2007-2008

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

ELECTRONICS AND INSTRUMENTATION 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		**20**	**15**	**56**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

B.TECH. ELECTRONICS AND INSTRUMENTATION ENGINEERING

II YEAR I-SEMESTER
COURSE STRUCTURE

CODE	SUBJECT	T	P	C
	Mathematics – III	4+1*	-	4
	Electrical Technology	4+1 *	-	4
	Electromagnetic Waves and Transmission Lines	4+1 *	-	4
	Signals and Systems	4+1 *	-	4
	Pulse and Digital Circuits	4+1 *	-	4
	Switching Theory and Logic Design	4+1*	-	4
	Electrical Technology Lab	-	3	2
	Pulse and Digital Circuits Lab	-	3	2
	TOTAL	**30**	**6**	**28**

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KAKINADA

B.TECH. ELECTRONICS AND INSTRUMENTATION ENGINEERING

COURSE STRUCTURE
II YEAR II SEMESTER

CODE	SUBJECT	T	P	C
	Managerial Economics and Financial Analysis	4+1*	-	4
	Environmental Studies	4+1*	-	4
	Calibration and Electronic Measurements	4+1*	-	4
	Digital IC Applications	4+1*	-	4
	Linear IC Applications	4+1*	-	4
	Sensors and Signal Conditioning	4+1*	-	4
	IC Applications Lab	-	3	2
	Instrumentation Lab – I	-	3	2
	TOTAL	**30**	**6**	**28**

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B.TECH. ELECTRONICS AND INSTRUMENTATION ENGINEERING

III YEAR I SEMESTER
COURSE STRUCTURE

CODE	SUBJECT	T	P	C
	Management Science	4+1*	-	4
	Computer Organization	4+1*	-	4
	Control Systems	4+1*	-	4
	Electronic Circuit Analysis	4+1*	-	4
	Industrial Instrumentation	4+1*	-	4
	Process Control Instrumentation	4+1*	-	4
	Process Control Lab.	-	3	2
	Advanced English Communication Skills Lab	-	3	2
	TOTAL	**30**	**6**	**28**

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B.TECH. ELECTRONICS AND INSTRUMENTATION ENGINEERING

III YEAR II SEMESTER
COURSE STRUCTURE

CODE	SUBJECT		T	P	C
	Automation of Industrial Processes		4+1*	-	4
	Microprocessors and Interfacing		4+1*	-	4
	Digital Signal Processing		4+1*	-	4
	Principles of Communication		4+1*	-	4
	Optoelectronic and Laser Instrumentation		4+1*	-	4
	Biomedical Instrumentation	4+1*	-	4	
	Electronics Design Automation Lab		-	3	2
	Instrumentation Lab. – II		-	3	2
	TOTAL		**30**	**6**	**28**

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B.TECH. ELECTRONICS AND INSTRUMENTATION ENGINEERING

IV YEAR I SEMESTER
COURSE STRUCTURE

CODE	SUBJECT		T	P	C
	VLSI Design		4+1*	-	4
	Object Oriented Programming		4+1*	-	4
	Analytical Instrumentation		4+1*	-	4
	P C Based Instrumentation	4+1*	-	4	
	ELECTIVE – I		4+1*	-	4
	Power Plant Instrumentation				
	Operating Systems				
	Virtual Instrumentation				
	ELECTIVE – II		4+1*	-	4
	Digital Control Systems				
	Artificial Neural Networks				
	Computer Networks				
	Microprocessors and Interfacing Lab		-	3	2
	Instrumentation Lab - III		-	3	2
	TOTAL		**30**	**6**	**28**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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B.TECH. ELECTRONICS AND INSTRUMENTATION ENGINEERING

IV YEAR II SEMESTER
COURSE STRUCTURE

CODE	SUBJECT		T	P	C
	Industrial Electronics		4+1*	-	4
	ELECTIVE – III		4+1*	-	4
	Robotics and Automation				
	Micro Controllers and Applications				
	Embedded and Real Time Systems				
	ELECTIVE – IV		4+1*	-	4
	Management Information Systems				
	Telemetry and Telecontrol				
	DSP Processors and Architectures				
	Industry Oriented Mini Project Work		-	-	2
	Seminar	-	-	2	
	Project Work		-	-	10
	Comprehensive Viva		-	-	2
TOTAL			**15**		**28**

NOTE: All University Examinations (Theory and Practical) are of 3 hours duration.
* : Tutorials
T : Theory periods per week P: Practical /Drawing Periods per week
C : Total Credits for the subject

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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I Year B.Tech. EIE	**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***, KAKINADA: 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. EIE	**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. EIE	**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. EIE	**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. EIE	**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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I Year B.Tech. EIE	**T**	**P**	**C**
	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 :

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

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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 I.
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:
$1+x+x^2+x^3+\ldots\ldots\ldots\ldots+x^n$
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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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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ELECTROMAGNETIC WAVES AND TRANSMISSION LINES

UNIT I

ELECTROSTATICS [1]

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 [1] 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) [2] 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 [2,1].

UNIT IV

EM Wave Characteristics - I [2] 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 [2] 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 [2,1].

UNIT V

Guided Waves Parallel Plane Waveguides [2] : 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 Characeristic 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; /4, /2, /8 Lines – Impedance Transformations. Smith Chart – Configuration and Applications, Single and Double Stub Matching. Related Problems.

TEXT BOOKS:

1. Elements of Electromagnetics – 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. Networks, Lines and Fields – John D. Ryder, PHI, 2nd ed.,1999. Engineering Electromagnetics – William H. Hayt Jr. and John A. Buck, TMH, 7th ed., 2006.
3. Electromagnetic Field Theory and Transmission Lines – G.S.N. Raju, Pearson Edn. Pte. Ltd., 2005.
4. Transmission Lines and Networks – Umesh Sinha, Satya Prakashan (Tech.India Publications), New Delhi, 2001.

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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. Signals & Systems Analysis Using Transformation Methods & MAT Lab - Robert:, TMH, 2003.
4. Signals, Systems and Transforms - C. L. Philips, J.M.Parr and Eve A.Riskin, Pearson education., 3rd Edition, 2004.

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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.
2. Wave Generation and Shaping - L. Strauss.
3. Pulse, Digital Circuits and Computer Fundamentals - R.Venkataraman.

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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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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 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 of 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, Cobb-Douglas 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)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit IV Introduction to Markets & Pricing Policies:

Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Objectives and Policies of Pricing- **Methods of Pricing:** Cost Plus Pricing, Marginal Cost Pricing, Sealed Bid Pricing, Going Rate Pricing, Limit Pricing, Market Skimming Pricing, Penetration Pricing, Two-Part Pricing, Block Pricing, Bundling Pricing, Peak Load Pricing, Cross Subsidization.

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).

TEXT BOOKS:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.
2. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2003.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.
5. S. A. Siddiqui & A. S. Siddiqui, Managerial Economics & Financial Analysis, New age International Space Publications.
6. Domnick Salvatore: Managerial Economics In a Global Economy, 4th Edition, Thomson.
7. Narayanaswamy: Financial Accounting—A Managerial Perspective, PHI.
8. Raghunatha Reddy & Narasimhachary: Managerial Economics& Financial Analysis, Scitech.
9. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas.
10. Truet and Truet: Managerial Economics:Analysis, Problems and Cases, Wiley.
11. Dwivedi:Managerial Economics, 6th Ed., Vikas.

Prerequisites: Nil

Objective: To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

Codes/Tables: Present Value Tables need to be permitted into the examinations Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions.
Each question should not have more than 3 bits.

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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 resources: 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 ological 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 andecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a mega-diversity nation - Hot-sports of biodiversity - Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. - Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ 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 cosystemspond,
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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CALIBRATION AND ELECTRONIC MEASUREMENTS

UNIT – I:

Introduction to measurements. Physical measurement. Forms and methods of measurements. Measurement errors. Statistical analysis of measurement data. Probability of errors. Limiting errors.

UNIT – II:

Standards. Definition of standard units. International standards. Primary standards. Secondary standards. Working standards. Voltage standard. Resistance standard. Current standard. Capacitance standard. Time and frequency standards.

UNIT – III:

Testing and calibration. Traceability. Measurement reliability. Calibration experiment and evaluation of results. Primary calibration. Secondary calibration. Direct calibration. Indirect calibration. Routine calibration. Calibration of a voltmeter, ammeter and an
oscilloscope
.

UNIT - IV

Voltage and current measurements: DC & AC voltage measurements using Rectifier, Thermocouple & Electronic voltmeters, Ohm meter, Digital Voltmeters, Range Extension of Ammeters & Voltmeter.

UNIT – V

Bridges: AC Bridges – measurement of inductance, Maxwell's bridge, Anderson bridge, measurement of capacitance, Schering bridge, measurement of impedance – Kelvin's bridge, Wheat Stone bridge, HF bridges, problems of shielding, and
grounding, Q-meter.

UNIT – Vl

Frequency Counters: Basic Principle, errors associated with counter, Different modes of operations: Frequency, Time, Time Period, Average time period, Totalizing, Frequency synthesizer, Wave meters, Wave Analyzers, Output Power meter.

UNIT – VII

Oscilloscopes: CRO operation, CRT characteristics, probes, Time base sweep modes, Trigger generator, Vertical amplifier, modes of operation, A, B, alternate & chop modes, sampling oscilloscopes, storage oscilloscope, Standard specifications of CRO, Synchronous selector circuits.

Unit – VIII

Spectrum analyzers, Different types of spectrum analyzer, Recorders, Introduction to magnetic recording techniques & X-Y plotters. Display Devices and Display Systems, Logic Analyzers – State & time referenced data capture.

TEXT BOOKS:

1. Electronic Instrumentation – HS Kalsi, Tata Mc Graw Hill, 2004..
2. PHIAlan S. Morris: Principles of measurement and instrumentation, 2nd edition,Prentice-Hall of India,2004.

REFERENCES:

1.John P. Bentley: Principles of measurement systems, 3rd edition, Addison Wesley Longman, 2000.
2.Measuring Systems, Application and Design – by E.O. Doebelin, McGraw Hill.
3. Electrical and Electronic Measurements – by Shawney, Khanna Publ.
4. Electronic Instrumentation and measurements – by David A. Bell, 2nd Edition,PHI, 2003.
5. M.M.S. Anand: Electronic instruments and instrumentation Technology, Prentice-Hall of India,2004.

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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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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 and its features, FET input. Op-Amps, Op-Amp parameters & Measurement, Input and Out put Off set voltages and 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 and Analog Integrated Circuits – Sergio Franco, McGraw Hill, 1988.
2. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick Driscoll, PHI, 6th Edition.
3. Micro Electronics – Millman, McGraw Hill,1988.
4. Operational Amplifiers – C.G. Clayton, Butterworth & Company Publ. Ltd./ Elsevier, 1971.
5. Linear Integrated Applications by K. Lal Kishore, Pearson Education - 2005

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SENSORS AND SIGNAL CONDITIONING

UNIT1:

Introduction to measurement systems: general concepts and terminology, measurement systems, sensor classification, general input-output configuration, methods of correction

performance characteristics: static characteristics of measurement systems, accuracy, precision, sensitivity, other characteristics: linearity, resolution, systematic errors , random errors, dynamic characteristics of measurement systems: zero-order, first-order, and second-order measurement systems and response

UNIT2:

Resistive sensors: potentiometers , strain gages and types, resistive temperature detectors (rtds) , thermistors , magneto resistors, light-dependent resistors (ldrs)

UNIT3:

Signal conditioning for resistive sensors: measurement of resistance , voltage dividers , Wheatstone bridge. Balance and deflection measurements , sensor bridge calibration and compensation instrumentation amplifiers , interference types and reduction

UNIT4:

Reactance variation and electromagnetic sensors : capacitive sensors – variable & differential, inductive sensors - reluctance variation, eddy current, linear variable differential transformers (lvdts) , variable transformers: synchros, resolvers, inductosyn , magneto elastic sensors, electromagnetic sensors - sensors based on faraday's law, hall effect sensors

UNIT5:

Signal conditioning for reactance variation sensors : problems and alternatives, ac bridges, carrier amplifiers - application to the lvdt, variable oscillators, resolverto- digital and digital-to-resolver converters

UNIT6:

Self-generating sensors: thermoelectric sensors, piezoelectric sensors, pyroelectric sensors, photovoltaic sensors , electrochemical sensors

UNIT7:

Signal conditioning for self-generating sensors: chopper and low-drift amplifiers, offset and drifts amplifiers , electrometer amplifiers, charge amplifiers, noise in amplifiers

UNIT8:

Digital sensors: position encoders, variable frequency sensors - quartz digital thermometer, vibrating wire strain gages , vibrating cylinder sensors, saw sensors, digital flow meters, Sensors based on semiconductor junctions : thermometers based on semiconductor junctions, magneto diodes and magneto transistors, photodiodes and phototransistors, sensors based on mosfet transistors, charge-coupled sensors - types of ccd imaging sensors , ultrasonic-based sensors , fiber-optic sensors

TEXT BOOK:

1. Sensors and Signal Conditioning : Ramon Pallás Areny, John G. Webster; 2nd edition, John Wiley and Sons, 2000.
2. Sensors and Transducers – D.Patranabis, TMH 2003

REFERENCES:

1. Sensor Technology Handbook – Jon Wilson, Newne 2004.
2. Instrument Transducers – An Introduction to Their Performance and Design – by Herman K.P. Neubrat, Oxford University Press.
3. Measurement System : Applications and Design – by E.O. Doeblin, McGraw Hill Publications.
4. Process Control Instrumentation Technology – D. Johnson, John Wiley and Sons

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LINEAR IC APPLICATIONS LAB

Minimum Twelve Experiments to be conducted :
Study of OP AMPs – IC 741, IC 555, IC 565, IC 566, IC 1496 – functioning, parameters and Specifications.
OP AMP Applications – Adder, Subtractor, Comparator Circuits.
Integrator and Differentiator Circuits using IC 741.
Active Filter Applications – LPF, HPF (first order)
Active Filter Applications – BPF, Band Reject (Wideband) and Notch Filters.
IC 741 Oscillator Circuits – Phase Shift and Wien Bridge Oscillators.
Function Generator using OP AMPs.
IC 555 Timer – Monostable Operation Circuit.
IC 555 Timer – Astable Operation Circuit.
Schmitt Trigger Circuits – using IC 741 and IC 555.
IC 565 – PLL Applications.
IC 566 – VCO Applications.
Voltage Regulator using IC 723.
Three Terminal Voltage Regulators – 7805, 7809, 7912.
4 bit DAC using OP AMP.

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INSTRUMENTATION LAB – I

(Minimum 10 experiments should be conducted)

1. Conversion of D' Arsonval Galvanometer into DC meters (Current and voltage)
2. Conversion of D' Arsonval Galvanometer into AC meters (Current and voltage)
3. Conversion of D' Arsonval Galvano meter into Ohm meter.
4. Measurement of RLC and Q using Q-meter
5. Measurement of strain using strain gauge
6. Measurement of R, L and C using bridge circuits.
7. RTD – characteristics.
8. LVDT – characteristics.
9. Inductive and capacitive tranducers.
10. Piezoelectric tranducers.
11. Bourdon tube
12. Acceleration transducer.

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MANAGEMENT SCIENCE

Unit I: ***Introduction to Management*****:** Concepts of Management and organization- Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, 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 III: ***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: $\bar{x}$ chart, R chart, *c* chart, *p* chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

Unit IV: ***A) Materials Management*****:** Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management

B) 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, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

Unit VIII: ***Contemporary Management Practices*****:** Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis,Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering and Bench Marking, Balanced Score Card.

Text Book:

1. Aryasri: *Management Science*, TMH, New Delhi.

Reference Books:

1. Kotler Philip & Keller Kevin Lane: Marketing Mangement 12/e, PHI, 2007
2. Koontz & Weihrich: *Essentials of Management*, 6/e, TMH, 2007
3. Thomas N.Duening & John M.Ivancevich *Management—Principles and Guidelines,* Biztantra,2007.
4. Kanishka Bedi, *Production and Operations Management*, Oxford University Press, 2007.

5. Memoria & S.V.Ganker, *Personnel Management*, Himalaya, 25/e, 2007
6. Schermerhorn: *Management*, Wiley, 2007.
7. Parnell: Strategic Management, Biztantra,20073.
8. L.S.Srinath: PERT/CPM,Affiliated East-West Press, 2007.

Pre-requisites: Managerial Economics

***Objective*:** To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables: Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions.
Each question should not have more than 3 bits.
Unit VIII will have only short questions, not essay questions.

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COMPUTER ORGANIZATION

UNIT I :

BASIC STRUCTURE OF COMPUTERS : Computer Types, Functional unit, Basic OPERATIONAL concepts, Bus structures, Software, Performance, multiprocessors and multi computers. 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 transfers, Arithmetic Mircrooperatiaons, 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. 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, microprogram example, design of control unit Hard wired control. Microprogrammed 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 : Basic concepts semiconductor RAM memories. Read-only memories Cache memories performance considerations, Virtual memories secondary storage. Introduction to RAID.

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; Introduction to peripheral component, Interconnect (PCI) bus. Introduction to standard serial communication protocols like RS232, USB, IEEE1394.

UNIT VII :

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

UNIT VIII :

MULTI PROCESSORS : Characteristics or Multiprocessors, Interconnection Structures, Interprocessor Arbitration. InterProcessor Communication and Synchronization Cache Coherance. Shared Memory Multiprocessors.

TEXT BOOKS :

1. Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.
2. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI

REFERENCES :

1. Computer Organization and Architecture – William Stallings Sixth Edition, Pearson/PHI
2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/Pearson
3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.
4. Computer Architecture a quantitative approach, John L. Hennessy and David A. Patterson, Fourth Edition Elsevier
5. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

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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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ELECTRONIC CIRCUIT 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 ¶t, expression for ¶b, Current Gain with Resistance Load, CE Short Circuit Current Gain, Hybrid– pi) Parameters, Measurement of ¶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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INDUSTRIAL INSTRUMENTATION

UNIT – I: METROLOGY

Measurement of length – Plainness – Area – Diameter – Roughness – Angle – Comparators – Gauge blocks – Optical Methods of length and distance measurements.

UNIT – II: VELOCITY AND ACCELERATION MEASUREMENT

Relative velocity – Translational and Rotational velocity measurement – Revolution counters and Timers - Magnetic and Photoelectric pulse counting stroboscopic methods - Accelerometers of different types - Gyroscopes.

UNIT – III: FORCE AND TORQUE MEASUREMENT

Force measurement – Different methods –Torque measurement – Dynamometers- Gyroscopic Force and Torque Measurement – Vibrating wire Force transducer

UNIT – IV: PRESSURE MEASUREMENT

Basics of Pressure measurement – Deadweight Gages and Manometers types – Force-Balance and Vibrating Cylinder Transducers – High and Low Pressure measurement – McLeod Gage, Knudsen Gage, Momentum Transfer Gages, Thermal Conductivity Gages, Ionization Gazes, Dual Gage Techniques.

UNIT – V: FLOW MEASUREMENT

Head type, Area type (Rota meter), electromagnetic type, Positive displacement type, mass flow meter, ultrasonic type ,vertex shedding type, Hotwire anemometer type.. Laser Doppler Veloci-meter.

UNIT – VI: DENSITY MEASUREMENT

Volume Flow meter Plus Density measurement – Strain Gauge load cell method – Buoyancy method - Air pressure balance method – Gamma ray method – Vibrating probe method. Direct Mass Flow meters.

UNIT – VII: RADIATION MEASUREMENT

Radiation Fundamentals. Radiation Detectors. Radiation Thermometers. Optical Pyrometers.

UNIT – VIII: OTHER MEASUREMENTS

Sound-Level Meter. Microphones. Time, Frequency, and Phase-Angle measurement. Liquid Level. Humidity. Chemical Composition. Particle Instruments and Clean-Room

TEXT BOOKS:

1. Measurement Systems – Applications and Design – by Doeblin E.O., 4/e, McGraw Hill International, 1990.
2. Principles of Industrial Instrumentation – Patranabis D. TMH. End edition 1997

REFERENCES:

1. Process Instruments and Control Handbook – by Considine D.M., 4/e, McGraw Hill International, 1993.
2. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishers, 1986.
3. Instrument Technology, vol. I – by Jones E.B., Butterworths, 1981.

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PROCESS CONTROL INSTRUMENTATION

UNIT – I:

PROCESS DYNAMICS

Process variables – Load variables – Dynamics of simple pressure, flow level and temperature process – interacting and non-interacting systems – continuous and batch process – self-regulation – Servo and Regulator operation - problems.

UNIT – II:

CONTROL ACTIONS AND CONTROLLERS

Basic control actions – characteristics of two position, three position, Proportional, Single speed floating, Integral and Derivative control modes – PI, PD, PID control modes – Problems –

UNIT – III:

TYPES OF CONTROLLERS

Pneumatic, Hydraulic and Electronic Controllers to realize various control actions.

UNIT – IV:

CONTROLLER SETTINGS

Evaluation criteria – 1/4th decay ratio, IEA, ISE, ITAE - determination of optimum settings for mathematically described process using time response and frequency response.

UNIT – V:

TUNING OF CONTROLLERS

Tuning process curve reaction method – continuous oscillation method – damped oscillation method – problems.

UNIT – VI:

FINAL CONTROL ELEMENTS

I/P Converter , P/I converter - pneumatic, electric and hydraulic actuators – valve positioner

UNIT – VII:

CONTROL VALVES

Control valves – characteristic of control valves – valve body – Globe, Butterfly, diaphragm, Ball valves – Control valve sizing – Cavitations, flashing - problems.

UNIT – VIII:

MULTILOOP CONTROL SYSTEM

Feed forward control – Ratio control – Cascade control – Split range – Multivariable control and examples from distillation column and Boiler system.

TEXT BOOKS :

1. Chemical Process Control : An introduction to Theory and Practice – by Stephanopoulos, Prentice Hall, New Delhi, 1999.
2. Process Control – Harriott P. , TMH, 1991

REFERENCES:

1. Process Control, Third Edition – Liptak B.G., Chilton Book Company, Pennsylvania, 1995
2. Process control – by Pollard A., Heinemann Educational Books, London, 1971.
3. Automatic Process Control – by Eckman D.P. , Wiley Eastern Ltd., New Delhi, 1993.
4. Process Control – by Patranabis.
5. Process System Analysis and Control – Coughanowr, McGraw Hill, Singapore, 1991

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PROCESS CONTROL LAB

(Minimum 10 experiments should be conducted)
1. Flow level control unit.
2. Temperature level control unit.
3. Servo and regulator operation.
4. Realization of control actions: Pneumatic controllers. Hydraulic controllers.
5. Electronic controllers.
6. Process tuning – Process reaction curve method.
7. Process tuning – continuous and damped oscillation method.
8. Operation of flow loop in plant.
9. Input convertor – Pneumatic actuator.
10. Input convertor – Hydraulic actuator.
11. Control valve characteristics (Different types).
12. Multi loop control systems – Ratio Control.
13. Multi loop control systems – Cascade Control.

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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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AUTOMATION OF INDUSTRIAL PROCESSES

UNIT – I:

INTRODUCTION TO COMPUTER CONTROL

Role of computers in the control of Industrial processes (plants). Elements of Computer Controlled Process / Plant. Classification – Batch, Continuous, Supervisory and Direct Digital Controls. Architecture – Centralized, Distributed and Hierarchical Systems. Man Machine or Human Computer Interface (HCI).

UNIT – II:

BUILDING BLOCKS

Process Control Requirements of Computers. Process related variables. Computer Network. Communications in Distributed control Systems. Smart Sensors and Field bus.

UNIT – III:

CONTROL SYSTEM DESIGN -I

Control System Design – Heuristics, Structural Controllability and Relative Gain Array. Controller Design – Regulator design and other design considerations. Controller Tuning – P, PI, PID, and Ziegler-Nicholas method. Computer aided Control System Design.

UNIT – IV:

CONTROL SYSTEM DESIGN –II

Computer control loop, Modified Z – Transform, Zero-order hold equivalence, First order system with time delay, Converting continuous time controller to discrete time domain, Design of controllers based on discrete time model – Deadbeat and Dahlin's algorithms.

UNIT – V:

DESIGN OF FEED FORWARD CONTROLLER

Block Diagram, Feed Forward control algorithms – dynamic, static, Deadbeat

UNIT – VI:

CASCADE, PREDICTIVE AND ADAPTIVE CONTROL

Cascade Control – Dynamic response, Types, Implementation. Predictive Control – Model based and Multivariable System. Adaptive Control – Adjustment, Schemes, and Techniques.

UNIT – VII:

ADVANCED STRATEGIES

Inferential Control. Intelligent Control. Statistical Process Control. Algorithms for Processes with Dead Time – Smith Predictor (SP), Analytical Predictor (AP). Optimal Control

UNIT – VIII:

DISTRIBUTED DIGITAL CONTROL

Programmable logic controllers (PLC)- Architecture , Selection. Overview of Distributed Digital Control System (DCS). DCS Software configuration. DCS Communication – Data Highway. DCS Supervisory computer Tasks. DCS

Integration with PLCs and Computers.

TEXT BOOKS:

1. Computer Aided Process Control – S.K.Singh. PHI 2004
2. Computer Control of Processes – M.Chidambaram. Narosa 2003.

REFERENCES:

1. Computer-based Industrial Control by Krishna Kanth. PHI 1997
2. Real Time Control: An Introduction – second edition - S.Bennett, Pearson Education India 2003.

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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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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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PRINCIPLES OF COMMUNICATIONS

UNIT I

Introduction : Block diagram of Electrical communication system, Radio communication : Types of communications, Analog, pulse and digital Types of signals, Fourier Transform for various signals, Fourier Spectrum, Power spectral density, Autocorrelation, correlation, convolution.

UNIT II

Amplitude Modulation : Need for modulation, Types of Amplitude modulation, AM, DSB SC, SSB SC, Power and BW requirements, generation of AM, DSB SC, SSB SC, Demodulation of AM : Diode detector, Product demodulation for DSB SC & SSB SC.

UNIT III

Angle Modulation : Frequency & Phase modulations, advantages of FM over AM, Bandwidth consideration, Narrow band and Wide band FM, Comparison of FM & PM.

UNIT IV

Pulse Modulations : Sampling, Nyquist rate of sampling, Sampling theorem for Band limited signals, PAM, regeneration of base band signal, PWM and PPM, Time Divison Multiplexing, Frequency Divison Multiplexing, Asynchronous Multiplexing.

UNIT V

Digital Communication : Advantages, Block diagram of PCM, Quantization, effect of quantization, quantization error, Base band digital signal, DM, ADM, ADPCM and comparison.

UNIT VI

Digital Modulation : ASK, FSK, PSK, DPSK, QPSK demodulation, coherent and incoherent reception, Modems.

UNIT VII

Information Theory : Concept of information, rate of information and entropy, Source coding for optimum rate of information, Coding efficiency, Shanon-Fano and Huffman coding.

UNIT VIII

Error control coding : Introduction, Error detection and correction codes, block codes, convolution codes.

TEXT BOOKS:

1. Communication Systems Analog and Digital – R.P. Singh and SD Sapre, TMH, 20th reprint, 2004.
2. Principles of Communications – H. Taub and D. Schilling, TMH, 2003.

REFERENCES

1. Electronic Communication Systems – Kennedy and Davis, TMH, 4th edition, 2004.
2. Communication Systems Engineering – John. G. Proakis and Masoud Salehi, PHI, 2ndEd. 2004.

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OPTOELECTRONIC AND LASER INSTRUMENTATION

UNIT – I:

OPTICAL FIBERS AND THEIR PROPERTIES

Introduction to optical fibers – Light guidance – Numerical aperture – Dispersion – Different types of fibers and their properties.

UNIT – II:

Light Sources for fiber optics, Photo detectors, source coupling, splicing and connectors.

UNIT – III:

LASER FUNDAMENTALS

Laser configuration – Q-Switching – Mode locking – Different types of Lasers – Ruby, Nd-Yag, He-Ne, CO2, Orgon ion.

UNIT – IV:

FIBER OPTIC SENSORS

IR sources and detectors – Interferometer method of measurement of length – Moire fringes – Measurement of pressure, Temperature, Current, Voltage, Liquid level and strain - fiber optic Gyroscope – Polarization maintaining fibbers – Applications.

UNIT – V:

LASER INSTRUMENTATION

Industrial applications of lasers – Bio-medical application – Laser Doppler velocity meter – Laser heating

UNIT – VI:

HOLOGRAPHY: Principle, Methods, Holographic Interferometers and applications.

UNIT – VII:

MEDICAL APPLICATIONS: Lasers and tissue interaction, Laser instruments for surgery, removal tumors of vocal cords, plastic surgery, DERMATOLOGY.

UNIT – VIII:

OPTO-ELECTRONIC COMPONENTS

LED, LD, PIN & APD, Electro-optic, Magneto optic and Acousto-optic Modulators.

TEXT BOOKS:

1. An Introduction to Optical fibers.- Allen H.C. McGraw Hill, Singapore, 1993
2. Optics – A.K. Ghatak, Second edition, Tata McGraw Hill, New Delhi,1992.

REFERENCES

1. Lasers : Theory and Applications – by Thyagarajan K. and Ghatak A.K., Plenum Press, New York.
2. Lasers and Optical Engineering – by Das P., Springers International Students Edition, 1991.
3. Optical Electronics – by Ghatak A.K. and Thyagarajan K., Foundation Books, 1991.
4. Laser and Applications – by Guimarass W.O.N. and Mooradian A., Springer Verlag, 1981.

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BIO-MEDICAL INSTRUMENTATION

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 neuromuscular 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 – by Leslie Cromwell, F.J. Weibell, E.A. Pfeiffer, PHI.
2. Medical Instrumentation, Application and Design – by John G. Webster, John Wiley.

REFERENCES:
1. Principles of Applied Biomedical Instrumentation – by L.A. Geoddes and L.E. Baker, John Wiley and Sons.
2. Hand-book of Biomedical Instrumentation – by R.S. Khandpur, McGraw-Hill, 2003.
3. Biomedical Telemetry – by Mackay, Stuart R., John Wiley.

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ELECTRONIC DESIGN AND AUTOMATION LAB

Analog Circuit Simulation :

Design and simulation in simulation laboratory using multisium Or Pspice OR equivalent simulation software.

1. Common Eruilter and common source amplifier.
2. Two stage RC coupled amplifier
3. any two of the following :
   - (i). Current Services Feedback amplifier.
   - (ii). Voltage Services Feedback amplifier.
   - (iii). Voltage Shunt Services Feedback amplifier.
   - (iv). Current Services Feedback amplifier.
4. RC phase shift ascillator
5. class A / Class B power amplifier.
6. High Frequency Common Base (BJT) / Common Gate (JFET) amplifier.

Digital circuits simulation

Simulate the internal structure of the following digital IC's using VHDL/UERILOG and verify the operations of the digital IC's (Hardware) in laboratory:

1. Logic Gates.
2. D or T flipflop.
3. Decade (7490) / 4 bit counter 97493)
4. Shift registers (left/right shift) – 7495
5. 4 – bit componator – 7485
6. 8 X 1 or 16 X 1 multiplexer and 2 X 4 or 4 X 6 Demultplexer.

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(EI05330) INSTRUMENTATION LAB – II

(Minimum of ten experiments should be conducted.)
Design and simulation of Analog Circuits using CAD Package.
Design of PCBs using Packages and Fabrication of PCB.
Linearization of Thermistor using Microprocessor.
Study of Level monitoring Instruments using PLC.
pH measurements.
Measurement of Blood Pressure.
Calibration of P to I and I to P converters.
RPM indicator using Strobostrom/Gyroscope.
Measurement of Humidity.
Measurement of velocity of liquid using Ultrasonic (Doppler effect) method and also flow measurement.
Measurement of Level using Capacitance method/Transducer.
Displacement measurement using inductive pickup and capacitive pickup.
PID Controller setup (Flow/Temp. Level).

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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: I**ds**-V**ds** relationships, MOS, transistor threshold Voltage, gm, gds, figure of merit Co; 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:**m** 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 - t - 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.

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OBJECT ORIENTED PROGRAMMING

UNIT I :

Object oriented thinking :- Need for oop paradigm, A way of viewing world – Agents, responsibility, messages, methods, classes and instances, class hierarchies (Inheritance), method binding, overriding and exceptions, summary of oop concepts, coping with complexity, abstraction mechanisms.

UNIT II :

Java Basics History of Java, Java buzzwords, datatypes, variables, scope and life time of variables, arrays, operators, expressions, control statements, type conversion and costing, simple java program, classes and objects – concepts of classes, objects, constructors, methods, access control, this keyword, garbage collection, overloading methods and constructors, parameter passing, recursion, string handling.

UNIT III :

Inheritance – Hierarchical abstractions, Base class object, subclass, subtype, substitutability, forms of inheritance- specialization, specification, construction, extension, limitation, combination, benefits of inheritance, costs of inheritance. Member access rules, super uses, using final with inheritance, polymorphism- method overriding, abstract classes.

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.
Exploring packages – Java.io, java.util.

UNIT V :

Exception handling and multithreading - Concepts of exception handling, benefits of exception handling, Termination or resumptive models, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes. Differences between multi threading and multitasking, thread life cycle, creating threads, synchronizing threads, daemon threads, thread groups.

UNITVI :

Event Handling : Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes, inner classes.The AWT class hierarchy, user interface components- labels, button, canvas, scrollbars, text components, check box, check box groups, choices, lists panels – scrollpane, dialogs, menubar, graphics, layout manager – layout manager types – boarder, grid, flow, card and grib bag.

UNIT VII :

Applets – Concepts of Applets, differences between applets and applications, life cycle of an applet, types of applets, creating applets, passing parameters to applets.
Swing – Introduction, limitations of AWT, MVC architecture, components, containers, exploring swing- JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

UNIT VIII :

Networking – Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, Java .net package
Packages – java.util,

TEXT BOOKS :

1. Java; the complete reference, 7th editon, Herbert schildt, TMH.
2. Understanding OOP with Java, updated edition, T. Budd, pearson eduction.

REFERENCES :

1. An Introduction to programming and OO design using Java, J.Nino and F.A. Hosch, John wiley & sons.
2. An Introduction to OOP, second edition, T. Budd, pearson education.
3. Introduction to Java programming 6th edition, Y. Daniel Liang, pearson education.
4. An introduction to Java programming and object oriented application development, R.A. Johnson-Thomson.
5. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, seventh Edition, Pearson Education.
6. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education
7. Object Oriented Programming through Java, P. Radha Krishna, University Press.

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ANALYTICAL INSTRUMENTATION

UNIT – I: pH AND CONDUCTIVITY & DISSOLVED COMPONENT ANALYSER
Conductivity meters – pH meters – Dissolved oxygen, hydrogen analyzers – Sodium analyzer – Silica analyzer and sampling systems.
UNIT – II: GAS ANALYSERS
Thermal conductivity types – CO monitor – NOX analyzer – H2S analyzer system and sampling – Industrial analyzer circuits, Theory and problems on Beer – Lamberts Law.
UNIT – III: CHROMATOGRAPHY - I
Gas chromatography – Liquid chromatography – their principles and applications –
UNIT – IV: CHROMATOGRAPHY - II
oxygen analyzer – paramagnetic type – detectors and sampling systems.
UNIT – V: SPECTROPHOTOMETERS - I
UV, VIS Spectrophotometers – Single beam and double beam instruments – Instrumentation associated with the above Spectrophotometers – Sources and detectors – Sources and detectors for IR Spectrophotometers.
UNIT – VI: SPECTROPHOTOMETERS - II
FT IR Spectrometer – Flame emission and atomic absorption Spectrophotometer – Atomic emission Spectrophotometer - sources for Flame Photometers and online calorific value
measurements.
UNIT – VII: PRINCIPLE OF NUCLEAR MAGNETIC RESONANCE
Instrumentation associated with NMR Spectrophotometer – Introduction to mass spectrophotometers , Principle and brief discussion on ELECTRON SPIN RESONANCE (ESR.)
UNIT – VIII: APPLICATIONS
Nuclear radiation detectors – Ionization chamber – GM Counter – Proportional Counter – Solid state detectors.
TEXT BOOK:
1. Handbook of Analytical Instruments – by Khandpur. TMH
REFERENCES:
1. Instrumental Methods of Analysis – by Willard H.H., Merrit L.L., Dean J.A.. and Seattle F.L., CBS Publishing and Distributors, 6/e, 1995.
2. Instrument Technology – by Jones B.E., Butterworth Scientific Publ., London, 1987.
3. Mechanical and Industrial Measurements – by Jain R.K., Khanna Publishing, New Delhi, 2/e, 1992.
4. Principles of Instrumental Analysis – by Skoog D.A. and West D.M., Holt Sounder Publication, Philadelphia, 1985.
5. Instrumental Analysis – by Mann C.K., Vickerks T.J. & Gullick W.H., Harper and Row Publishers, New York, 1974.

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PC BASED INSTRUMENTATION

UNIT –I : Introduction to Computers : Personal Computer, Operating System, I/O Ports, Plug-in-slots, PCI bus, Operators Interface. Computer Interfacing for Data Acquisition and Control – Interfacing Input Signals, Output system with continuous actuators.

Unit – II: Data Acquisition and Control using Standard Cards: PC expansion systems, Plug-in Data Acquisition Boards; Transducer to Control room, Backplane bus – VXI

Unit – III: PC Programming Considerations Using the command line interface; Assembly language programming; C and C++ programming; Data transfer; Scaling and linearization;

UNIT – IV: Programmable logic controller (PLC) basics: Definition, overview of PLC systems, input/output modules, power supplies and isolators.

UNIT – V: Basic PLC programming Programming on-off inputs/ outputs. Creating Ladder diagrams
Basic PLC functions PLC Basic Functions, register basics, timer functions, counter functions.

UNIT – VI:PLC intermediate functions: Arithmetic functions, number comparison functions, Skip and MCR functions, data move systems. Utilizing digital bits, sequencer functions, matrix functions.

UNIT – VII: PLC Advanced functions: Analog PLC operation, networking of PLC, PLC-PID functions.

UNIT – VIII: Related Topics
Alternate programming languages. Auxiliary commands and functions. PLC installation, troubleshooting and maintenance.
Field bus: Introduction, concept. HART protocol: Method of operation, structure, and applications. Smart transmitters, smart valves and smart actuators.

TEXT BOOKS:

1. John. W .Webb Ronald A Reis , Programmable Logic Controllers - Principles and Applications, Fourth edition, Prentice Hall Inc., New Jersey, 1998.
2. Computer Control of Processes – M.Chidambaram. Narosa 2003

REFERENCES:

1. PC Based Instrumentation and Control Third Edition by Mike Tooley ; Elsevier
2. PC Interfacing and Data Acquisition Techniques for Measurement, Instrumentation and Control. By Kevin James; Elsevier
3. Practical Data Acquisition for Instrumentation and Control Systems by John Park and Steve Mackay
4. Distributed Control Systems, Lukcas M.P, Van Nostrand Reinhold Co., New York, 1986.
5. Programmable Logic Controllers, Second edition, Frank D. Petruzella, McGraw Hill, Newyork, 1997.

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POWER PLANT INSTRUMENTATION
(ELECTIVE - I)

UNIT – I: AN OVERVIEW OF POWER GENERATION
Brief survey of methods of power generation – Hydrothermal, Nuclear, Solar, Wind etc. Importance of instrumentation for power generation – Thermal power plants – Building blocks – Details of the Boiler Processes – PI diagram of Boiler – Cogeneration.

UNIT – II: PARAMETERS AND MEASUREMENTS -I
Electrical measurements – current, Voltage, Power, Frequency power factor, Trivector meter –

UNIT – III: PARAMETERS AND MEASUREMENTS - II
Non electrical parameters, flow of feed water, fuel, air and steam with correction factors for temperature – Pressure – temperature – level radiation detectors – smoke density measurements – dust monitor.

UNIT – IV: COMBUSTION CONTROL IN BOILERS
Combustion control – control of Main header Pressure, air fuel ratio control – furnace draft and excessive air control, drum level (three element control) main and reheat steam temperature control, burner tilting up, bypass damper, super heater

UNIT – V: OTHER CONTROLS
Spray and gas recirculation controls – BFP recirculation control – Hot well and deaerator level control – pulverizer control, Computers in Power Plants.

UNIT – VI: TURBINE MONITORING AND CONTROL
Condenser vacuum control – gland steam exhaust pressure control – Speed, vibration, Shell temperature monitoring and control – Lubricating oil temperature control – Hydrogen – generator cooling system.

UNIT – VII: ANALYZERS IN POWER PLANTS - I
Thermal conductive type – paramagnetic type, Oxygen analyzer, infrared type and trim analyzer – Spectrum analyzer – hydrogen purity meter

UNIT – VIII: ANALYZERS IN POWER PLANTS – II Chromatography – pH meter – Conductivity cell – fuel analyzer, brief survey of pollution monitoring and control equipment.

TEXT BOOKS:
1. Modern Power Stations Practice, vol. 6, Instrumentation, Controls and Testing
- Pergamon Press, Oxford, 1971.
2. Power Plant Technology – by Wakil M.M., McGraw Hill.

REFERENCES:
1. Standard Boiler Operations - Questions and Answers – by Elonka S.M., and
Kohal A.L., TMH, New Delhi, 1994.

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OPERATING SYSTEMS

UNIT I :
Computer System and Operating System Overview: Overview of computer operating systems operating systems functions protection and security distributed systems special purpose systems operating systems structures and systems calls operating systems generation

UNIT II :
Process Management – Process concepts threads, scheduling-criteria algorithms, their evaluation, Thread scheduling, case studies UNIX, Linux, Windows

UNIT III :
Concurrency : Process synchronization, the critical- section problem, Peterson's Solution, synchronization Hardware, semaphores, classic problems of synchronization, monitors, Synchronization examples, atomic transactions. Case studies UNIX, Linux, Windows

UNIT IV :
Memory Management : Swapping, contiguous memory allocation, paging, structure of the page table , segmentation, virtual memory, demand paging, page-Replacement, algorithms, case studies UNIX, Linux, Windows

UNIT V :
Principles of deadlock – system model, deadlock characterization, deadlock prevention, detection and avoidance, recovery form deadlock,
I/O systems, Hardware, application interface, kernel I/O subsystem, Transforming I/O requests Hardware operation, STREAMS, performance.

UNIT VI :
File system Interface- the concept of a file, Access Methods, Directory structure, File system mounting, file sharing, protection.
File System implementation- File system structure, file system implementation, directory implementation, directory implementation, allocation methods, free-space management, efficiency and performance, case studies. UNIX, Linux, Windows

UNIT VII :
Mass-storage structure overview of Mass-storage structure, Disk structure, disk attachment disk scheduling, swap-space management, RAID structure, stable-storage implementation, Tertiary storage structure.

UNIT VIII :
Protection : Protection, Goals of Protection, Principles of Protection, Domain of protection Access Matrix, Implementation of Access Matrix, Access control, Revocation of Access Rights, Capability- Based systems, Language – Based Protection,
Security- The Security problem, program threats, system and network threats cryptography as a security tool, user authentication, implementing security defenses, firewalling to protect systems and networks, computer – security classifications, case studies UNIX, Linux, Windows

TEXT BOOKS :
1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Operating systems- A Concept based Approach-D.M.Dhamdhere, 2nd Edition, TMH

REFERENCES :
1. Operating Systems' – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education/PHI
2. Operating System A Design Approach-Crowley, TMH.
3. Modern Operating Systems, Andrew S Tanenbaum 2nd edition Pearson/PHI.

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VIRTUAL INSTRUMENTATION
(ELECTIVE - I)

UNIT –I
Virtual Instrumentation: Historical perspective, advantages, block diagram and architecture of a virtual instrument, data-flow techniques, graphical programming in data flow, comparison with conventional programming. Development of Virtual Instrument using GUI, Real-time systems, Embedded Controller, OPC, HMI / SCADA software, Active X programming.
UNIT – II
VI programming techniques: VIS and sub-VIS, loops and charts, arrays, clusters and graphs, case and sequence structures, formula nodes, local and global variables, string and file I/O, Instrument Drivers, Publishing measurement data in the web.
UNIT –III
Data acquisition basics: Introduction to data acquisition on PC, Sampling fundamentals, Input/ Output techniques and buses. ADC, DAC, Digital I/O, counters and timers, DMA, Software and hardware installation, Calibration, Resolution, Data acquisition interface requirements.
UNIT –IV
VI Chassis requirements. Common Instrument Interfaces: Current loop, RS 232C/ RS485, GPIB.
UNIT –V
Bus Interfaces: USB, PCMCIA, VXI, SCSI, PCI, PXI, Firewire. PXI system controllers, Ethernet control of PXI.
UNIT –VI
Networking basics for office & Industrial applications, VISA and IVI.
UNIT – VII
VI toolsets, Distributed I/O modules. Application of Virtual Instrumentation: Instrument Control, Development of process database management system
UNIT –VIII
Simulation of systems using VI, Development of Control system, Industrial Communication, Image acquisition and processing, Motion control.
TEXT BOOKS:
1. Gary Johnson, LabVIEW Graphical Programming, 2nd edition,McGraw Hill, Newyork, 1997.
2. Lisa K. wells & Jeffrey Travis, LabVIEW for everyone, Prentice Hall, New Jersey, 1997.
REFERENCES:
1. Kevin James, PC Interfacing and Data Acquisition: Techniques for Measurement, Instrumentation and Control, Newnes,2000.
Course Aim: This course aims to introduce the latest instrumentation system design and development tools available today
Prerequisite: Course on personal computer systems and interfacing

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DIGITAL CONTROL SYSTEMS
(ELECTIVE - II)

UNIT – I SAMPLING AND RECONSTRUCTION
Introduction, Examples of Data control systems – Digital to Analog conversion and Analog to Digital conversion, sample and hold operations.

UNIT-II THE Z – TRANSFORMS
Introduction, Linear difference equations, pulse response, Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms

UNIT-III Z-PLANE ANALYSIS OF DISCRETE-TIME CONTROL SYSTEM
Z-Transform method for solving difference equations; Pulse transforms function, block diagram analysis of sampled – data systems, mapping between s-plane and z-plane.

UNIT – IV STATE SPACE ANALYSIS
State Space Representation of discrete time systems, Pulse Transfer Function Matrix solving discrete time state space equations, State transition matrix and it's Properties, Methods for Computation of State Transition Matrix, Discretization of continuous time state – space equations

UNIT – V CONTROLLABILITY AND OBSERVABILITY
Concepts of Controllability and Observability, Tests for controllability and Observability. Duality between Controllability and Observability, Controllability and Observability conditions for Pulse Transfer Function

UNIT – VI STABILITY ANALYSIS
Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips – Constant frequency loci, Constant damping ratio loci, Stability Analysis of closed loop systems in the Z-Plane. Jury stablility test – Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion.

UNIT – VII DESIGN OF DISCRETE TIME CONTROL SYSTEM BY CONVENTIONAL METHODS
Transient and steady – State response Analysis – Design based on the frequency response method – Bilinear Transformation and Design procedure in the w-plane, Lead, Lag and Lead-Lag compensators and digital PID controllers.

UNIT – VIII STATE FEEDBACK CONTROLLERS AND OBSERVERS
Design of state feedback controller through pole placement – Necessary and sufficient conditions, Ackerman's formula.
State Observers – Full order and Reduced order observers.

TEXT BOOKS:
1. Discrete-Time Control systems - K. Ogata, Pearson Education/PHI, 2nd Edition
2. Digital Control and State Variable Methods by M.Gopal, TMH

REFERENCES:
1. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
2. Digital Control Engineering, M.Gopal

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ARTIFICIAL NEURAL NETWORKS
(ELECTIVE - II)

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.

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COMPUTER NETWORKS
(ELECTIVE - II)

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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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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INSTRUMENTATION LAB – III

1. Gas analyzer.
2. Gas and liquid chromatography.
3. Spectrometer: UV and VIS spectrometer.
4. Spectrometer: IR and FT IR Spectrometer.
5. Flame photometer.
6. Measurement of calorific value.
7. Mass spectrometer.
8. Interfacing of ADC to PC and observe the data.
9. Interfacing of DAC to PC and generate various types of signals.
10. Serial communication through RS-232C between µCs / PCs.
11. GPIB interface – master to slave data transfer.
12. GPIB interface – slave to slave data transfer.
13. Data transfer through IEEE-1394 (fireware) interface.

Equipment:

Gas/ Liquid chromatographer, Gas Analyzer, UV & VIS spectrometer, IR spectrophotometer, Absorption spectrophotometer, Flame photometer, Bomb calorimeter, ADC, DAC add-on cards for PC. GPIB interface Master / slave cards for PC, IEEE-1394 (fireware) interface for PC

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INDUSTRIAL ELECTRONICS
(ELECTIVE - III)

UNIT I
DC AMPLIFIERS:
Need for DC amplifiers, DC amplifiers—Drift, Causes, Darlington Emitter Follower, Cascode amplifier, Stabilization, Differential amplifiers—Chopper stabilization, Operational Amplifiers, Ideal specifications of Operational Amplifiers, Instrumentation Amplifiers.

UNIT II
REGULATED POWER SUPPLIES:
Block diagram, Principle of voltage regulation, Series and Shunt type Linear Voltage Regulators, Protection Techniques— Short Circuit, Over voltage and Thermal Protection.

UNIT III
SWITCHED MODE & IC REGULATORS :
Switched Mode voltage regulator, Comparison of Linear and Switched Mode Voltage Regulators, Servo Voltage Stabilizer, monolithic voltage regulators Fixed and Adjustable IC Voltage regulators, 3-terminal Voltage regulators—Current boosting .

UNIT IV
SCR AND THYRISTOR:
Principles of operation and characteristics of SCR, Triggering of Thyristors, Commutation Techniques of Thyristors—Classes A, B, C, D, E and F, Ratings of SCR.

UNIT V
APPLICATIONS OF SCR IN POWER CONTROL:
Static circuit breaker, Protection of SCR, Inverters—Classification, Single Phase inverters, Converters – single phase Half wave and Full wave.

UNIT VI
DIAC, TRIAC AND THYRISTOR APPLICATIONS:
Chopper circuits – Principle, methods and Configurations, Diac and Triac, Triacs – Triggering modes, Firing Circuits, Commutation.

UNIT VII
INDUSTRIAL APPLICATIONS - I
Industrial timers -Classification, types, Electronic Timers – Classification, RC and Digital timers, Time base Generators. Electric Welding – Classification, types and methods of Resistance and ARC wielding, Electronic DC Motor Control.

UNIT VIII
INDUSTRIAL APPLICATIONS - II
High Frequency heating – principle, merits, applications, High frequency Source for Induction heating. Dielectric Heating – principle, material properties, Electrodes and their Coupling to RF generator, Thermal losses and Applications.Ultrasonics – Generation and Applications.

TEXTBOOKS:
1. Industrial and Power Electronics – G.K. Mithal and Maneesha Gupta, Khanna Publishers, 19th Ed., 2003.
2. Integrated Electronics – J. Millman and C.C Halkias, McGraw Hill, 1972.
REFERENCES :
1. Electronic Devices and circuits – Theodore.H.Bogart, Pearson Education,6th Edn., 2003.
2. Thyristors and applications – M. Rammurthy, East-West Press, 1977.
3. Integrated Circuits and Semiconductor Devices – Deboo and Burroughs, ISE.

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ROBOTICS AND AUTOMATION
(ELECTIVE - III)

UNIT – I BASIC CONCEPTS
Automation and Robotics – An over view of Robotics – present and future applications – classification by coordinate system and control system, Dynamic stabilization of Robotics.

UNIT – II POWER SOURCES AND SENSORS
Hydraulic, Pneumatic and electric drivers – Determination HP of motor and gearing ratio, variable speed arrangements, Path Determination - Machinery Vision – Ranging – Laser – Acoustic, Magnetic Fiber Optic and Tactile Sensor

UNIT – III MANUPULATORS
Construction of Manupulators, Manupulator Dynamic and Force Control, Electronic and Pneumatic manupulators.

UNIT – IV ACTUATORS AND GRIPPERS
Pneumatic, Hydraulic Actuators, Stepper Motor Control Circuits, End Effecter, Various types of Grippers, Design consideration.

UNIT – V
Differential transformation and manipulators, Jacobians – problems.Dynamics: Lagrange – Euler and Newton – Euler formations – Problems.

UNIT VI KINEMATICS
Forward and Inverse Kinematic Problems, Solutions of Inverse Kinematic problems, Multiple Solution, Jacobian Work Envelop – Hill Climbing Techniques.

UNIT VII PATH PLANNING
Trajectory planning and avoidance of obstacles, path planning, Skew motion, joint integrated motion – straight line motion – Robot programming, languages and software packages.

UNIT VIII CASE STUDY
Multiple Robots – Machine Interface – Robots in Manufacturing and Non- Manufacturing applications – Robot Cell Design Selection of a Robot.

TEXT BOOKS:
1. Industrial Robotics / Groover M P /Pearson Edu.
3. Robotics / Fu K S/ McGraw Hill.
4.

REFERENCES:
1. Robotics, CSP Rao and V.V. Reddy, Pearson Publications (In press)
2. Robotics and Control / Mittal R K & Nagrath I J / TMH.
3. An Introduction to Robot Technology, / P. Coiffet and M. Chaironze / Kogam Page Ltd. 1983 London.
4. Robotic Engineering / Richard D. Klafter, Prentice Hall
5. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science
6. Introduction to Robotics / John J Craig / Pearson Edu.
7. Robot Dynamics and Control by Mark W. Spong and M. Vidyasagar, John Wiley & Sons.

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MICROCONTROLLERS AND APPLICATIONS
(ELECTIVE-III)

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-cum-asynchronous serial communication - Interrupts.

UNIT II

8051 FAMILY MICROCONTROLLERS INSTRUCTION SET

Basic assembly language programming – Data transfer instructions – Data and Bitmanipulation 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 – Keyboardcum- 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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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.

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MANAGEMENT INFORMATION SYSTEMS
(ELECTIVE - IV)

UNIT I - Information systems in the enterprise : Why information systems, perspectives on information systems, contemporary approaches to information systems, four major types of systems in organizationstransaction
processing systems, management information systems, decision support systems, executive support systems.

UNIT II - Systems from a functional perspective- Sales and Marketing Systems, Manufacturing and Production Systems, Financial and Accounting Systems, Human Resources Systems. Integrating functions and business processes.

UNIT III - **The Digital Firm, Electronic Business and Electronic Commerce :** Internet technology and the digital firm, categories of electronic commerce, customer centered retailing, business-to-business electronic commerce, commerce payments, electronic business, management opportunities, challenges and solutions.

UNIT IV - The wireless revolution: business value of wireless networking, wireless transmission media and devices, cellular network standards and generations, wireless computer networks and internet access, M-commerce and Mobile computing, wireless technology in the enterprise.

UNIT V - **Security and control :** system vulnerability and abuse, business value of security and control, establishing a management framework for security and control, technologies and tools for security and control.

UNIT VI - Enterprise Applications and Business Process Systems : What are enterprise systems, How enterprise systems work, supply chain management systems, customer relationship management systems, enterprise integration trends.

UNIT VII - Redesigning the organizations with information systems : systems as planned organizational change, business process reengineering and process improvement, overview of system development, alternative systems building approaches – traditional systems life cycle, prototyping, enduser development, application software package and outsourcing.

UNIT VIII - Managing change and international information systems : The importance of change management in information systems success and failure, managing implementation, the growth of international systems, organizing international information systems, managing global systems, technology issues and opportunities for global value chains.

TEXT BOOK

1. Management Information Systems Kenneth - C. Laudon, Jane P. Laudon & VM Prasad, 9/e, Pearson Education, 2005.

REFERENCES

1. Management Information Systems - Effy Oz, Third Edition, Thomson, 2002.
2. Information Technology-Strategic Decision Making for Managers - M Henry C.Lucas, Jr., John Wiley & Sons, Inc, 2005.
3. Introduction to Information Systems, - James A. O'Brien, TMH, New Delhi, 2002.
4. Information Systems Today - Jessup &Velacich, PHI, 2004.
5. Management Information Systems - Sadagopan, PHI, 2004.
6. Information Systems, Pearson Education - Steven Alter, Fourth Edition, 2004.
7. Information Technology, - Turban, Rainer, Potter, John Wiley, 2003.
8. Management Information Systems - W S Jawadekar, TMH, Second Edition, 2002.

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TELEMETRY AND TELECONTROL
(ELECTIVE - IV)

UNIT – I: TELEMETRY PRINCIPLES
Introduction, Functional blocks of Telemetry system, Methods of Telemetry - Non Electrical, Electrical, Pneumatic, Frequency, Power Line Carrier Communication .
UNIT – II: SYMBOLS AND CODES
Bits and Symbols, Time function pulses, Line and Channel Coding, Modulation Codes. Intersymbol Interference.
UNIT – III: FREQUENCY DIVISION MULTIPLXED SYSTEMS
FDM, IRIG Standard, FM and PM Circuits, Receiving end, PLL
UNIT – IV: TIME DIVISION MULTIPLXED SYSTEMS
TDM-PAM, PAM /PM and TDM – PCM Systems. PCM reception. Differential PCM. Introduction, QAM, Protocols.
UNIT – V: SATELLITE TELEMETRY
General considerations, TT&C Service, Digital Transmission systems, TT&C Subsystems, Telemetry and Communications.
UNIT – VI: OPTICAL TELEMETRY
Optical fibers Cable – Sources and detectors – Transmitter and Receiving Circuits, Coherent Optical Fiber Communication System.
UNIT – VII & VIII: TELECONTROL METHODS
Analog and Digital techniques in Telecontrol, Telecontrol apparatus – Remote adjustment, Guidance and regulation – Telecontrol using information theory – Example of a Telecontrol System.
TEXT BOOKS:
1. Telemetry Principles – D. Patranabis, TMH
2. Telecontrol Methods and Applications of Telemetry and Remote Control – by Swoboda G., Reinhold Publishing Corp., London, 1991
REFERENCES:
1. Handbook of Telemetry and Remote Control – by Gruenberg L., McGraw Hill, New York, 1987.
2. Telemetry Engineering – by Young R.E., Little Books Ltd., London, 1988.
3. Data Communication and Teleprocessing System – by Housley T., PH Intl., Englewood Cliffs, New Jersey, 1987.

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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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INDUSTRY ORIENTED MINI PROJECT

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PROJECT WORK

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COMPREHENSIVE VIVA