADAR SYSTEMS

UNIT I
Introduction Nature of Radar, Maximum Unambiguous Range, Radar Waveforms, Simple form of Radar Equation, Radar Block Diagram and Operation, Radar Frequencies and Applications. Related Problems.

UNIT II
Radar Equation : Prediction of Range Performance, Minimum Detectable Signal, Receiver Noise and SNR, Integration of Radar Pulses, Radar Cross Section of Targets (simple targets - sphere, cone-sphere), Transmitter Power, PRF and Range Ambiguities, System Losses (qualitative treatment). Related Problems.

UNIT III
CW and Frequency Modulated Radar : Doppler Effect, CW Radar – Block Diagram, Isolation between Transmitter and Receiver, Non-zero IF Receiver, Receiver Bandwidth Requirements, Applications of CW radar.

UNIT IV
FM-CW Radar, Range and Doppler Measurement, Block Diagram and Characteristics (Approaching/ Receding Targets), FM-CW altimeter, Measurement Errors, Multiple Frequency CW Radar.

UNIT V
MTI and Pulse Doppler Radar : Introduction, Principle, MTI Radar with - Power Amplifier Transmitter and Power Oscillator Transmitter, Delay Line Cancellers – Filter Characteristics, Blind Speeds, Double Cancellation, Staggered PRFs. Range Gated Doppler Filters. MTI Radar Parameters, Limitations to MTI Performance. Non-coherent MTI, MTI versus Pulse Doppler Radar.

UNIT VI
Tracking Radar : Tracking with Radar, Sequential Lobing, Conical Scan, Monopulse Tracking Radar – Amplitude Comparison Monopulse (one- and two- coordinates), Phase Comparison Monopulse. Target Reflection Characteristics and Angular Accuracy. Tracking in Range, Acquisition and Scanning Patterns. Comparison of Trackers.

UNIT VII
Detection of Radar Signals in Noise : Introduction, Matched Filter Receiver – Response Characteristics and Derivation, Correlation Function and Cross-correlation Receiver, Efficiency of Non-matched Filters, Matched Filter with Non-white Noise.

UNIT VIII
Radar Receivers – Noise Figure and Noise Temperature. Displays – types. Duplexers – Branch type and Balanced type, Circulators as Duplexers. Introduction to Phased Array Antennas – Basic Concepts, Radiation Pattern, Beam Steering and Beam Width changes, Series versus Parallel Feeds, Applications, Advantages and Limitations.

TEXT BOOKS :
1. Introduction to Radar Systems – Merrill I. Skolnik, SECOND EDITION, McGraw-Hill, 1981.

REFERENCES :
1. Introduction to Radar Systems – Merrill I. Skolnik, THIRD EDITION, Tata McGraw-Hill, 2001.

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MICRO CONTROLLERS AND APPLICATIONS
(ELECTIVE – I)

UNIT I
OVERVIEW OF ARCHITECTURE AND MICROCONTROLLER RESOURCES : Architecture of a microcontroller – Microcontroller resources – Resources in advanced and next generation microcontrollers – 8051 microcontroller – Internal and External memories – Counters and Timers – Synchronous serial-cumasynchronous serial communication - Interrupts.

UNIT II
8051 FAMILY MICROCONTROLLERS INSTRUCTION SET : Basic assembly language programming – Data transfer instructions – Data and Bit-manipulation instructions – Arithmetic instructions – Instructions for Logical operations on the tes among the Registers, Internal RAM, and SFRs – Program flow control instructions – Interrupt control flow.

UNIT III
REAL TIME CONTROL : INTERRUPTS : Interrupt handling structure of an MCU – Interrupt Latency and Interrupt deadline – Multiple sources of the interrupts – Non-maskable interrupt sources – Enabling or disabling of the sources – Polling to determine the interrupt source and assignment of the priorities among them – Interrupt structure in Intel 8051.

UNIT IV
REAL TIME CONTROL: TIMERS : Programmable Timers in the MCU's – Free running counter and real time control – Interrupt interval and density constraints.

UNIT V
SYSTEMS DESIGN : DIGITAL AND ANALOG INTERFACING METHODS : Switch, Keypad and Keyboard interfacings – LED and Array of LEDs – Keyboard-cum-Display controller (8279) – Alphanumeric Devices – Display Systems and its interfaces – Printer interfaces – Programmable instruments interface using IEEE 488 Bus – Interfacing with the Flash Memory – Interfaces – Interfacing to High Power Devices – Analog input interfacing – Analog output interfacing – Optical motor shaft encoders – Industrial control – Industrial process control system – Prototype MCU based Measuring instruments – Robotics and Embedded control – Digital Signal Processing and Digital Filters.

UNIT VI
REAL TIME OPERATING SYSTEM FOR MICROCONTROLLERS : Real Time operating system – RTOS of Keil (RTX51) – Use of RTOS in Design – Software development tools for Microcontrollers.

UNIT VII
16-BIT MICROCONTROLLERS : Hardware – Memory map in Intel 80196 family MCU system – IO ports – Progammable Timers and High-speed outputs and input captures – Interrupts – instructions.

UNIT VIII
ARM 32 Bit MCUs : Introduction to 16/32 Bit processors – ARM architecture and organization – ARM / Thumb programming model – ARM / Thumb instruction set – Development tools.

TEXT BOOKS :
1. Microcontrollers Architecture, Programming, Interfacing and System Design – Raj Kamal, Pearson Education, 2005.
2. The 8051 Microcontroller and Embedded Systems – Mazidi and Mazidi, PHI, 2000.

REFERENCES :
1. Microcontrollers (Theory & Applications) – A.V. Deshmuk, WTMH, 2005.
2. Design with PIC Microcontrollers – John B. Peatman, Pearson Education, 2005.

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TELEVISION ENGINEERING
(ELECTIVE – I)

UNIT I
INTRODUCTION : TV transmitter and receivers, synchronization. Television Pictures: Geometric form and aspect ratio, image continuity, interlaced scanning, picture resolution, Composite video signal: Horizontal and vertical sync, scanning sequence. Colour signal generation and Encoding**:** Perception of brightness and colours, additive colour mixing, video signals for colours, luminance signal, colour difference signals, encoding of colour difference signals, formation of chrominance signals, PAL encoder.

UNIT II
TV SIGNAL TRANSMISSION AND PROPAGATION : Picture signal transmission, positive and negative modulation, VSB transmission, sound signal transmission, standard channel BW, TV transmitter, TV signal propagation, interference, TV broadcast channels, TV transmission Antennas.

UNIT III
TV CAMERAS : Camera tube types, Vidicon, Silicon Diode Array Vidicon, Monochrome TV camera, color camera. CCD Image Sensors.

UNIT IV
PICTURE TUBES : Monochromatic Picture tube, Electrostatic focussing, Beam deflection, picture tube characteristics and specifications, colour picture tubes. TV Standards: American 525 line B&W TV system, NTSC colour system, 625-line monochrome system,b PAL colour system, TV standards.

UNIT V
MONOCHROME TV RECEIVER : RF tuner, IF subsystem, video amplifier, sound section, sync separation and processing, deflection circuits, scanning circuits. PAL-D Colour Receiver: Electron tuners, IF subsystem, Y-signal channel, Chroma decoder, Separation of U & V Colour Phasors, synchronous demodulators, Subcarrier generation, raster circuits.

UNIT VI
VISION IF SUBSYSTEM : AGC, noise cancellation, video and intercarrier sound signal detection, vision IF subsystem of Black and White receivers, Colour receiver IF subsystem. Receiver sound system: FM detection, FM Sound detectors, typical applications. TV Receiver Tuners: Tuner operation, VHF and UHF tuners, digital tuning techniques, remote control of receiver functions.

UNIT VII
COLOUR SIGNAL DECODING : PAL – D decoder, chroma signal amplifiers, separation of U and V signals, Color burst separation, Burst phase discriminator, ACC amplifier, Reference oscillator, Indent and colour killer circuits, RO phase shift and 180o PAL–SWITCH circuitry, U & V demodulators, Colour signal mixing.

UNIT VIII
SYNC SEPARATION, AFC AND DEFLECTION OSCILLATORS : Synchronous separation, k noise in sync pulses, separation of frame and line sync pulses. AFC, single ended AFC circuit. Deflection Oscillators, deflection drive Ics. Receiver Antennas. DIGITAL TV Digital Satellite TV, Direct to Home Satellite TV, Digital TV Receiver, Digital Terrestrial TV.

TEST BOOKS :
  1. Modern Television Practice – Principles, Technology and Service – R.R. Gulati, New Age International Publication, 2002.
  2. Monochrome and Colour TV – R.R. Gulati, New Age International Publication, 2002.

REFERENCES :
  1. Colour Television Theory and Practice – S.P. Bali, TMH, 1994.
  2. Television and Video Engineering - A.M. Dhake, 2nd Edition.
  3. Basic Television and Video Systems – B. Grob and C.E. Herndon, McGraw Hill, 1999.

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OPERATING SYSTEMS
(ELECTIVE - I)

UNIT I
Computer System and Operating System Overview; Overview of Computer System hardware – Instruction execution – I/O function – Interrupts – Memory hierarchy – I.O Communication techniques. Operating System Objectives and functions – Evaluation of operating System – Example Systems.

UNIT II
Process Description – Process Control-process states – Process and Threads - Examples of Process description and Control.

UNIT III
Concurrency : Principles of Concurrency – Mutual Exclusion – Software and hardware approaches – semaphores – Monitors – Message Passing – Readers Writers Problem.

UNIT IV
Principles of deadlock – deadlock prevention, detection and avoidance dining philosophers problem – example Systems.

UNIT V
Memory Management: Memory Management requirements – loading programmes in to main memory – virtual memory – hardware and Control structures – OS Software – Examples of Memory Management.

UNIT VI
Uniprocessor Scheduling: Types of Scheduling – Scheduling algorithms – I/O management and Disc Scheduling – I/o devices – organization – of I/O function – OS design issues – I/O buffering – Disk I/O – disk scheduling Policies – examples System.

UNIT VII
File Management and Security: Overview of file management – file organization and access – File Directories – File sharing – record blocking – secondary Storage Management – example system.

UNIT VIII
Security : Security threats – Protection – intruders – Viruses – trusted System.

TEXT BOOKS :
1. Operating Systems' – Internal and Design Principles, Fifth Edition–2005, Pearson education./PHI
2. Operating System Principles- Abraham Silberchatz, Peter B. Galvin, Greg Gagne,7th Edition John Wiley

REFERENCES :
1. Operating Systems A design approach- Crowley,TMH.
2. Modern Operating Systems, Andrew S Tanenbaum. 2nd Edition, PHI/PEARSON.

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DIGITAL IMAGE PROCESSING
(ELECTIVE – II)

UNIT I

Digital image fundamentals - Digital Image through scanner, digital camera. Concept of gray levels. Gray level to binary image conversion. Sampling and quantization. Relation ship between pixels. Imaging Geometry.

UNIT II

Image Transforms 2-D FFT , Properties. Walsh transform, Hadamard Transform, Discrete cosine Transform, Haar transform, Slant transform, Hotelling transform.

UNIT III

Image enhancement Point processing. Histogram processing. Spatial filtering.

UNIT IV

Enhancement in frequency domain, Image smoothing, Image sharpening.

UNIT V

Colour image processing : Psedo colour image processing, full colour image processing.

UNIT VI

Image Restoration Degradation model, Algebraic approach to restoration, Inverse filtering, Least mean square filters, Constrained Least Squares Restoration, Interactive Restoration.

UNIT VII

Image segmentation Detection of discontinuities. Edge linking and boundary detection, Thresholding, Region oriented segmentation.

UNIT VIII

Image compression Redundancies and their removal methods, Fidelity criteria, Image compression models, Source encoder and decoder, Error free compression, Lossy compression.

TEXT BOOK :

1. Digital Image processing – R.C. Gonzalez & R.E. Woods, Addison Wesley/ Pearson education, 2nd Education, 2002.

REFERENCES :

1. Fundamentals of Digital Image processing – A.K.Jain , PHI.
2. Digital Image processing using MAT LAB – Rafael C. Gonzalez, Richard E Woods and Steven L. Edition, PEA, 2004.
3. Digital Image Processing – William K. Pratt, John Wilely, 3rd Edition, 2004.
4. Fundamentals of Electronic Image Processing – Weeks Jr., SPIC/IEEE Series, PHI.

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SATELLITE COMMUNICATIONS
(ELECTIVE – II)

UNIT I
INTRODUCTION [2] : Origin of Satellite Communications, Historical Back-ground, Basic Concepts of Satellite Communications, Frequency allocations for Satellite Services, Applications, Future Trends of Satellite Communications.

UNIT II
ORBITAL MECHANICS AND LAUNCHERS[1] : Orbital Mechanics, Look Angle determination, Orbital perturbations, Orbit determination, launches and launch vehicles, Orbital effects in communication systems performance.

UNIT III
SATELLITE SUBSYSTEMS[1] : Attitude and orbit control system, telemetry, tracking, Command and monitoring, power systems, communication subsystems, Satellite antenna Equipment reliability and Space qualification.

UNIT IV
SATELLITE LINK DESIGN[1] : Basic transmission theory, system noise temperature and G/T ratio, Design of down links, up link design, Design of satellite links for specified C/N, System design example.

UNIT V
MULTIPLE ACCESS[1][2] : Frequency division multiple access (FDMA) Intermodulation, Calculation of C/N. Time division Multiple Access (TDMA) Frame structure, Examples. Satellite Switched TDMA Onboard processing, DAMA, Code Division Multiple access (CDMA),Spread spectrum transmission and reception.

UNIT VI
EARTH STATION TECHNOLOGY[3] : Introduction, Transmitters, Receivers, Antennas, Tracking systems, Terrestrial interface, Primary power test methods.

UNIT VII
LOW EARTH ORBIT AND GEO-STATIONARY SATELLITE SYSTEMS[1] : Orbit consideration, coverage and frequency considerations, Delay & Throughput considerations, System considerations, Operational NGSO constellation Designs

UNIT VIII
SATELLITE NAVIGATION & THE GLOBAL POSITIONING SYSTEM [1] : Radio and Satellite Navigation, GPS Position Location principles, GPS Receivers and codes, Satellite signal acquisition, GPS Navigation Message, GPS signal levels, GPS receiver operation, GPS C/A code accuracy, Differential GPS.

TEXT BOOKS :
1. Satellite Communications – Timothy Pratt, Charles Bostian and Jeremy Allnutt, WSE, Wiley Publications, 2nd Edition, 2003.
2. Satellite Communications Engineering – Wilbur L. Pritchard, Robert A Nelson and Henri G.Suyderhoud, 2nd Edition, Pearson Publications, 2003.

REFERENCES :
1. Satellite Communications : Design Principles – M. Richharia, BS Publications, 2nd Edition, 2003.
2. Satellite Communication - D.C Agarwal, Khanna Publications, 5th Ed.
3. Fundamentals of Satellite Communications – K.N. Raja Rao, PHI, 2004
4. Satellite Communications – Dennis Roddy, McGraw Hill, 2nd Edition, 1996.

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DATABASE MANAGEMENT SYSTEMS
(ELECTIVE-II)

UNIT – I

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor – History of Data base Systems.Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT – II

Relational Model: Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views. Relational Algebra and Calculus: Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT – III

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOTR – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL 0 Triggers and Active Data bases.

UNIT – IV

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – forth Normal Form.

UNIT – V

Overview of Transaction Management: ACID Properties – Transactions and Schedules – Concurrent Execution of transaction – Lock Based Concurrency Control – Performance Locking – Transaction Support in SQL – Introduction to Crash recovery.

UNIT – VI

Concurrency Control: Serializability, and recoverability – Introduction to Lock Management – Lock Conversions – Dealing with Dead Locks – Specialized Locking Techniques – Concurrency without Locking. Crash recovery: Introduction to ARIES – the Log – Other Recovery related Structures – the Write-Ahead Log Protocol – Check pointing – re3covering from a System Crash – Media recovery – Other approaches and Interaction with Concurrency control.

UNIT – VII

Overview of Storage and Indexing: Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning.

UNIT – VIII

Storing data: Disks and Files : - The Memory Hierarchy – Redundant Arrays of Independent – Disks – Disk Space Management – Buffer Manager – Files of records – Page Formats – record formats. Tree Structured Indexing: Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure. Hash Based Indexing: Static Hashing – Extendable hashing – Linear Hashing – Exendble vs. Liner hashing.

TEXT BOOKS :

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1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition.
2. Data base System Concepts, Silberschatz, Korth, Mc.Graw hill, IV edition.

REFERENCES :

1. Introduction to Database Systems, C.J.Date Pearson Education
2. Data base Systems design, Implementation, and Management, Rob & Coronel 5th Edition.Thomson.
3. Data base Management System, Elmasri Navrate Pearson Education.
4. Data base Management System Mathew Leon, Leon Vikas.
5. Data base Systems, Connoley Pearson education.

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MICROWAVE AND OPTICAL COMMUNICATIONS LAB

Minimum Twelve Experiments to be conducted:

Part – A (Any 7 Experiments) :
1. Reflex Klystron Characteristics.
2. Gunn Diode Characteristics.
3. Attenuation Measurement.
4. Directional Coupler Characteristics.
5. VSWR Measurement.
6. Impedance and Frequency Measurement.
7. Waveguide parameters measurement.
8. Scattering parameters of Circulator.
9. Scattering parameters of Magic Tee.

Part – B (Any 5 Experiments) :
10. Characterization of LED.
11. Characterization of Laser Diode.
12. Intensity modulation of Laser output through an optical fiber.
13. Measurement of Data rate for Digital Optical link.
14. Measurement of NA.
15. Measurement of losses for Analog Optical link.

Equipment required for Laboratories:

1. Regulated Klystron Power Supply
2. VSWR Meter   -
3. Micro Ammeter   -   0 – 500 µA
4. Multimeter
5. CRO
6. GUNN Power Supply, Pin Moderator
7. Reflex Klystron
8. Crystal Diodes
9. Micro wave components (Attenuation)
10. Frequency Meter
11. Slosted line carriage
12. Probe detector
13. wave guide shorts
14. Pyramidal Horn Antennas
15. Directional Coupler
16. E, H, Magic Tees
17. Circulators, Isolator
18. Matched Loads
19. Fiber Optic Analog Trainer based LED
20. Fiber Optic Analog Trainer based laser
21. Fiber Optic Digital Trainer
22. Fiber cables   -   (Plastic, Glass)

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DIGITAL SIGNAL PROCESSING LAB

LIST OF EXPERIMENTS :

1. To study the architecture of DSP chips – TMS 320C 5X/6X Instructions.
2. To verify linear convolution.
3. To verify the circular convolution.
4. To design FIR filter (LP/HP) using windowing technique
a) Using rectangular window
b) Using triangular window
c) Using Kaiser window
5. To Implement IIR filter (LP/HP) on DSP Processors
6. N-point FFT algorithm.
7. MATLAB program to generate sum of sinusoidal signals.
8. MATLAB program to find frequency response of analog LP/HP filters.
9. To compute power density spectrum of a sequence.
10. To find the FFT of given 1-D signal and plot.

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OPTICAL COMMUNICATIONS

UNIT I

Overview of optical fiber communication - Historical development, The general system, advantages of optical fiber communications. Optical fiber wave guides- Introduction, Ray theory transmission, Total Internal Reflection, Acceptance angle, Numerical Aperture, Skew rays. Cylindrical fibers- Modes, Vnumber, Mode coupling, Step Index fibers, Graded Index fibers.

UNIT II

Single mode fibers- Cut off wavelength, Mode Field Diameter, Effective Refractive Index. [2]. Fiber materials — Glass, Halide, Active glass, Chalgenide glass, Plastic optical fibers. Signal distortion in optical fibers- Attenuation, Absorption, Scattering and Bending losses, Core and Cladding losses.

UNIT III

Information capacity determination, Group delay, Types of Dispersion - Material dispersion, Wave-guide dispersion, Polarization mode dispersion, Intermodal dispersion. Pulse broadening. Optical fiber Connectors- Connector types, Single mode fiber connectors, Connector return loss.

UNIT IV

Fiber Splicing- Splicing techniques, Splicing single mode fibers. Fiber alignment and joint loss- Multimode fiber joints, single mode fiber joints,. Optical sources- LEDs, Structures, Materials, Quantum efficiency, Power, Modulation, Power bandwidth product. Injection Laser Diodes- Modes, Threshold conditions, External quantum efficiency,Laser diode rate equations,Resonant frequencies. Reliability of LED&ILD.

UNIT V

Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling.

UNIT VI

Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparision of Photodetectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers.

UNIT VII

Optical system design — Considerations, Component choice, Multiplexing. Point-to- point links, System considerations, Link power budget with examples. Overall fiber dispersion in Multi mode and Single mode fibers, Rise time budget with examples.

UNTI VIII

Transmission distance, Line coding in Optical links, WDM, Necessity , Principles, Types of WDM, Measurement of Attenuation and Dispersion, Eye pattern.

TEXT BOOKS :
1. Optical Fiber Communications – Gerd Keiser, Mc Graw-Hill International edition, 3rd Edition, 2000.
2. Optical Fiber Communications – John M. Senior, PHI, 2nd Edition, 2002.

RERFERENCES :
1. Fiber Optic Communications – D.K. Mynbaev , S.C. Gupta and Lowell L. Scheiner, Pearson Education, 2005.
2. Text Book on Optical Fibre Communication and its Applications – S.C.Gupta, PHI, 2005.
3. Fiber Optic Communication Systems – Govind P. Agarwal , John Wiley, 3rd Ediition, 2004.
4. Fiber Optic Communications – Joseph C. Palais, 4th Edition, Pearson Education, 2004.

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EMBEDDED AND REAL TIME SYSTEMS
(ELECTIVE – III)

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.

UNIT II

GENERAL PURPOSE PROCESSORS : Basic architecture, operation, Pipelining, Programmer's view, development environment, Application Specific Instruction-Set Processors (ASIPs) – Micro Controllers and Digital Signal Processors.

UNIT III

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 IV

COMMUNICATION INTERFACE : Need for communication interfaces, RS232 / UART, RS422 / RS485, USB, Infrared, IEEE 1394 Firewire, Ethernet, IEEE 802.11, Blue tooth.

UNIT V

EMBEDDED / RTOS CONCEPTS – I : Architecture of the Kernel, Tasks and Task scheduler, Interrupt service routines, Semaphores, Mutex.

UNIT VI

EMBEDDED/RTOS CONCEPTS – II : Mailboxes , Message Queues, Event Registers, Pipes, Signals

UNIT VII

EMBEDDED / RTOS CONCEPTS – III : Timers, Memory Management, Priority inversion problem, Embedded operating systems Embedded Linux, Real-time operating systems, RT Linux, Handheld operating systems, Windows CE.

UNIT VIII

DESIGN TECHNOLOGY : Introduction, Automation, Synthesis, Parallel evolution of compilation and synthesis, Logic Synthesis, RT synthesis, Behavioral Synthesis, Systems Synthesis and Hardware/ Software Co-Design, Verification, Hardware/Software co-simulation, Reuse of intellectual property codes.

TEXT BOOKS :
   1. Embedded System Design – A Unified Hardware/Software Introduction - Frank Vahid, Tony D. Givargis, John Wiley, 2002.
   2. Embedded / Real Time Systems – KVKK Prasad, Dreamtech Press, 2005.

REFERENCES :
   1. Embedded Microcomputer Systems – Jonathan W. Valvano, Brooks / Cole, Thompson Learning.
   2. An Embedded Software Primer – David E. Simon, Pearson Ed., 2005.
   3. Introduction to Embedded Systems – Raj Kamal, TMS, 2002.
   4. Embedded Real Time Systems Programming – Sri Ram V Iyer, Pankaj Gupta, TMH, 2004.

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BIO-MEDICAL INSTRUMENTATION
(ELECTIVE – III)

UNIT I

Components of Medical Instrumentation System. Bioamplifier. Static and dynamic characteristics of medical instruments. Biosignals and characteristics. Problems encountered with measurements from human beings.

UNIT II

Organisation of cell. Derivation of Nernst equation for membrane Resting Potential Generation and Propagation of Action Potential, Conduction through nerve to neuro-muscular junction.

UNIT III

Bio Electrodes – Biopotential Electrodes-External electrodes, Internal Electrodes. Biochemical Electrodes.

UNIT IV

Mechanical function, Electrical Conduction system of the heart. Cardiac cycle. Relation between electrical and mechanical activities of the heart.

UNIT V

Cardiac Instrumentation Blood pressure and Blood flow measurement. Specification of ECG machine. Einthoven triangle, Standard 12-lead configurations, Interpretation of ECG waveform with respect to electro mechanical activity of the heart.

UNIT VI

Therapeutic equipment. Pacemaker, Defibrillator, Shortwave diathermy. Hemodialysis machine.

UNIT VII

Neuro-Muscular Instrumentation Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording. Intrepretation of EEG and EMG.

UNIT VIII

Respiratory Instrumentation Mechanism of respiration, Spirometry, Pnemuotachograph Ventilators.

TEXT BOOKS :

1. Biomedical Instrumentation and Measurements – Leslie Cromwell and F.J. Weibell, E.A. Pfeiffer, PHI, 2nd Ed, 1980.
2. Medical Instrumentation, Application and Design – John G. Webster, John Wiley, 3rd Ed., 1998.

REFERENCES :

1. Principles of Applied Biomedical Instrumentation – L.A. Geoddes and L.E. Baker, John Wiley, 1975.
2. Hand-book of Biomedical Instrumentation – R.S. Khandpur, TMH, 2nd Ed., 2003.
3. Biomedical Telemetry – Mackay, Stuart R., John Wiley, 1968.

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DIGITAL DESIGN THROUGH VERILOG
(ELECTIVE – III)

UNIT I

INTRODUCTION TO VERILOG : Verilog as HDL, Levels of Design Description, Concurrency, Simulation and Synthesis, Functional Verification, System Tasks, Programming Language Interface (PLI), Module, Simulation and Synthesis Tools, Test Benches.

LANGUAGE CONSTRUCTS AND CONVENTIONS : Introduction, Keywords, Identifiers, White Space Characters, Comments, Numbers, Strings, Logic Values, Strengths, Data Types, Scalars and Vectors, Parameters, Memory, Operators, System Tasks, Exercises.

UNIT II

GATE LEVEL MODELING : Introduction, AND Gate Primitive, Module Structure, Other Gate Primitives, Illustrative Examples, Tri-State Gates, Array of Instances of Primitives, Additional Examples, Design of Flip-flops with Gate Primitives, Delays, Strengths and Contention Resolution, Net Types, Design of Basic Circuits, Exercises.

UNIT III

BEHAVIORAL MODELING : Introduction, Operations and Assignments, Functional Bifurcation, *Initial* Construct, *Always* Construct, Examples, Assignments with Delays, *Wait* construct, Multiple Always Blocks, Designs at Behavioral Level, Blocking and Non blocking Assignments, The *case* statement, Simulation Flow. *if* and *if-else* constructs, *assign-deassign* construct, *repeat* construct, *for* loop, the *disable* construct, *while* loop, *forever* loop, parallel blocks, *force-release* construct, Event.

UNIT IV

MODELING AT DATA FLOW LEVEL : Introduction, Continuous Assignment Structures, Delays and Continuous Assignments, Assignment to Vectors, Operators.

SWITCH LEVEL MODELING.

Introduction, Basic Transistor Switches, CMOS Switch, Bi-directional Gates, Time Delays with Switch Primitives, Instantiations with Strengths and Delays, Strength Contention with Trireg Nets, Exercises.

UNIT V

SYSTEM TASKS, FUNCTIONS, AND COMPILER DIRECTIVES : Introduction, Parameters, Path Delays, Module Parameters, System Tasks and Functions, File-Based Tasks and Functions, Compiler Directives, Hierarchical Access, General Observations, Exercises,

FUNCTIONS, TASKS, AND USER-DEFINED PRIMITIVES : Introduction, Function, Tasks, User- Defined Primitives (UDP), FSM Design (Moore and Mealy Machines)

UNIT VI

DIGITAL DESIGN WITH SM CHARTS : State Machine Charts, Derivation of SM Charts, Realization of SM Charts, Implementation of the Dice Game, Alternative realizations for SM Charts using Microprogramming, Linked State Machines.

UNIT VII

DESIGNING WITH PROGRAMMABLE GATE ARRAYS AND COMPLEX PROGRAMMABLE

LOGIC DEVICES : Xilinx 3000 Series FPGAs, Designing with FPGAs, Using a One-Hot State Assignment, Altera Complex Programmable Logic Devices (CPLDs), Altera FLEX 10K Series CPLDs.

UNIT VIII

VERILOG MODELS : Static RAM Memory, A simplified 486 Bus Model, Interfacing Memory to a Microprocessor Bus, UART Design, Design of Microcontroller CPU.

TEST BOOKS :
   1. Design through Verilog HDL – T.R. Padmanabhan and B. Bala Tripura Sundari, WSE, 2004 IEEE Press.
   2. A Verilog Primier – J. Bhaskar, BSP, 2003.

REFERENCES :
   1. Fundamentals of Logic Design with Verilog – Stephen. Brown and Zvonko Vranesic, TMH, 2005.

2. Digital Systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.
3. Advanced Digital Design with Verilog HDL – Michael D. Ciletti, PHI, 2005.
4. Digital systems Design using VHDL – Charles H Roth, Jr. Thomson Publications, 2004.

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WIRELESS COMMUNCIATIONS AND NETWORKS
(ELECTIVE – IV)

UNIT I
MULTIPLE ACCESS TECHNIQUES FOR WIRELESS COMMUNICATION : Introduction, FDMA, TDMA, Spread Spectrum, Multiple access, SDMA, Packet radio, Packet radio protocols, CSMA protocols, Reservation protocols

UNIT II
INTRODUCTION TO WIRELESS NETWORKING : Introduction, Difference between wireless and fixed telephone networks, Development of wireless networks, Traffic routing in wireless networks.

UNIT III
WIRELESS DATA SERVICES : CDPD, ARDIS, RMD, Common channel signaling, ISDN, BISDN and ATM, SS7, SS7 user part, signaling traffic in SS7.

UNIT IV
MOBILE IP AND WIRELESS ACCESS PROTOCOL : Mobile IP Operation of mobile IP, Co-located address, Registration, Tunneling, WAP Architecture, overview, WML scripts, WAP service, WAP session protocol, wireless transaction, Wireless datagram protocol.

UNIT V
WIRELESS LAN TECHNOLOGY : Infrared LANs, Spread spectrum LANs, Narrow bank microwave LANs, IEEE 802 protocol Architecture, IEEE802 architecture and services, 802.11 medium access control, 802.11 physical layer.

UNIT VI
BLUE TOOTH : Overview, Radio specification, Base band specification, Links manager specification, Logical link control and adaptation protocol. Introduction to WLL Technology.

UNIT VII
MOBILE DATA NETWORKS : Introduction, Data oriented CDPD Network, GPRS and higher data rates, Short messaging service in GSM, Mobile application protocol.

UNIT VIII
WIRELESS ATM & HIPER LAN : Introduction, Wireless ATM, HIPERLAN, Adhoc Networking and WPAN.

TEXT BOOKS :
1. Wireless Communications, Principles, Practice – Theodore, S. Rappaport, PHI, 2nd Edn., 2002.
2. Wireless Communication and Networking – William Stallings, PHI, 2003.

REFERENCES :
1. Wireless Digital Communications – Kamilo Feher, PHI, 1999.
2. Principles of Wireless Networks – Kaveh Pah Laven and P. Krishna Murthy, Pearson Education, 2002.
3. Wireless Communications – Andreaws F. Molisch, Wiley India, 2006.
4. Introduction to Wireless and Mobile Systems – Dharma Prakash Agarwal, Qing-An Zeng, Thomson 2nd Edition, 2006.

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DSP PROCESSORS AND ARCHITECTURES
(ELECTIVE – IV)

UNIT I

INTORODUCTION TO DIGITAL SIGNAL PROCESING : Introduction, A Digital signal-processing system, The sampling process, Discrete time sequences. Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT), Linear time-invariant systems, Digital filters, Decimation and interpolation, Analysis and Design tool for DSP Systems MATLAB, DSP using MATLAB.

UNIT II

COMPUTATIONAL ACCURACY IN DSP IMPLEMENTATIONS : Number formats for signals and coefficients in DSP systems, Dynamic Range and Precision, Sources of error in DSP implementations, A/D Conversion errors, DSP Computational errors, D/A Conversion Errors, Compensating filter.

UNIT III

ARCHITECTURES FOR PROGRAMMABLE DSP DEVICES : Basic Architectural features, DSP Computational Building Blocks, Bus Architecture and Memory, Data Addressing Capabilities, Address Generation Unit, Programmability and Program Execution, Speed Issues, Features for External interfacing.

UNIT IV

EXECUTION CONTROL AND PIPELINING : Hardware looping, Interrupts, Stacks, Relative Branch support, Pipelining and Performance, Pipeline Depth, Interlocking, Branching effects, Interrupt effects, Pipeline Programming models.

UNIT V

PROGRAMMABLE DIGITAL SIGNAL PROCESSORS : Commercial Digital signal-processing Devices, Data Addressing modes of TMS320C54XX DSPs, Data Addressing modes of TMS320C54XX Processors, Memory space of TMS320C54XX Processors, Program Control, TMS320C54XX instructions and Programming, On-Chip Peripherals, Interrupts of TMS320C54XX processors, Pipeline Operation of TMS320C54XX Processors.

UNIT VI

IMPLEMENTATIONS OF BASIC DSP ALGORITHMS : The Q-notation, FIR Filters, IIR Filters, Interpolation Filters, Decimation Filters, PID Controller, Adaptive Filters, 2-D Signal Processing.

UNIT VII

IMPLEMENTATION OF FFT ALGORITHMS : An FFT Algorithm for DFT Computation, A Butterfly Computation, Overflow and scaling, Bit-Reversed index generation, An 8-Point FFT implementation on the TMS320C54XX, Computation of the signal spectrum.

UNIT VIII

INTERFACING MEMORY AND I/O PERIPHERALS TO PROGRAMMABLE DSP DEVICES :
Memory space organization, External bus interfacing signals, Memory interface, Parallel I/O interface, Programmed I/O, Interrupts and I/O, Direct memory access (DMA). A Multichannel buffered serial port (McBSP), McBSP Programming, a CODEC interface circuit, CODEC programming, A CODEC-DSP interface example.

TEXT BOOKS :
   1. Digital Signal Processing – Avtar Singh and S. Srinivasan, Thomson Publications, 2004.
   2. DSP Processor Fundamentals, Architectures & Features – Lapsley et al. S. Chand & Co, 2000.

REFERENCES :
   1. Digital Signal Processors, Architecture, Programming and Applications – B. Venkata Ramani and M. Bhaskar, TMH, 2004.
   2. Digital Signal Processing – Jonatham Stein, John Wiley, 2005.

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ARTIFICIAL NEURAL NETWORKS
(ELECTIVE – IV)

UNIT I
INTRODUCTION TO ARTIFICIAL NEURAL NETWORKS : Introduction, Artificial Neural Networks, Historical Development of Neural Networks, Biological Neural Networks, Comparison Between Brain and the Computer, Comparison Between Artificial and Biological Neural Networks, Network Architecture, Setting the Weights, Activation Functions, Learning Methods.

UNIT II
FUNDAMENTAL MODELS OF ARTIFICIAL NEURAL NETWORKS : Introduction, McCulloch – Pitts Neuron Model, Architecture, Learning Rules, Hebbian Learning Rule, Perceptron Learning Rule, Delta Learning Rule (Widrow-Hoff Rule or Leastmean Squre (LMS) rule, Competitive Learning Rule, Out Star Learning Rule, Boltzmann Learning, Memory Based Learning.

UNIT III
FEED FORWARD NETWORKS : Introduction, Single Layer Perceptron Architecture, Algorithm, Application Procedure, Perception Algorithm for Several Output Classes, Perceptron Convergence Theorem, Brief Introduction to Multilayer Perceptron networks, Back Propagation Network (BPN), Generalized Delta Learning Rule, Back Propagation rule, Architecture, Training Algorithm, Selection of Parameters, Learning in Back Propagation, Application Algorithm, Local Minima and Global Minima, Merits and Demerits of Back Propagation Network, Applications, Radial Basis Function Network (RBFN), Architecture, Training Algorithm for an RBFN with Fixed Centers.

UNIT IV
ADALINE AND MADALINE NETWORKS : Introduction, Adaline Architecture, Algorithm, Applications, Madaline, Architecture, MRI Algorithm, MRII Algorithm.

UNIT V
COUNTER PROPAGATION NETWORKS : Winner Take – all learning, out star learning, Kohonen Self organizing network, Grossberg layer Network, Full Counter Propagation Network (Full CPN), Architecture, Training Phases of Full CPN, Training Algorithm, Application Procedure, Forward Only counter Propagation Network, Architecture, Training Algorithm, Applications, Learning Vector Quantizer (LVQ).

UNIT VI
ASSOCIATIVE MEMORY NETWORKS - I : Types, Architecture, Continuous and Discrete Hopfield Networks, Energy Analysis, Storage and Retrival Algorithms, Problems with Hopfield Networks.

UNIT VII
ASSOCIATIVE MEMORY NETWORKS – II : Boltzman Machine, Bidirectional Associative Memory, Adaptive Resonance Theory Networks Introduction, Architecture, Algorithm.

UNIT VIII
APPLICATIONS OF NEURAL NETWORKS : Implementation of A/D Converter using Hopfield Network, Solving Optimization Problems, Solving Simultaneous Linear Equation, Solving Traveling Salesman Problems using Hopfield Networks, Application in Pattern Recognition, Image Processing.

TEXTBOOKS :
1. Introduction to Artificial Neural Systems - J.M.Zurada, Jaico Publishers, 3rd Edition.
2. Introduction to Neural Networks Using MATLAB 6.0 - S.N. Shivanandam, S. Sumati, S. N. Deepa, TMH.

REFERENCES :
1. Elements of Artificial Neural Networks - Kishan Mehrotra, Chelkuri K. Mohan, and Sanjay Ranka, Penram International.
2. Artificial Neural Network – Simon Haykin, Pearson Education, 2nd Ed.
3. Fundamental of Neural Networks – Laurene Fausett, Pearson, 1st Ed.
4. Artificial Neural Networks - B. Yegnanarayana, PHI.