ACADEMIC REGULATIONS COURSE STRUCTURE AND DETAILED SYLLABUS

For

B.TECH. FOUR YEAR DEGREE COURSE

(Applicable for the batches admitted from 2005-2006)

INSTRUMENTATION AND CONTROL ENGINEERING

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KUKATPALLY, HYDERABAD - 500 072.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

B.TECH. INSTRUMENTATION AND CONTROL ENGINEERING

I Year

COURSE STRUCTURE

CODE	SUBJECT	T	P	C
HS05231	English	2+1*	-	4
MA05363	Mathematics – I	3+1*	-	6
MA05361	Mathematical Methods	3+1*	-	6
PY05047	Applied Physics	2+1*	-	4
CS05106	C Programming and Data Structures	3+1*	-	6
EE05189	Electrical Circuits	2+2*	-	4
EC05210	Electronic Devices and Circuits	3+1*	-	6
ME05220	Engineering Drawing Practice Lab	-	3	4
CS05144	Computer Programming Lab	-	3	4
ME05230	Engineering Workshop Practice	-	3	4
EC05211	Electronic Devices and Circuits Lab	-	3	4
HS05232	English Language Communication Skills Lab	-	3	4
Total		**26**	**15**	**56**

B.TECH. INSTRUMENTATION AND CONTROL ENGINEERING

COURSE STRUCTURE

II YEAR B.Tech. — **I Semester**

CODE	SUBJECT	T	P	C
MA05365	Mathematics - III	4+1*	-	4
EE05539	Switching Theory and Logic Design	4+1*	-	4
EE05200	Electrical Technology	4+1*	-	4
IC05111	Calibration and Electronic Measurements	4+1*	-	4
EI05516	Sensors and Signal Conditioning	4+1*	-	4
EE05149	Control Systems	4+1*	-	4
EE05201	Electrical Technology Lab	-	3	2
IC05556	Transducers and Instrumentation lab	-	3	2
	TOTAL	30	6	28

II Year — **II Semester**

CODE	SUBJECT	T	P	C
CS05140	Computer Organization	4+1*	-	4
EI05309	Industrial Instrumentation	4+1*	-	4
IC05470	Prime Movers and Mechanical Components	4+1*	-	4
EC05497	Pulse and Digital Circuits	4+1*	-	4
EC05342	Linear and digital IC applications	4+1*	-	4
EC05517	Signals and Systems	4+1*	-	4
EE05151	Control Systems Lab - I	0	3	2
EC05300	IC and Pulse and Digital Circuits Lab	0	3	2
	Total	30	6	28

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B.TECH. INSTRUMENTATION AND CONTROL ENGINEERING

COURSE STRUCTURE

III YEAR B.Tech. — **I Semester**

CODE	SUBJECT	T	P	C
HS05353	Managerial Economics and Financial Analysis	4+1*	-	4
CE05239	Environmental studies	4+1*	-	4
EC05400	Micro processors and Interfacing	4+1*	-	4
CS05308	Industrial Electronics	4+1*	-	4
IC05479	Process Control Instrumentation	4+1*	-	4
CS05434	OOPS through JAVA	4+1*	-	4
EC05401	Microprocessors Lab	-	3	2
IC05310	Industrial Instrumentation Lab	-	3	2
	Total	30	6	28

III Year — **II Semester**

CODE	SUBJECT	T	P	C
HS05352	Management Science	4+1*	-	4
EC05176	Digital Signal Processing	4+1*	-	4
EC05471	Principles of Communications	4+1*	-	4
IC05167	Digital and Optimal Control Systems	4+1*	-	4
IC05443	PC Based Instrumentation	4+1*	-	4
EI05038	Analytical Instrumentation	4+1*	-	4
IC05480	Process Control Lab	-	3	2
EE05152	Control Systems Lab - II	-	3	2
	Total	30	6	28

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B.TECH. INSTRUMENTATION AND CONTROL ENGINEERING
COURSE STRUCTURE

IV YEAR B.Tech. I Semester

CODE	SUBJECT	T	P	C
EE05425	Neural Network and Fuzzy Logic	4+1*	-	4
EI05090	Bio medical Instrumentation	4+1*	-	4
EN05136	Computer Aided Design of Control Systems	4+1*	-	4
IC05463	Power Plant Instrumentation	4+1*	-	4
	ELECTIVE – I			
ME05508	1.Robotics and Automation	4+1*	-	4
IC05403	2. Micro Electro Mechanical Systems			
EC05215	3. Embedded and Real Time Systems			
	ELECTIVE - II			
EN05544	1. Telemetry and Tele control	4+1*	-	4
IC05572	2. Virtual Instrumentation			
IC05001	3. Adaptive Control Systems			
EE05153	Analytical and Biomedical Instrumentation Lab	-	3	2
IC05035	Control Systems Lab - III	-	3	2
	TOTAL	**30**	**6**	**28**

II Year II Semester

CODE	SUBJECT	T	P	C
EN05179	Distributed Computer Control Systems	4+1*	-	4
	ELECTIVE - III			
HS05233	1. Entrepreneur ship	4+1*	-	4
EC05399	2. Micro Controllers and Applications			
EC05574	3. VLSI Design			
	ELECTIVE - IV			
IC05298	1. Hydraulics and Pneumatic Control Systems	4+1*	-	4
IC05440	2. Opto – Electronic and Laser Instrumentation			
IC05322	3. Instrumentation and Control in Manufacturing Systems			
CA05515	Seminar	-	-	2
CA05315	Industry oriented Mini Project	-	-	2
CA05495	Project Work	-	-	12
	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

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I Year B.Tech. ICE

T	P	C
2+1	0	4

(HS 05231) 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, to encourage them to develop their language skills. The two textbooks identified by the Board of Studies serve the purpose of illustrating the conceptual framework within which the syllabus is to be administered in the classroom. When a textbook is prescribed content is generally paid attention to. However, the stress in this syllabus is on language acquisition and skill development, calling for both the teacher and the taught to go beyond the prescribed texts and innovate exercises and tasks.

2. OBJECTIVES :

1. To promote the language proficiency of the students with emphasis on improving their LSRW skills.

2. To impart training to the students through the syllabus and its theoretical and practical components.

3. To improve communication skills in formal and informal situations.

3. SYLLABUS :

Listening Skills :
- Listening for general content
- Listening to fill up information gaps
- Intensive listening
- Listening for specific information
- Note-taking - guided and unguided
- Post-listening testing

Speaking Skills :
- Oral practice
- Developing confidence
- Introducing oneself/others
- Asking for/ giving information
- Describing objects/offering solutions
- Describing situations
- Role play
- Expressing agreement/disagreement

Reading Comprehension

- 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 student, through the training imparted to him/her by means of the text-based approach, will be examined in answering questions on an unseen passage.**

Writing Skills :

- Writing a sentence
- Use of appropriate vocabulary
- Paragraph writing
- Coherence and cohesiveness
- Narration / description
- Interpreting data
- Formal and informal letter writing
- Sending e-mails
- Information transfer
- 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:

1. **LEARNING ENGLISH:** A Communicative Approach, Hyderabad: Orient Longman, 2005.(Selected Lessons)

2. **WINGS OF FIRE:** An Autobiography – APJ Abdul Kalam, Abridged version with Exercises, Hyderabad: Universities Press (India) Pvt. Ltd., 2004.

The following lessons from the prescribed texts are recommended for study :

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
Reading and Writing Skills
Reading Comprehension
Situational dialogues
Report writing
Letter writing
Essay writing
Information transfer

Unit – VIII

Remedial English

Common errors

Subject-Verb agreement

Use of Articles and Prepositions

Tense and aspect

Vocabulary – Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

TEXT BOOKS:

1. **Effective Technical Communication**, M Ashraf Rizvi, Tata McGraw-Hill Publishing Company Ltd.

2. **Everyday Dialogues in English**, Robert J Dixson, Prentice Hall of India Pvt Ltd., New Delhi.

REFERENCES

1. **Strengthen Your English**, Bhaskaran & Horsburgh, Oxford University Press

2. **English for Technical Communication**, K R Lakshminarayana, SCITECH

3. **Strategies for Engineering Communication**, Susan Stevenson & Steve Whitmore (John Wiley and sons).

4. **English for Engineers: With CD**, Sirish Chaudhary, Vikas Publishing House Pvt. Ltd. With CD.

5. **Basic Communication Skills for Technology**, Andrea J Rutherfoord, Pearson Education Asia.

6. **Murphy's English Grammar with CD**, Murphy, Cambridge University Press

7. **A Practical Course in English Pronunciation, (with two Audio cassettes),** Sethi, Sadanand & Jindal , Prentice –Hall of India Pvt Ltd., New Delhi.

8. **English for Professional Students,** by S S Prabhakara Rao.

9. **The Oxford Guide to Writing and Speaking,** John Seely, Oxford.

10. **Grammar Games,** Renvolucri Mario, Cambridge University Press.

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I Year B.Tech. ICE

T	P	C
3+1	0	6

(MA 05363) MATHEMATICS – I

UNIT – I

Sequences – series – Convergences and divergence – Ratio test – Comparison test – Integral test – Cauchy's root test – Raabe's test – Absolute and conditional convergence. Rolle's theorem – Lagrange's Mean Value Theorem – Cauchy's Mean value Theorem – Generalized Mean Value theorem (Taylor's Theorem).

UNIT – II

Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints or without constraints- Radius, Centre and Circle of Curvature – Evolutes and Envelopes.

UNIT – III

Curve tracing – Cartesian , polar and Parametric curves - Applications of integration to lengths , volumes and surface areas in Cartesian and polar coordinates.

UNIT – IV

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-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 – V

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.

UNIT – VI

I Year B.Tech. ICE

T P C
3+1 0 6

(MA 05361) MATHEMATICAL METHODS

UNIT - I

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

Fitting a straight line –Nonlinear curve fitting –Curve fitting by a sum of exponentials-Weighted least squares approximation-Linear weighted least squares approximation-Nonlinear weighted least squares.

Numerical Differentiation and Integration: The Cubic Spline Method – Trapezoidal rule – Simpson's 1/3 Rule –Simpson's 3/8 Rule- Boole's and Weddle's Rules .

UNIT - III

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 – IV

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 – V

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 - VI

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 –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

UNIT – VII

Multiple integrals - double and triple integrals – change of variables – change of order of integration.

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.

UNIT – VIII

Vector integral theorems: Green's theorem- Stoke's and Gauss's Divergence Theorem. Verification of Green's - Stoke's and Gauss's Theorems – Cylindrical, Spherical coordinates-Expressions Grad, div, curl in spherical and cylindrical coordinates.

TEXT BOOKS :

1. A text book of Engineering Mathematics Volume – 1, 2005
   T.K.V.Iyengar, B.Krishna Gandhi and others, S.Chand and Company.

2. Engineering Mathematics, B.V.Ramana, Tata McGraw-Hill 2003.

REFERENCES :

1. Engineering Mathematics–I, 2002, P.Nageswara Rao, Y.Narsimhulu, Prabhakara Rao, Deepthi Publishers

2. Engineering Mathematics– I, 2004, Dr.Shahnaz Bathul, Right Publishers.

3. Engineering Mathematics, S.K.V.S. Sri Rama Chary, M.Bhujanga Rao, Shankar, B.S. Publications 2000.

4. Engineering Mathematics-I Rukmangadhachary, Pearson Education.

5. A Text book of Engineering Mathematics, VP Mishra, Galgotia Publications.

6. Engineering Mathematics – I, Sankaraiah, VGS Book Links, Hyderabad.

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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. A Text book of Engineering Mathematics Volume – II, 2005 T.K.V.Iyengar, B.Krishna Gandhi and others, S.Chand and Company.

2. Engineering Mathematics, B.V.Ramana, Tata McGraw-Hill 2003.

REFERENCES :

1. Engineering Mathematics–II, 2002, P.Nageswara Rao, Y.Narsimhulu, Prabhakara Rao B.S.Publications 2000.

2. Engineering Mathematics, S.K.V.S. Sri Rama Chary, M.Bhujanga Rao, Shankar, B.S.Publications 2000.

3. Advanced Engineering Mathematics (eighth edition), Erwin Kreyszig, John Wiley & Sons (ASIA) Pvt. Ltd. 2001.

4. Advanced Engineering Peter V.O'Neil Thomson Brooks/Cole.

5. Advanced Engineering Mathematics, Merle C.Potter, J.L.Goldberg, E.F.Abrufadel, Oxford University Press. Third Edition 2005.

6. Numerical Methods: V N Vedamurthy , Iyengar N Ch N Vikas pub. Reprint 2005

7. Numerical Methods: S.Arumugam & others. Scitech pub.

8. Elementary Numerical Analysis : An Algorithmic Approach: S.D.Conte and Carl.D.E.Boor, Tata Mac-Graw Hill.

9. Introductory Methods of Numerical Analysis: S.S.Sastry, Prentice Hall of India, Pvt Ltd.,

10. Engineering Mathematics – II, 2005, Sankaraiah, VGS Book Links, Hyderabad.

11. Numerical Methods for Scientific and Engineering Computation: M.K.Jain, S.R.K. Iyengar, R.K.Jain, New Age International (P) Ltd.

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I Year B.Tech. ICE

	T	P	C
	2+1	0	4

(PY 05047) APPLIED PHYSICS

UNIT I

BONDING IN SOLIDS : Introduction - Types of Bonding - Ionic bond - Covalent bond - Metallic bond - Cohesive energy - Calculation of Cohesive energy.

UNIT II

CRYSTAL STRUCTURES : Introduction - Space lattice - Basis - Unit cell - Lattice parameter - Crystal systems - Bravais lattices - Structure and Packing fractions of Simple cubic - Body Centred Cubic - Face Centred Cubic crystals - Structures of Diamond, ZnS, NaCl, CsCl.

UNIT III

DEFECTS IN SOLIDS : Imperfections in Crystals - Point defects - Schottky and Frenkel defects - Energy for formation of a Vacancy - Equilibrium concentration of Schottky and Frenkel defects -Line defects - Edge and Screw dislocations - Burger's Vectors.

UNIT IV

PRINCIPLES OF QUANTUM MECHANICS : Waves and Particles - Planck's quantum theory - de-Broglie hypothesis – Matter waves - Davisson and Germer experiment - Schroedinger's Time Independent Wave equation - Physical significance of the Wave function - Particle in a one dimensional potential box.

UNIT V

ELECTRON THEORY OF METALS : Classical free electron theory - Mean free path - Relaxation time and drift velocity - Fermi-Dirac distribution (descriptive) - Quantum free electron theory - Sources of electrical resistance - Kronig-Penney model (qualitative treatment) - Origin of energy band formation in solids - Concept of effective mass.

UNIT VI

SEMICONDUCTORS : Introduction - Intrinsic semiconductor and carrier concentration – Equation for

DIELECTRIC PROPERTIES: Introduction - Dielectric constant - Electronic, Ionic and Orientation polarizabilities - Internal fields - Clausius-Mossotti equation – 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 - anti-Ferro and Ferri magnetism - Ferrites and their applications.

conductivity - Extrinsic semiconductor and carrier concentration - Drift and diffusion - Einstein's equation - Hall effect.

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

UNIT VII

LASERS : Introduction - Characteristics of Lasers - Spontaneous and Stimulated Emission of radiation - Einstein's coefficients - Population inversion - Ruby Laser - Helium-Neon Laser - Semiconductor Laser - Applications of Lasers in Industry, Scientific and Medical fields.

UNIT VIII

FIBER OPTICS : Introduction - Principle of optical fiber - Acceptance angle and Acceptance cone - Numerical aperture - Step-Index fiber and transmission of signal in SI fiber - Graded-Index fiber and transmission of signal in GI fiber - Attenuation in optical fibers - Advantages of optical fibers in communication - Application of optical fibers in Medicine and Sensors.

TEXT BOOKS :

1. Applied Physics by Dr. M.Chandra Shekar & Dr.P.Appala Naidu; V.G.S. Book links.
2. Solid State Physics by P.K. Palanisamy; Scitech Publications (India) Pvt.ltd.

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. Solid State Physics by Dr. B.S.Bellubbi & Dr. Adeel Ahmad; Premier Publishing house
5. Solid State Physics by Mani Naidu; Vijayam Publications
6. Materials Science by M.S.Vijaya & G. Rangarajan; Tata McGraw Hill
7. Introduction to Solid State Physics by C.Kittel; Wiley Eastern limited

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I Year B.Tech. ICE

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	3+1	0	6

(CS 05106) C PROGRAMMING AND DATA STRUCTURES

UNIT - I

Algorithm, flowchart, program development steps, basic structures of C language, C tokens, data types and sizes, declaration of variables, assigning values, arithmetic, relational and logical operator, increment and decrement operators, conditional operator, bit-wise operators, type conversions, expressions, evaluation, input-output statements, blocks, if and switch statement, while, do-while and for statements, C programs covering all the above aspects.

UNIT - II

One dimensional & Two dimensional arrays, initialization, string variables-declaration, reading, writing, Basics of functions,Parameter pasing,String handling function, user-defined functions, recursive functions, variables and storage classes, scope rules, block structure, header files, C preprocessor, example C programs.

UNIT - III

Pointer and Arrays : Pointers and addresses, Pointers and Arrays, Pointers And function arguments, Address arithmetic, character pointers and functions, pointers to pointers, multi-dimensional arrays, initialization of pointer arrays, command line arguments, pointers to functions.

UNIT - IV

Structures : Definition, initializing, assigning values, passing of structures as arguments, Arrays of structures, pointers to structures, self referential structures. Unions, typedef, bit fields, C program examples.

UNIT - V

Console & File I/O : Standard I/O, Formatted I/O, opening & closing of files, I/O operations on files.

UNIT - VI

Linear DataStructures : Introduction to DataStructures, representing stacks and queues in C using arrays, Infix, Postfix & Prefix programs, circular queues.

UNIT - VII

Linked Lists : Singly linked list, Doubly linked list, Circular List, representing stacks and Queues in C using linked lists

Non-Linear Data Structures : Binary trees: Representation, tree traversals, graph representation, graph traversal, Spanning trees.

UNIT - VIII

Sorting & Searching : Searching Methods- Linear and binary search methods, Sorting methods- Ex: Bubble sort, Selection sort, Insertion sort, heap sort, quick sort.

TEXT BOOKS :

1. C And Data structures – P.Padmanabham, BS Publications
2. C & Data Structures, Ashok N.Kamthane, Pearson Education

REFERENCES :

1. C & Data Structures – Prof. P.S.DeshPande, Prof O.G.Kakde, Wiley Dreamtech Pvt. Ltd., NewDelhi.
2. DataStructures Using C – A.S.Tanenbaum, PHI/Pearson education
3. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/ Pearson Education

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I Year B.Tech. ICE

T P C
2+2 0 4

(EE05189) ELECTRICAL CIRCUITS

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 MAGNETIC CIRCUITS

Magnetic Circuits – Faraday's laws of electromagnetic induction – concept of self and mutual inductance – dot convention – coefficient of coupling – composite magnetic circuit - Analysis of series and parallel magnetic circuits

UNIT – III SINGLE PHASE A.C CIRCUITS

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 Reactance, Impedance, Susceptance and Admittance – Phase and Phase difference – concept of power factor, Real and Reactive powers – J-notation, Complex and Polar forms of representation, Complex power – Locus diagrams – series R-L, R-C, R-L-C and parallel combination with variation of various parameters – Resonance – series, parallel circuits, concept of band width and Q factor.

UNIT – IV THREE PHASE CIRCUITS

Three phase circuits: Phase sequence – Star and delta connection – Relation between line and phase voltages and currents in balanced systems – Analysis of balanced and Unbalanced 3 phase circuits – Measurement of active and reactive power.

UNIT – V NETWORK TOPOLOGY

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

UNIT – VI NETWORK THEOREMS

Tellegen's, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer, Millman's and Compensation theorems for d.c. and a.c. excitations.

UNIT – VII TRANSIENT ANALYSIS

Transient response of R-L, R-C, R-L-C circuits (Series and Parallel combinations) for d.c. and sinusoidal excitations – Initial conditions – Classical method and laplace transforms methods of solutions.

UNIT – VIII NETWORK PARAMETERS

Two port network parameters – Z, Y, ABCD and hybrid parameters and their relations— – concept of transformed network – 2-port network parameters using transformed variables.

TEXT BOOKS:

1. Engineering circuit analysis – by William Hayt and Jack E. Kemmerly, Mc Graw Hill Company, 6th edition.

2. Network Theory:- N.C. Jagan & C.Lakshminarayana, B.S Publications .

REFERENCES:

1. Network Analysis by Vanvalkenburg, PHI.
2. Linear circuit analysis (time domain phasor ,and Laplace transform approaches) Second edition by RAYMOND A.DeCARLO and PEN-MIN-LIN, Oxford University Press. Second edition 2004.
3. Electric Circuit theory by K. Rajeswaran, Pearson Education,2004.
4. "Circuits" by Carlson, Thomson Publishers.
5. Network Theory by N.Sreenivasulu, HiTech Publications.
6. Network Analysis:- C.K. Mitthal, Khanna Publishers.
7. Electric Circuits by A. Chakrabarthy, Dhanipat Rai & Sons.

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I Year B.Tech. ICE

	T	P	C
	3+1	0	6

(EC 05210) ELECTRONIC DEVICES AND CIRCUITS

UNIT-I

ELECTRON DYNAMICS AND CRO : Motion of charged particles in electric and magnetic fields only. Electrostatic and magnetic fields. Simple problems involving electric and magnetic focusing. Principles of CRT, deflection sensitivity (Electrostatic and magnetic deflection). Applications of CRO: Voltage, Current and Frequency Measurements.

UNIT-II

JUNCTION DIODE CHARACTERISTICS : Review of semi conductor Physics – n and p –type semi conductors, Mass Action Law, Continuity Equation, Hall Effect, Open-circuited p-n junction, The p-n junction as a rectifier (forward bias and reverse bias), The current components in p-n diode, Law of junction, Diode equation, Energy band diagram of p-n diode, Volt-ampere characteristics of p-n diode, Temperature dependence of VI characteristic, Transition and Diffusion capacitances, Breakdown Mechanisms in Semi Conductor Diodes, Zener diode characteristics, Characteristics of Tunnel Diode, Varactar 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 π section 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 CHARACTERISTICS : Construction, principle of operation, V-I characteristics, symbol, equivalent circuit, parameter calculations, applications, and specifications of – BJT, FET, and MOSFETS, Enhancement and Depletion mode MOSFET, Salient features of different configuration of BJT and FET. Introduction to SCR, UJT, LED and Photodiode.

UNIT-V

BIASING AND STABILISATION : BJT biasing, DC equivalent model, criteria for fixing operating point, methods of Bias stabilization, Thermal run away, Thermal stability Biasing of JFET and MOSFET, Comparison of BJT, JFET and MOSFET devices.

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. FET and MOSFET Small signal model. (C.G, C.D, C.S configurations) R.C Coupled Amplifiers using BJT and JFET, Concepts of f_α, f_β and f_τ

UNIT- VII

FEEDBACK AMPLIFIERS : Concept of feedback, Classification of feedback amplifiers, General characteristics of negative feedback amplifiers, Effect of Feedback on Amplifier characteristics, Simple problems.

UNIT-VIII

OSCILLATORS : Condition for oscillations. RC and LC type Oscillators, Crystal oscillators, Frequency and amplitude stability of oscillators, Generalized analysis of LC oscillators, Quartz ,Hartley, and Colpitts Oscillators, RC-phase shift and Wien-bridge oscillators.

TEXT BOOKS :

1. Electronic Devices and Circuits – J.Millman and C.C.Halkias, Tata McGraw Hill, 1998.
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 – K. Lal Kishore, B.S. Publications, 2nd Edition, 2005.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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I Year B.Tech. ICE

T	P	C
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(ME 05220) ENGINEERING DRAWING PRACTICE LAB

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

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

UNIT – V

Isometric projections of lines, planes and simple solids

TEXT BOOKS :

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

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I Year B.Tech. ICE

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(CS 05144) COMPUTER PROGRAMMING LAB

1. Write a C program to evaluates the following algebraic expressions after reading necessary values from the user:

   a) ax+b/ax-b

   b) 2.5 log x + cos 32° + $|x^2 - y^2| + xy$

   c) $1/\alpha\pi e \cdot (x-m/\sigma)^2$

2. Write a C program for the following

   a) Printing three given integers in ascending order

   b) Sum of $1 + 2 + 3 + ----- n$

   c) $1 + x^2/2! + x^2/4! + ----$ upto ten terms

   d) $x + x^3/3! + x^5/5! + -----$ upto 7th digit accuracy

   e) Read x and compute Y =1 for x > 0

      Y = 0 for x = 0

      Y = -1 for x<0

3. Write C program using FOR statement to find the following from a given set of 20 integers.

   i) Total number of even integers. ii) Total number of odd integers.

   iii) Sum of all even integers.   iv) Sum of all odd integers.

4. Write a C program to obtain the product of two matrices A of size (3X3) and B of size (3X2). The resultant matrix C is to be printed out along with A and B. Assume suitable values for A & B.

5. Using switch-case statement, write a C program that takes two operands and one operator from the user, performs the operation and then prints the answer. (consider operators +,-,/ , * and %).

6. Write C procedures to add, subtract, multiply and divide two complex numbers (x+iy) and (a+ib). Also write the main program that uses these procedures.

7. The total distance traveled by vehicle in 't' seconds is given by distance = ut+1/2at² where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write C program to find the distance traveled 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'.

8. A cloth show room has announced the following seasonal discounts on purchase of items.

PURCHASE		Discount (Percentage)	
Amount		Mill Cloth	Handloom items
1-100		-	5.0
101-200		5.0	7.5
201-300		7.5	10.0
Above 300		10.0	15.0

Write a C program using Switch and If statements to complete the net amount to be paid by a customer.

9. Given a number, write a C program using while loop to reverse the digits of the number. Example 1234 to be written as 4321.

10. The Fibonacci sequence of numbers is 1,1,2,3,5,8… based on the recurrence relation

    f(n) = f (n-1) + f (n-2) for n>2.

    Write a C program using do-while to calculate and print the first n fibonacci numbers.

11. Write C programs to print the following outputs using For loop.

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

12. Write a C program to extract a portion of a character string and print the extracted string. Assume that m characters are extracted starting with the nth character.

13. A Maruthi Car dealer maintains a record of sales of various vehicles in the following form:

Vehicle type	Month of Sales	Price (Rs).
Maruthi – 800	02/87	75,000
Maruthi – DX	07/87	95,000
Gypsy	04/88	1,10,000
Maruthi Van	08/88	85,000

14. Write a C program to read this data into a table of strings and output the details of a particular vehicle sold during a specified period. The program should request the user to input the vehicle type and the period (Starting month & ending month).

15. Write a function that will scan a character string passed as an argument and covert all lower case characters into their upper case equivalents.

16. Implement the following data structures using Arrays

   i) Stacks ii) Linear Queues iii) Circular queues

17. Implement binary search tree using linked list and perform the following operations.

   i) Insertion ii) Deletion iii) Inorder Traversal iv) Preorder Traversal

   v) Post Order Traversal.

18. Singly linked list and doubly linked lists

   i) Insertion   ii) Deletion iii) Lookup

19. i) Implement stack using singly linked list.

   ii) Implement queue using singly linked list.

20. Implement the following sorting techniques.

   i) Bubble sort ii) Insertion Sort iii) Quick Sort iv) Heap Sort.

21. Implement the following searching method.

   i) Sequential Search ii) Binary Search

22. i) Conversion of Infix expression to Postfix notation.

   ii) Simple expression evaluator, that can handle +,-,/ and . *

23. Implement the algorithms for the following iterative methods using C to find one root of the equation

   $9x_1 + 2x_2 + 4x_3 = 0$

   $x_1 + 10x_2 + 4x_3 = 6$

   $2x_1 - 4x_2 + 10x_3 = -15.$

24. Write Computer programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

25. Implement in 'C' the linear regression and polynomial regression algorithms.

26. Implement Traezoidal and Simpson methods.

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I Year B.Tech. ICE

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(ME05230) ENGINEERING WORKSHOP PRACTICE

1. TRADES FOR EXERCISES:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. IT Workshop-I : Computer hard ware , identification of parts , Disassembly, ssembly of computer to working condition, Simple diagnostic exercises.
8. IT workshop-II : Installation of Operating system windows and Linux , simple diagnostic exercises.

II TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Welding
3. Machine Shop
4. Power Tools in construction, Wood working, Electrical Engg & Mechanical Engg
5. Metal Cutting (water plasma)

TEXT BOOKS: Work shop Manual / P.Kannaiah/ K.L.Narayana/ Scitech publishers

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I YEAR B.Tech. ICE

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(EC 05211) ELECTRONIC DEVICES AND CIRCUITS LAB

PART A :
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

6. 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.

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	T	P	C
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(HS05232) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

The following course content is prescribed for the English Language Laboratory Practice

1. Introduction to Phonetics.
2. Introduction to Vowels and Consonants and associated Phonetic symbols.
3. Introduction to Accent, Intonation and Rhythm.
4. Situational Dialogues / Role Play.
5. Public Speaking.
6. Debate
7. Group discussions
8. Facing Interviews
9. Resume preparation
10. e-correspondence

MINIMUM REQUIREMENT

Computer aided multi media language lab with 30 systems with LAN facility.

Conventional Language Lab. with audio and video systems, speakers, head phones and a teacher console to accommodate 30 students.

SUGGESTED SOFTWARE

Cambridge Advanced Learners' Dictionary with exercises

The Rosetta Stone English Library

Clarity Pronunciation Power

Mastering English in Vocabulary, Grammar, Spellings, Composition

Dorling Kindersley series of Grammar, Punctuation, Composition etc.

Language in Use, Foundation Books Pvt Ltd

Learning to Speak English - 4 CDs

Microsoft Encarta

Murphy's English Grammar, Cambridge

Time series of IQ Test, Brain-teasers, Aptitude Test etc.

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

2005-2006

BOOKS SUGGESTED FOR LANGUAGE LAB.

Developing Communication Skills - Krishna Mohan & Meera Benerji, Macmillan.

Speaking English Effectively - Krishna Mohan & NP Singh, Macmillan.

Better English Pronunciation - JDO Connor, UBS, Cambridge.

Oxford Practice Grammar with Answers - John Eastwood, Oxford

Handbook of English Grammar and Usage - Mark Lester and Larry Beason, Tata McGraw-Hill

A text book of English Phonetics for Indian Students - T.Balasubramanian Macmillan.

Lingua TOEFL CBT Insider - Dreamtech .

TOEFL & GRE - KAPLAN, AARCO & BARRONS, USA, Cracking GRE, CLIFFS)

English Skills for Technical Students - WBSCTE with British Council, OL

A Handbook of English for Competitive Examinations - B Shyamala Rao, Blakie Books, Chennai.

ENGLISH LANGUAGE LABORATORY PRACTICE

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.

2005-2006

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II YEAR B.Tech. ICE - I Semester

(MA05365) MATHEMATICS – III

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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 indentation.

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 Volume – III, 2005 T.K.V.Iyengar, B.Krishna Gandhi and others, S.Chand and Company.

2. Engineering Mathematics, B.V.Ramana, Tata McGraw-Hill 2003.

REFERENCES:

1. Engineering Mathematics–III 2002, P.Nageswara Rao, Y.Narsimhulu, Prabhakara Rao

2. Engineering Mathematics, S.K.V.S. Sri Rama Chary, M.Bhujanga Rao, Shankar, B.S.Publications 2000.

3. Advanced Engineering Mathematics (eighth edition), Erwin Kreyszig, John Wiley & Sons (ASIA) Pvt. Ltd. 2001.

4. Advanced Engineering Peter V.O'Neil Thomson Brooks/Cole.

5. Engineering Mathematics – III, 2005, Sankaraiah, VGS Book Links, Hyderabad.

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II YEAR B.Tech. ICE - I Semester

	T	P	C
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(EE05539) 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 and 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 and 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.

TEXT BOOKS:

1. Switching and Logic design – CVS Rao, Pearson, 2005.
2. Switching & Finite Automata theory – Zvi Kohavi, TMH,2nd Edition.

REFERENCES:

1. Introduction to Switching Theory and Logic Design - F.J.Hill, G.R.Petrerson, John Wiley, 2nd edition.
2. Switching Theory and Logic Design – R.P.Jain, TMH Editon, 2003.
3. Digital Design - Morris Mano, PHI, 2nd edition.
4. An Engineering Approach To Digital Design – Fletcher, PHI.
5. Digital Logic – Application and Design – John M. Yarbrough, Thomson Publications, 1997.
6. Fundamentals of Logic Design – Charles H. Roth, Thomson Publications, 5th Edition, 2004.

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II YEAR B.Tech. ICE - I Semester

	T	P	C
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(EE05200) 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 Synchonous 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:

Introduction to Electrical Engineering – M.S Naidu and S. Kamakshaiah, TMH Publ.

Basic Electrical Engineering by T.K. Nagasarkar and M.S.Sukhija, Oxford University Press,2005

REFRENCES:

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

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II YEAR B.Tech. ICE - I Semester

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4+1	0	4

(IC05111) 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 – VI:

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. John P. Bentley: Principles of measurement systems, 3rd edition, Addison Wesley Longman, 2000.

REFERENCES:

1. Electronic Instrumentation & Measurement Techniques – by W.D. Cooper, PHI

2. Alan S. Morris: Principles of measurement and instrumentation, 2nd edition, Prentice-Hall of India,2004.

3. Measuring Systems, Application and Design – by E.O. Doebelin, McGraw Hill.

4. Electrical and Electronic Measurements – by Shawney, Khanna Publ.

5. Electronic Instrumentation and measurements – by David A. Bell, 2nd Edition, PHI, 2003.

6. M.M.S. Anand: Electronic instruments and instrumentation Technology, Prentice-Hall of India,2004.

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II YEAR B.Tech. ICE - I Semester

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(EI05516) SENSORS AND SIGNAL CONDITIONING

UNIT-I: 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

UNIT-II: RESISTIVE SENSORS: potentiometers, strain gages and types, resistive temperature detectors (RTD's), thermistors, magneto resistors, light-dependent resistors (LDR's)

UNIT-III: 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

UNIT-IV: REACTANCE VARIATION AND ELECTROMAGNETIC SENSORS: capacitive sensors - variable & differential, inductive sensors - reluctance variation, eddy current, linear variable differential transformers (LVDT's), variable transformers: Synchros, resolvers, inductosyn, magneto elastic sensors, electromagnetic sensors - sensors based on faraday's law, hall effect sensors

UNIT-V: SIGNAL CONDITIONING FOR REACTANCE VARIATION SENSORS: problems and alternatives, ac bridges, carrier amplifiers - application to the LVDT, variable oscillators, resolver-to-digital and digital-to-resolver converters

UNIT-VI: SELF-GENERATING SENSORS: thermoelectric sensors, piezoelectric sensors, pyroelectric sensors, photovoltaic sensors, electrochemical sensors

UNIT-VII: SIGNAL CONDITIONING FOR SELF-GENERATING SENSORS: chopper and low-drift amplifiers, offset and drifts amplifiers, electrometer amplifiers, charge amplifiers, noise in amplifiers

UNIT-VIII: 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 BOOKS:

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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II YEAR   B.Tech. ICE - I Semester

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(EE05149) CONTROL SYSTEMS

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 stability criterion – qualitative stability and conditional 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 and applications of Nyquist criterion to find the stability – Effects of adding poles and zeros to G(s)H(s) on the shape of the Nyquist diagrams.

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

TEXT BOOKS:

1. Control Systems Engineering – by I. J. Nagrath and M. Gopal, New Age International (P) Limited, Publishers, 2nd edition.

2. Modern Control Engineering – by Katsuhiko Ogata – Prentice Hall of India Pvt. Ltd., 3rd edition, 1998.

REFERENCES:

1. Control Systems by N.K.Sinha, New Age International (P) Limited Publishers, 3rd Edition, 1998.

2. Automatic Control Systems 8th edition– by B. C. Kuo 2003– John wiley and son's.

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.

	T	P	C
	0	3	2

(EE05201) ELECTRICAL TECHNOLOGY LAB

(Minimum TEN experiments should be performed)

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.

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(IC05556) TRANSDUCERS AND INSTRUMENTATION LAB

(Minimum TEN experiments should be performed)

1. Extension of Range of DC Ammeter, Voltmeter

2. Extension of Range of AC Voltmeter, Ammeter

3. Construction of Series & Shunt type Ohm meters using PMMC

4. RLC and Q measurement using Q-meter

5. Study of Strain gauges using any one application

6. Measurement of temperature using RTD

7. Measurement of linear displacement using LVDT

8. Study of Capacitive transducers

9. Measurement of Resistance Using Wheat stone Bridge / Kelvin Bridge.

10. Measurement of Capacitance Using Shearing Bridge.

11. Measurement of Inductance Using Maxwell's Bridge.

12. Characteristics of Opto – Electric Transducers (Photo Transistor, Photo diode, LDR)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

HYDERABAD

II YEAR B.Tech. ICE - IInd Semester

(CS05140) COMPUTER ORGANIZATION

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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 Micro-operations, 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, micro program example, design of control unit Hard wired control. Micro programmed control

UNIT IV: COMPUTER ARITHMETIC

Addition and subtraction, multiplication Algorithms, Division Algorithms, Floating – point Arithmetic operations. Decimal Arithmetic unit Decimal Arithmetic operations.

UNIT V: THE MEMORY SYSTEM

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, Inter processor Arbitration. Inter Processor Communication and Synchronization Cache Coherence. Shared Memory Multiprocessors.

TEXT BOOKS:

1. Computer Systems Architecture – M.Moris Mano, IIIrd Edition, PHI/Pearson.

2. Computer Organization – Car Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill.

REFERENCES:

1. Computer Organization and Architecture – William Stallings Sixth Edition, PHI/ Pearson.

2. Structured Computer Organization – Andrew S. Tanenbaum, 4th Edition PHI/ Pearson.

3. Fundamentals or Computer Organization and Design, - Sivaraama Dandamudi Springer Int. Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

II YEAR B.Tech. ICE - IInd Semester

(EI05309) INDUSTRIAL INSTRUMENTATION

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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 (Rotameter), 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 Technology.

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

II YEAR   B.Tech. ICE - IInd Semester

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(IC05470) PRIME MOVERS AND MECHANICAL COMPONENTS

UNIT – I: HYDRAULIC TURBINES

Impact of Jets, Classification – Pelton wheel – Francis and Kaplan turbines – working principle – Specific speed – Performance and Characteristic curves of turbines.

UNIT – II: HYDRAULIC PUMPS

Reciprocating pumps – Types – main components – working principle – air vessels – slip – indicator diagrams – centrifugal pumps – main components – working principle – performance and characteristic curves of centrifugal pump.

UNIT – III: STEAM GENERATORS:

Introduction – classification of boilers – comparison between "Fire – Tube and water-tube boilers – selection of boiler – Essentials of a good steam boiler – fire tube boilers – simple vertical boiler, Cochran boiler, Cornish boiler, Lancashire-boiler, locomotive boiler, scotch boiler – water tube boilers – Babcock and Wilcox water – tube boiler – high pressure boilers – Lamon boiler, Loefflar boiler, Benson boiler, Velox Boiler – Super Critical boilers – Super – Charged boilers.

UNIT – IV: BOILER MOUNTINGS AND ACCESSORIES

Introduction – Boiler Mountings – Water level indicator, pressure gauge, safety valves, high steam and low water safety valve, fusible plug, blow – off cock, feed check valve, Junction or stop valve – Boiler accessories – Feed pumps, Injector, Economizer, Air Preheater, Super heater, Steam separator, Steam trap, Steam Condensers.

UNIT-V: STEAM TURBINES

Carnot, Rankine and Joule cycles. Classification – Impulse and Reaction Turbines – Mechanical Details – Principle of Operation – Simple Impulse Turbine – Methods to reduce rotor speed, velocity compounding, pressure compounding and pressure – velocity compounding.

UNIT – VI: GAS TURBINES

Introduction – Classification – gas turbine – simple gas turbine plant – principle of working – ideal and actual cycles – open closed turbines.

UNIT-VII: HYDRAULIC ACTUATING SYSTEMS

Hydraulics- Hydraulic Systems, Hydraulic pump dutychek Control valves, Hydraulic Cylinders, Rotary Actuators.

UNIT – VIII: MECHANICAL ACTUATING SYSTEMS

Mechanical Actuating Systems – Types of Motion, Freedom and Constraints, Loading and Kinematics chains, Slider Change Mechanism

TEXT BOOKS:

1. Hydraulics and fluid mechanics including hydraulic machines - Bansal
2. Thermal engineering - R.S.Kurmy

REFERENCES:

1. Hydraulics and fluid mechanics including hydraulic machines by R.P.N.Modi & dr. S.M.Seth
2. Thermal engineering by 1.R.K.Rajput, 2. D.S.Kumar
3. Mechanical details for production design: Greenwood

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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II YEAR B.Tech. ICE - IInd Semester

(EC05497) PULSE AND DIGITAL CIRCUITS

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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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY

HYDERABAD

II YEAR B.Tech. ICE - IInd Semester

	T	P	C
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(EC05342) LINEAR AND DIGITAL IC APPLICATIONS

UNIT I: INTEGRATED CIRCUITS

Classification, chip size and circuit complexity, basic information of Op-amp, ideal and practical Op-amp, internal circuits, Op-amp characteristics, DC and AC characteristics, 741 op-amp and its features, modes of operation-inverting, non-inverting, differential.

UNIT II: OP-AMP APPLICATIONS

Basic application of Op-amp, instrumentation amplifier, ac amplifier, V to I and I to V converters, sample & hold circuits, multipliers and dividers, Differentiators and Integrators, Comparators, Schmitt trigger, Multivibrators, introduction to voltage regulators, features of 723.

UNIT III: ACTIVE FILTERS & OSCILLATORS

Introduction, 1st order LPF, HPF filters. Band pass, Band reject and all pass filters. Oscillator types and principle of operation – RC, Wien and quadrature type, waveform generators – triangular, sawtooth, square wave and VCO.

UNIT IV: 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 of 565.

UNIT V: D-A AND A- 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.

UNIT VI:

Classification of Integrated circuits, comparison of various logic families, standard TTL NAND Gate- Analysis& characteristics, TTL open collector O/Ps, Tristate TTL,

MOS & CMOS open drain and tristate outputs, CMOS transmission gate, IC interfacing- TTL driving CMOS & CMOS driving TTL.

UNIT VII:

Design using TTL-74XX & CMOS 40XX series, code converters, decoders, Demultiplexers, decoders & drives for LED & LCD display, Encoder, priority Encoder, multiplexers & their applications, priority generators/checker circuits. Digital arithmetic circuits-parallel binary adder/subtractor circuits using 2's, Complement system. Digital comparator circuits.

UNIT VIII: SEQUENTIAL CIRCUITS

Flip-flops & their conversions. Design of synchronous counters. Decade counter, shift registers & applications, familiarities with commonly available 74XX & CMOS 40XX series of IC counters.

Memories: ROM architecture, types & applications, RAM architecture, Static & Dynamic RAMs, synchronous DRAMs.

TEXT BOOKS:

1. Linear Integrated Circuits –D. Roy Chowdhury, New Age International (p) Ltd, 2nd Ed., 2003.

2. Op-Amps & Linear ICs – Ramakanth A. Gayakwad, PHI, 1987.

REFERENCES:

1. Operational Amplifiers and Linear Integrated Circuits – R.F. Coughlin and Fredrick F. Driscoll, PHI, 1977.

2. Operational Amplifiers and Linear Integrated Circuits: Theory and Applications –Denton J. Daibey, TMH.

3. Design with Operational Amplifiers and Analog Integrated Circuits - Sergio Franco, McGraw Hill, 3rd Ed., 2002.

4. Digital Fundamentals – Floyd and Jain, Pearson Education,8th Edition, 2005.

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II YEAR B.Tech. ICE - IInd Semester

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(EC05517) 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

II YEAR B.Tech. ICE - IInd Semester

	T	P	C
	0	3	2

(EE05151) CONTROL SYSTEM LAB - I

(Minimum TEN experiments should be performed)

1. Characteristics of synchro transducer, Synchro receiver and control transformers

2. Gain control of the output of D.C. Amplifier with and without chopper stabilization.

3. Programming a P.L.C

4. Torque- displacement characteristics of stepper motor using A\D converters.

5. Open loop control of a relay servomechanism (On- off control of a temp in a heater bath)

6. Advantage of . feedback on the performance of an open loop speed control system (D.C. Motor speed control system)

7. Response of a first order system, with R.C Components (Simulated transfer function) on X-Y plotter/ Servo scope.

8. Operation of pneumatically operated pressure control system using pressure sensitive bellows and LVDT as sensors.

9. Error comparators- gauged potentiometer and systems potentiometer-sensitivity determination.

10. Calibration of a torque- balance pressure control system using a flapper nozzle in the pressure sensing circuit.

11. Modeling of a distillation column as a lumped parameter multi variable system.

12. Pneumatically operated PID controller, with independent gain control of P.I, and D control loops, of a step input response.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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II YEAR B.Tech. ICE - IInd Semester

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(EC05300) IC AND PULSE AND DIGITAL CIRCUITS LAB

(Minimum TEN experiments should be performed)

1. Linear wave shaping

2. Non Linear Wave Shaping – Clippers

3. Non Linear Wave Shaping – Clampers

4. Study of Logic Gates & Some Applications

5. Astable Multivibrator, Monostable Multivibrator using transistors

6. Bistable Multivibrator, Schmit Trigger using transistors

7. IC 741 OP AMP Applications – Adder, Integrator and Differentiator Circuits

8. Active Filters – LPF, HPF (first order)

9. Function Generator using 741 OP AMP

10. IC 555 Timer – Monostable Operation Circuits, Astable Operation Circuits

11. Schmitt Trigger Circuits – Using IC 741 and IC 555

12. Voltage Regulator using IC 723

13. 4 bit DAC using 741 OP AMP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

III YEAR B.Tech. ICE - I Semester

T	P	C
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(HS05353) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

UNIT I: INTRODUCTION TO MANAGERIAL ECONOMICS

Definition, Nature and Scope Managerial Economics–Demand Analysis: Demand Determinants, Law of Demand and its exceptions.

UNIT II: ELASTICITY OF DEMAND

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

UNIT III: THEORY OF PRODUCTION AND COST ANALYSIS

Production Function – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Production function, Laws of Returns, Internal and External Economies of Scale.

Cost Analysis: Cost concepts, Opportunity cost, Fixed Vs.Variable costs, Explicit costs Vs.Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)–termination of Break-Even Point (simple problems)–Managerial Significance and limitations of BEA.

UNIT IV: INTRODUCTION TO MARKETS & PRICING STRATEGIES

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

UNIT V : BUSINESS & NEW ECONOMIC ENVIRONMENT

Characteristic features of Business, Features and evaluation of Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, Changing Business Environment in Post-liberalization scenario.

UNIT VI : CAPITAL AND CAPITAL BUDGETING

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

UNIT VII: INTRODUCTION TO FINANCIAL ACCOUNTING

Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments).

UNIT VIII : FINANCIAL ANALYSIS THROUGH RATIOS

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

TEXT BOOKS:

1. Managerial Economics and Financial Analysis – Aryasri, TMH,2/E, 2005.
2. Managerial Economics - Varshney & Maheswari, Sultan Chand, 2003.

REFERENCES:

1. Financial Accounting for Management - Ambrish Gupta, Pearson Education, New Delhi, 2004.
2. Financial Accounting - Schaum's Outlines, Shim &Siegel,TMH, 2/E,2004
3. Production and Operations Management – Chary, TMH, 3/e, 2004.
4. Managerial Economics In a Global Economy - Domnick Salvatore, Thomson, 4th Edition 2003.
5. Financial Accounting—A Managerial Perspective – Narayanaswamy,PHI, 2005
6. Managerial Economics - Peterson & Lewis, Pearson Education, 4th Edition, 2004
7. Managerial Economics& Financial Analysis - Raghunatha Reddy & Narasimhachary, Scitech, 2005.
8. Financial Accounting - S.N.Maheswari & S.K. Maheswari, Vikas, 2005.
9. Managerial Economics:Analysis, Problems and Cases - Truet and Truet, Wiley, 2004.
10. Managerial Economics – Dwived, Vikas, 6th Ed.,2002
11. Managerial Economics - Yogesh Maheswari, PHI, 2nd Ed., 2nd Ed. 2005.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

III YEAR   B.Tech. ICE - I Semester

(CE 05529) ENVIRONMENTAL STUDIES

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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 ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

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

UNIT - IV

Biodiversity and its conservation : Introduction - Definition: genetic, species and ecosystem diversity. - Bio-geographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - . Biodiversity at global, National and local levels. - . India as a 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 ecosystems-pond, river, hill slopes, etc.

TEXTBOOK :

Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

III YEAR B.Tech. ICE - I Semester

T	P	C
4+1	0	4

(EC05400) 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.

UNIT II:

Addressing modes of 8086. Instruction set of 8086. Assembler directives, simple programs, procedures, and macros.

UNIT III:

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

UNIT IV:

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

UNIT V:

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

UNIT VI:

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 VII:

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 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. Microprocessors and interfacing - Douglas V. Hall, TMH, 2nd Edition, 1999.

REFERENCES:

1. Micro computer systems, The 8086/8088 Family Architecture, Programming and Design - Y.Liu and G.A. Gibson, PHI, 2nd edition.

2. Microprocessors 8086/ 8088 - Avatar singh and Triebel, PHI.

3. Assembly Language Techniques for the IBM PC - Alan R, Miller, BPB. (for DOS and BIOS interrupts only)

4. Micro Controllers - Rajkamal, Pearson Education, 2005.

5. Design with PIC Micro Controllers – John B. Peatman, 2005.

6. 8051 Micro Controllers – Dr. Rajiv Kapadia.

7. 8086 Micro Processor - Kenneth J. Ayala, Penram International/ Thomson, 1995.

8. 8051 Microcontroller - Kenneth J. Ayala, Penram International/ Thomson, 3rd Edition, 2005.

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III YEAR B.Tech. ICE (1st Semester)

	T	P	C
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(CS05308) INDUSTRIAL ELECTRONICS

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.

TEXT BOOKS:

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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III YEAR B.Tech. ICE (1st Semester)

	T	P	C
	4+1	0	4

(IC05479) 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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III YEAR B.Tech. ICE (1st Semester)

	T	P	C
	4+1	0	4

(CS05434) OOPS THROUGH JAVA

UNIT I

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

UNIT II

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

UNIT III

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

UNIT IV

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

UNIT V

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

UNIT VI

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling mouse and keyboard events, Adapter classes.

AWT: Concepts of components, container, panel, window, frame, canvas, Font class, Color class and Graphics.

UNIT VII

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

Swing – JApplet, JFrame and JComponent, Icons and Labels, Handling threading issues, text fields, buttons –The JButton class, Check boxes, Radio buttons, Combo boxes, Tabbed Panes, Scroll Panes, Trees, and Tables.

Applets – Concepts of Applets, differences between applets and applications,life cycle of an applet, types of applets, creating applets, passing parameters to applets.

UNIT VIII

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

TEXT BOOKS:

1. The Complete Reference Java J2SE 5th Edition, Herbert Schildt, TMH Publishing Company Ltd, NewDelhi./PHI
2. Big Java 2nd Edition, Cay Horstmann, John Wiley and Sons.

REFERENCES:

1. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education.
2. Core Java 2, Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. Core Java 2, Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. Beginning in Java 2, Iver Horton, Wrox Publications

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III YEAR B.Tech. ICE (1st Semester)

	T	P	C
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(EC05401) MICROPROCESSORS 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.

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III YEAR B.Tech. ICE (1st Semester)

	T	P	C
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(IC05310) INDUSTRIAL INSTRUMENTATION LAB
(Minimum TEN experiments should be performed)

1. Study of P to I and I to P converters
2. RPM measurement using Stroboscope / Tachometer
3. Measurement of Acceleration using Piezo Electric Crystal
4. Pressure Measurement using Bourdon Tube.
5. Measurement of Flow using Venturi / Orifice / Turbine Type Flow meter
6. Measurement of level using Capacitive transducer
7. Measurement of Troque using Trobian bar
8. Displacement measurement by an Sesmic displacement transducer
9. Opto electric measurement by an
10. DAC & ADC
11. Data Acquisition system
12. Linearization of Thermistor using Microprocessor

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III YEAR B.Tech. ICE (IInd Semester)

(HS05352) MANAGEMENT SCIENCE

	T	P	C
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UNIT I: INTRODUCTION TO MANAGMENT

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

UNIT II: DESIGNING ORGANISATIONAL STRUCTURES

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

UNIT 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: chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

UNIT IV : MATERIALS MANAGEMENT

A)Materials Management Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records.
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, Value Chain Analysis, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

UNIT VIII: CONTEMPORARY MANAGEMENT PRACTICES

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

TEXT BOOKS:

1. Management Science – Aryasri, TMH, 2004.
2. Management - Stoner, Freeman, Gilbert, Pearson Education, New Delhi, 6th Ed., 2004.

REFERENCES:

1. Marketing Mangement 1 - Kotler Philip & Keller Kevin Lane, PHI, 2/e, 2005.
2. Essentials of Management - Koontz & Weihrich, TMH, 6/e, 2005
3. Management—Principles and Guidelines - Thomas N.Duening & John M.Ivancevich Biztantra,2003.
4. Production and Operations Management - Kanishka Bedi, Oxford University Press, 2004.
5. Personnel Management - Memoria & S.V.Gauker, Himalaya, 25/e, 2005
6. Modern Management - Samuel C.Certo, PHI, 9/e, 2005
7. Management - Schermerhorn, Capling, Poole & Wiesner, Wiley, 2002.
8. Strategic Management - Parnell, Biztantra,2003.
9. Business Policy and Strategic Management - Lawrence R Jauch, R.Gupta &William F.Glueck, Frank Bros., 2005.
10. PERT/CPM - L.S.Srinath , Affiliated East-West Press, 2005.

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III YEAR B.Tech. ICE (IInd Semester)

	T	P	C
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(EC05176) 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.

UNIT III: FAST FOURIER TRANSFORMS

Fast Fourier transforms (FFT) - Radix-2 decimation in time and decimation in frequency, FFT Algorithms, Inverse FFT, FFT with General Radix.

UNIT IV: REALIZATION OF DIGITAL FILTERS

Applications of z-transforms, solution of difference equations of digital filters. System function, stability criterion, frequency response of stable systems. Realization of digital filters – direct, canonic, cascade and parallel forms, Lattice structures.

UNIT V: IIR DIGITAL FILTERS

Analog filter approximations – Butter worth and Chebshev, Design of IIR Digital filters from analog filters, Bilinear transformation method, step and impulse invariance techniques, Spectral 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, filter design and implementation for 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.

Examples: Features of TMS 320CXX Processors, Internal Architecture, External memory accesses, Pipeline operations, Peripherals.

TEXT BOOKS:

1. Digital Signal Processing : Principals, Algorithms and Applications - Proakis, J.Gard and D.G.Manolakis, 3rd Edn., PHI, 1996.

2. Fundamentals of Digital Signal Processing – Robert J. Schilling and Sandra L. Harris, Thomson, 2005.

REFERENCES:

1. Discrete Time Signal Processing – A.V. Oppenheim and R.W. Schaffer, PHI, 1989.

2. Fundamentals of Digital Signal Processing – Loney Luderman.

3. Digital Signal Processing – S. Salivahanan et al., TMH, 2000.

4. Digital Signal Processing – Thomas J. Cavicchi, WSE, John Wiley, 2004.

5. Digital Signal Processors, Architecture, Programming & Applications, - B. Venkata Ramani, M. Bhaskar, TMH, 4th reprint, 2004.

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III YEAR B.Tech. ICE (IInd Semester)

	T	P	C
	4+1	0	4

(EC05471) 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, 2nd Ed. 2004.

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III YEAR B.Tech. ICE (IInd Semester)

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4+1	0	4

(IC05167) DIGITAL & OPTIMAL CONTROL SYSTEMS

UNIT – I: SAMPLING AND RECONSTRUCTION & THE Z- TRANSFORMS

Introduction., Examples of Data control systems –sample and hold operations, Reconstruction of original signals, Linear difference equations, pulse response.

The Z – TRANSFORMS: Z – transforms, Theorems of Z – Transforms, the inverse Z – transforms, Modified Z- Transforms, 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 – II: 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 – III: 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 – IV: STABILITY ANALYSIS

Mapping between the S-Plane and the Z-Plane – Primary strips and Complementary Strips, Stability Analysis of closed loop systems in the Z-Plane. Jury stability test, Stability Analysis by use of the Bilinear Transformation and Routh Stability criterion, Stability in the sense of Lyapunov., Lyapunov's stability and Lypanov's instability theorems. Direct method of Lypanov for the Linear and Nonlinear continuous time autonomous systems.

UNIT –V: DESIGN OF DIGITAL CONTROLLERS

Design of digital control systems with digital controllers through bilinear transformation. Digital PID controller, Design for dead beat response, pole placement design by state feedback for single input and multi-input systems, pole placement design by incomplete feedback or output feedback.

UNIT – VI: STATE OBSERVERS

Introduction, State Observers – Full order and Reduced order observers.

UNIT-VII: CALCULUS OF VARIATIONS

Minimization of functionals of single function, Constrained minimization. Minimum principle. Control variable inequality constraints. Control and state variable inequality constraints. Euler Lagrangine Equation.

UNIT –VIII: OPTIMAL CONTROL

Formulation of optimal control problem. Minimum time, Minimum energy, minimum fuel problems. State regulator problem. Output regulator problem. Tracking problem, Continuous-Time Linear Regulators.

TEXT BOOKS:

1. K. OGATA : Discrete time control systems, Prentice Hall
2. Digital Control and State Variable Methods by M.Gopal, TMH

REFERENCES:

1. Modern Control Theory by M.Gopal, M/s. TMH Publications.
2. Digital Control Systems, Kuo, Oxford University Press, 2nd Edition, 2003.
3. Digital Control Engineering, M.Gopal

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III YEAR B.Tech. ICE (IInd Semester)

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4+1	0	4

(IC05443) 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

UNIT – VI: 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,
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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III YEAR B.Tech. ICE (IInd Semester)

T	P	C
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(EI05038) 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 – H S 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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III YEAR B.Tech. ICE (IInd Semester)

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(IC05480) PROCESS CONTROL LAB

(Minimum **TEN** 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. Electronic controllers.
5. Process tuning – Process reaction curve method.
6. Process tuning – continuous and damped oscillation method.
7. Operation of flow loop in plant.
8. Input convertor – Pneumatic actuator.
9. Input convertor – Hydraulic actuator.
10. Control valve characteristics (Different types).
11. Multi loop control systems – Ratio Control.
12. Multi loop control systems – Cascade Control.

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III YEAR B.Tech. ICE (IInd Semester)

	T	P	C
	0	3	2

(EE05152) CONTROL SYSTEMS LAB - II

(Minimum **TEN** experiments should be performed)

1. Determination of the control characteristics of A.C servomotor.
2. Transfer function of armature controlled D.C servomotor with inertia and viscous
3. Control characteristic of a magnetic amplifier with and without feedback.
4. D.C Motor speed control with regenerative and degenerative feedback and with tach generator in the feedback path.
5. D.C position control system—Output control with variation of control loop gain
6. System identification for the frequency response of a filter (based pass + band elimination filter)
7. Shaft angle encoder, decoder, output characteristics.
8. Amplitude modulation of low frequency, Signal and recovery after demodulation (effect of modulating frequency on the signal to noise ratio).
9. Robot manipulator motion control using feed pendent.
10. Pick and plan assignment of robot manipulator with microcontroller.
11. 4-1 line multiplexer with digital logic gates.
12. Elementary fast programming on a robot manipulator (describing a trajectory, which is predefined).

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IV YEAR B.Tech. ICE (Ist Semester)

(EE05425) NEURAL NETWORKS & FUZZY LOGIC

T	P	C
4+1	0	4

UNIT – I: INTRODUCTION TO NEURAL NETWORKS

Introduction, Humans and Computers, Organization of the Brain, Biological Neuron, Biological and Artificial Neuron Models, Hodgkin-Huxley Neuron Model, Integrate-and-Fire Neuron Model, Spiking Neuron Model, Characteristics of ANN, McCulloch-Pitts Model, Historical Developments, Potential Applications of ANN.

UNIT– II: ESSENTIALS OF ARTIFICIAL NEURAL NETWORKS

Artificial Neuron Model, Operations of Artificial Neuron, Types of Neuron Activation Function, ANN Architectures, Classification Taxonomy of ANN – Connectivity, Neural Dynamics (Activation and Synaptic), Learning Strategy (Supervised, Unsupervised, Reinforcement), Learning Rules, Types of Application

UNIT–III: SINGLE LAYER FEED FORWARD NEURAL NETWORKS

Introduction, Perceptron Models: Discrete, Continuous and Multi-Category, Training Algorithms: Discrete and Continuous Perceptron Networks, Perceptron Convergence theorem, Limitations of the Perceptron Model, Applications.

UNIT– IV: MULTILAYER FEED FORWARD NEURAL NETWORKS

Credit Assignment Problem, Generalized Delta Rule, Derivation of Backpropagation (BP) Training, Summary of Backpropagation Algorithm, Kolmogorov Theorem, Learning Difficulties and Improvements.

UNIT V: ASSOCIATIVE MEMORIES

Paradigms of Associative Memory, Pattern Mathematics, Hebbian Learning, General Concepts of Associative Memory (Associative Matrix, Association Rules, Hamming Distance, The Linear Associator, Matrix Memories, Content Addressable Memory), Bidirectional Associative Memory (BAM) Architecture, BAM Training Algorithms: Storage and Recall Algorithm, BAM Energy Function, Proof of BAM Stability Theorem Architecture of Hopfield Network: Discrete and Continuous versions, Storage and Recall Algorithm, Stability Analysis, Capacity of the Hopfield Network

UNIT – VI: CLASSICAL & FUZZY SETS

Introduction to classical sets - properties, Operations and relations; Fuzzy sets, Membership, Uncertainty, Operations, properties, fuzzy relations, cardinalities, membership functions.

UNIT VII: FUZZY LOGIC SYSTEM COMPONENTS

Fuzzification, Membership value assignment, development of rule base and decision making system, Defuzzification to crisp sets, Defuzzification methods.

UNIT VIII: APPLICATIONS

Neural network applications: Process identification, control, fault diagnosis and load forecasting.

Fuzzy logic applications: Fuzzy logic control and Fuzzy classification.

TEXT BOOKS:

1. Neural Networks, Fuzzy logic, Genetic algorithms: synthesis and applications by Rajasekharan and Rai – PHI Publication.
2. Introduction to Artificial Neural Systems - Jacek M. Zuarda, Jaico Publishing House, 1997.

REFERENCES:

1. Neural and Fuzzy Systems: Foundation, Architectures and Applications, - N. Yadaiah and S. Bapi Raju, Pearson Education
2. Neural Networks – James A Freeman and Davis Skapura, Pearson, 2002.
3. Neural Networks – Simon Hykins , Pearson Education
4. Neural Engineering by C.Eliasmith and CH.Anderson, PHI
5. Neural Networks and Fuzzy Logic System by Bork Kosk, PHI Publications.

Summary and Discussion of Instance/Memory Based Learning Algorithms, Applications.

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IV YEAR B.Tech. ICE (Ist Semester)

	T	P	C
	4+1	0	4

(EI05090) 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 neuro-muscular junction.

UNIT – III:

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

UNIT – IV:

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

UNIT – V:

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

UNIT – VI:

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

UNIT – VII:

Neuro-Muscular Instrumentation: Specification of EEG and EMG machines. Electrode placement for EEG and EMG recording, Intrepetation 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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IV YEAR B.Tech. ICE (Ist Semester)

	T	P	C
	4+1	0	4

(EN05136) COMPUTER AIDED DESIGN OF CONTROL SYSTEMS

UNIT I: INTRODUCTION

Introduction and mathematical back ground, system models, Generation of system matrices–Least order, Decoupling zeros, mode of the system transformation – Mcmillian form – Reduction to least order

UNIT II: CONTROLLABILITY AND OBSERVABILITY

Concepts of controllability and observability, Controllability and observability - Decomposition of state space and Duality.

UNIT III: STABILITY ANALYSIS OF SISO SYSTEMS

System Specification, Stability- Decoupling zeros , Nyquist Diagram. Inverse Nyquist diagram-

UNIT IV: DESIGN OF COMPENSATORS

Design of phase lead compensators from inverse Nyquist diagram- Design of phase lag compensators from inverse Nyquist diagram.

UNIT V: DESIGN CRITERIA

Design using Root loci method of design, Comparison with inverse Nyquist diagram techniques – Sensitivity Design criteria , step response – frequency response – pole location – Selection of criteria. Irrational transfer functions, Non minimum phase response . the circle criteria – Connection with the describing function.

UNIT VI:MULTIVARIABLE SYSTEMS

Notation, Gain space, stability, frequency response criteria for stability, diagonal dominance, Ostrowski's theorem, Achieving dominance, Sensitivity, Direct Nyquist array, design procedure- Multi variable circle criterion.

UNIT VII: MATLAB PROGRAMMING

Introduction, variables, Expressions, Control statements, Logical & Relational operators, Function files, Script files, Input-Output format, Working with Workspace

UNIT VIII: DESIGN OF CONTROLLERS USING MATLAB

Introduction to Control system Tool Box, Time and Frequency domain anlysis of Control Systems using MATLAB, Stability analysis using MATLAB, Controllability and Observability testing using MATLAB, Design of static Feed back Controllers.

TEXT BOOKS:

1. Computer Aided Design of Control Systems – by Resenbrockk(Academic Press)

2. Multi variable Control Theory by Y.S. Apte.

REFERENCES:

1. MATLAB Control System Tool Box.

2. Simulation Tools for Electrical Engineers – by N. Yadaiah and G. Tulasi Ram Das, Pearson Education.

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IV YEAR B.Tech. ICE (Ist Semester)

	T	P	C
	4+1	0	4

(IC05463) POWER PLANT INSTRUMENTATION

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, Tri-vector 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 de-aerator 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.

REFERENCES:

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

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IV YEAR B.Tech. ICE (Ist Semester)

	T	P	C
	4+1	0	4

(ME05508) ROBOTICS AND AUTOMATION
(ELECTIVE I)

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 MANIPULATORS

Construction of Manipulators, Manipulator Dynamic and Force Control, Electronic and Pneumatic manipulators.

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.
2. Robotics / Fu K S/ McGraw Hill.

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. Klatter, 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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IV YEAR B.Tech. ICE (Ist Semester)

T	P	C
4+1	0	4

(IC05403) MICRO ELECTRO MECHANICAL SYSTEMS
(ELECTIVE – I)

UNIT – I: MEMS OVERVIEW:
Definition of MEMS, MEMS history and development, MEMS examples.

UNIT – II:
Dimensional analysis and scaling, complex 3D micro structure, technology considerations, material requirements, measured signal and performance.

UNIT – III: PATTERNING TECHNOLOGY:
Lithographic patterning, mask design, selective wet etching

UNIT – IV:
Directional dry etching, tin film deposition.

UNIT – V: MICRO MACHINING TECHNOLOGY:
New materials from MEMS, Surface and bulk micro machining, Release of microstructures.

UNIT – VI: PACKAGING AND INTEGRATION:
Wafer bonding, chemical mechanical polishing, packing sensors and circuit integration.

UNIT – VII: FUTURE TRENDS:
Mechanical, Optical Transducers

UNIT – VIII: BIOMEDICAL & CHEMICAL TRANSDUCERS:
Optical MEMS, bio MEMS, Plastic MEMS. Multi disciplinary applications.

TEXT BOOKS:
1. "The MEMS " hand book, M.Gad-el-Hak, CRC Press, 2002.
2. N. Maluf, " An Introduction to Microelectromechanical systems engineering", Artech House, Boston, s2000.

REFERENCES
1. B.Bhushan, "Handbook of Micro / Nano Tribology" CRC Press, 1999.
2. M.J.Madou, "Fundamentals of Micro machining" CRC Press, 1997.

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IV YEAR B.Tech. ICE (Ist Semester)

T	P	C
4+1	0	4

(EC05215) EMBEDDED AND REAL TIME SYSTEMS
(ELECTIVE – I)

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.

IV YEAR B.Tech. ICE (Ist Semester)

	T	P	C
	4+1	0	4

(EN05544) TELEMETRY & TELECONTROL
(ELECTIVE – II)

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 MULTIPLEXED SYSTEMS

FDM, IRIG Standard, FM and PM Circuits, Receiving end, PLL

UNIT – IV: TIME DIVISION MULTIPLEXED 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 Sub-systems, 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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IV YEAR B.Tech. ICE (Ist Semester)

	T	P	C
	4+1	0	4

(IC05572) VIRTUAL INSTRUMENTATION

(ELECTIVE II)

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, Second 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.

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IV YEAR B.Tech. ICE (1st Semester)

T	P	C
4+1	0	4

(IC05001) ADAPTIVE CONTROL SYSTEMS
(ELECTIVE-II)

UNIT I: INTRODUCTION

Concept of Adaptive Control, Definitions, Types of adaptivity, Effects of process variation, Control Essentials, Ratio of Adaptive Control, and Adaptive Systems.

UNIT II: REAL TIME PARAMETER ESTIMATION

Introduction to Parameter Estimation, Least Squares and Regression Models – Least Squares Estimation, Recursive Computation, Continuous-Time Models, Estimation Parameters in Dynamical Systems – Finite Impulse Response (FIR) Models, Transfer Function Models.

UNIT III: DETERMINISTIC SELF TUNING REGULATORS

Introduction, Block Diagram, Pole Placement Design, Indirect Self Tuning Regulators(STR), Continuous – Time Self Tuners, Direct Self Tuning Regulators

UNIT IV: STOCHASTIC SELF TUNING REGULATORS

Design of Minimum Variance and Moving Average Controllers – Minimum Variance Control, Non-minimum phase System, Moving Average Controller, LQG control, Stochastic Self Tuning Regulators, Unification of Direct Self Tuning Regulators, Linear Quadratic STR

UNIT V: STABILITY ANALYSIS

Introduction to Stability, Definitions, Theorems, Lyapunov theory on stability, Bounded Input – Bounded Output Stability.

UNIT VI: MODEL REFERENCE ADAPTIVE SYSTEMS (MRAS)

Introduction – The MIT rules, Determination of Adaptation Gain, Design of MRAS using Lyapunov Theory, Output Feedback, Relations between MRAS and STR.

UNIT VII: AUTO-TUNING

Introduction, PID Control, Auto-Tuning Techniques, Transient Response Methods, Methods based on Relay feedback, Relay oscillations.

UNIT VIII: GAIN SCHEDULING

Introduction, The principle, Design of Gain-Scheduling controllers, Nonlinear Transformations.

TEXT BOOK:

1. Adaptive control by Karl.J.Astrom, Bjorn Wittenmark, Pearson Education, 2003.

REFERENCES:

1. Adaptive control systems by Misthkin and Braun – McGraw Hill
2. Digital control systems by P.N.Paraskevopoules Prentice Hall.

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IV YEAR B.Tech. ICE (1st Semester)

T	P	C
0	3	2

(IC05035) ANALYTICAL AND BIOMEDICAL INSTRUMENTATION LAB
(Minimum TEN experiments should be performed)

1. pH Measurement
2. Spectrometer: UV and VIS spectrometer.
3. Spectrometer and FT IR spectrometer.
4. Flame photometer.
5. Gas chromatography.
6. Measurement of Calorific Value.
7. Geiger Muller Counter
8. Thermal Conductivity detector
9. Measurement of Blood Pressure.
10. Application of Instrumentation Amplifier in Biomedical field
11. Plythesmograph system
12. Galvanic Skin resistance system
13. Bio telemetry with Transmitter/Receiver

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IV YEAR B.Tech. ICE (Ist Semester)

T	P	C
0	3	2

(EE05153) CONTROL SYSTEMS LAB - III
(Minimum TEN experiments should be performed)

1. Plot bode plot measurements frequency domain plots for selected transfer function with MAT LAB- Nyquist of gain and phase margins

2. Plotting root locus for selected transfer function using MAT LAB.

3. Step function response of a second order system on MATLAB- Control of transient and steady state parameters

4. Obtaining state – space model for a classical transfer function using MATLAB

5. Pole placement for dead beat response of the chosen system (from the state – space model), using MATLAB and state feedback

6. Design of phases lead compensator and phase lag components for the Bode plot

7. Transfer function of a sample and zero order hold circuit

8. Design a dead beat digital controller for step input for a chosen 2nd order system

9. Model reference adaptor control system, with parameter optimization for a position control system

10. Design of a full order digital observer for the chosen state – space model using state space approach and compute simulation for a chosen system

11. Programming a microprocessor (real time control; for a computer controlled temperature control system for a heater bath)

12. A pc based digital controller for a position control system for prescribed specification

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IV YEAR B.Tech. ICE (IInd Semester)

T	P	C
4+1	0	4

(EN05179) DISTRIBUTED COMPUTER CONTROL SYSTEMS

UNIT I
Architecture computer control systems – controlled architecture –Distributed control architecture Data highway system.

UNIT II
Distributed computing system: Distributed processing . Digital control system-digital control system – computer control, self tuning and adaptive algorithms .

UNIT III
Supervising control systems, Multi layer hierarchical structure , system decomposition , open loop co-ordination strategies, model reality differences, closed loop co-ordinate strategies

UNIT IV
Integrated system, Optimization an parameter estimation(ISOPE) , Double interactive strategies

UNIT V
Real time control systems: Design techniques and tools – MASCOT , structured development of real time system.

UNIT VI
Fault tolerance in mixed hardware – software system- Fault detection measures- fault detection mechanism – Damage confinement and assessment.

UNIT VII
Expert system in real time control- Knowledge based process management , Representation of knowledge , reasoning in real time , application of knowledge based systems for process management .

UNIT VIII
Real time task management , Task scheduling dispatch , Task co- operations and Communications , distributed data, distributed control

TEXT BOOK:
1. Distributed Computer Control systems by SS Lamba, Y D Singh. TMH publications new Delhi

REFERNECE: NIL

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IV YEAR B.Tech. ICE (IInd Semester)

(HS05233) ENTREPRENEURSHIP
(Elective-III)

T	P	C
4+1	0	4

Unit I Introduction to Entrepreneurship: Definition of Entrepreneur Entrepreneurial Traits. Entrepreneur vs. Manager, Entrepreneur vs. Entrepreneur. The entrepreneurial decision process. Role of Entrepreneurship in Economic Development. Ethics and Social responsibility of Entrepreneurs. Opportunities for Entrepreneurs in India and abroad. Woman as Entrepreneur.

Unit II : Creating and Starting the venture: Sources of new ideas, methods of generating ideas, creating problem solving, product planning and development process.

Unit III : The Business Plan: Nature and scope of Business Plan, Writing Business Plan, Evaluating Business Plans. Using and Implementing business plans. Marketing plan, financial plan and the organizational plan. Launching formalities.

Unit IV : Financing and Managing the new venture :Sources of capital, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and entrepreneurship, Internet advertising.

Unit V : New venture Expansion Strategies and Issues: Features and evaluation of Joint ventures, acquisitions, mergers, franchising. Public issues, rights issues, bonus issues and stock splits.

Unit VI : Institutional support to entrepreneurs: Role of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and Village Industries Commission (KVIC), Technical Consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI)

Unit VII: Production and Marketing Management: Thrust areas of production management, Selection of production Techniques, Plant utilization and maintenance, Designing the work place, Inventory control, material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

Unit VIII : Labour legislation, Salient Provisions under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

TEXT BOOKS:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH, 5th Edition.
2. Dollinger: Entrepreneurship, 4/e, Pearson,2004.

REFERENCE BOOKS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and Management, Himalaya Publishing House, 2004.
2. Harvard Business Review on Entrepreneurship, HBR Paper Back, 1999.
3. Robert J.Calvin: Entrepreneurial Management, TMH, 2004.
4. Gurmeet Naroola: The entrepreneurial Connection, TMH,2001.
5. Bolton & Thompson: Entrepreneurs —Talent, Temperament, Technique, Butterworth Heinemann, 2001.
6. Agarwal: Indian Economy, Wishwa Prakashan 2005.
7. Dutt & Sundaram: Indian Economy,S.Chand, 2005
8. Srivastava :Industrial Relations & Labour Laws, Vikas, 2005.
9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2003.
10. Essential of entrepreneurship and small business management by Thomas W.Zimmerer & Norman M.Searborough, PHI-2005
11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2005.

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IV YEAR B.Tech. ICE (IInd Semester)

(EC05399) MICROCONTROLLERS AND APPLICATIONS
(ELECTIVE – III)

	T	P	C
	4+1	0	4

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 Bit-manipulation instructions – Arithmetic instructions – Instructions for Logical operations on the tes among the Registers, Internal RAM, and SFRs – Program flow control instructions – Interrupt control flow.

UNIT III: REAL TIME CONTROL: INTERRUPTS

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

UNIT IV: REAL TIME CONTROL: TIMERS

Programmable Timers in the MCU's – Free running counter and real time control – Interrupt interval and density constraints.

UNIT V: SYSTEMS DESIGN: DIGITAL AND ANALOG INTERFACING METHODS

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

UNIT VI: REAL TIME OPERATING SYSTEM FOR MICROCONTROLLERS

Real Time operating system – RTOS of Keil (RTX51) – Use of RTOS in Design – Software development tools for Microcontrollers.

UNIT VII: 16-BIT MICROCONTROLLERS

Hardware – Memory map in Intel 80196 family MCU system – IO ports – Programmable 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

IV YEAR B.Tech. ICE (IInd Semester)

(EC05574) VLSI DESIGN
(ELECTIVE-III)

T	P	C
4+1	0	4

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, g_m, g_{ds}, figure of merit ω_0; 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 μ 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 R$_s$ and its concept to MOS, Area Capacitance Units, Calculations - τ - Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out, Choice of layers

UNIT V: SUBSYSTEM DESIGN

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

UNIT VI: SEMICONDUCTOR INTEGRATED CIRCUIT DESIGN

PLAs, FPGAs, CPLDs, Standard Cells, Programmable Array Logic, Design Approach.

UNIT VII: VHDL SYNTHESIS

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

UNIT VIII: CMOS TESTING

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

TEXT BOOKS:

1. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas 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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

IV YEAR B.Tech. ICE (IInd Semester)

(IC05298) HYDRAULIC & PNEUMATIC CONTROL SYSTEMS
(ELECTIVE – IV)

T	P	C
4+1	0	4

UNIT – I:

Introduction to Fluid Power, merits and utility of Fluid Power in industries. Difference between Hydraulic Systems & Pneumatic Systems. Fluid Power Components: Construction and operation of – Pump, Relief valve, Non-return valve, Pilot operated relief valve, Series and Parallel compensator of flow valve, Pressure compensated pump, motor, actuators, Seals used in the control systems.

UNIT – II:

Symbolic representation of Hydraulic and pneumatic Elements. Compressor and air line installations. Various types of Pumps used in hydraulic systems. Hydraulic Fluid and Effective contamination control. Purpose of Air-filters and types in Pneumatic systems.

UNIT – III:

Transmission System: Transmission of Fluid Power through various type of cylinders. Compressibility and inertia loading. Hydraulic stiffness, stiffness of pneumatic system. Component effectiveness, breakage, constant torque load, constant power load, inertia load, viscous damping.

UNIT – IV:

Valve controlled Systems: Flow through a single speed control valve, Series Pressure Compensation, combined directional and flow rate control valve, Steady reaction and Transient Reaction force.

UNIT – V:

Hydraulic and pneumatic circuits for different controls like – Sequencing circuit, counter balancing, indexing, linear motion, rotation & Hydro copying circuit. Electro-Pneumatics & Electro-Hydraulic controls, Hydro-Pneumatics, Cartridge valve design.

UNIT – VI:

Analysis of Accumulator Systems: Accumulator system dynamics, Thermodynamics, Thermodynamics consideration. Accumulator as Absorber of pressure shocks. Construction, operation and applications of Intensifier.

UNIT – VII:

Feed back Systems: Pressure control, Position control, Pump/motor systems. Control with variable capacity pumps. Pump stroke mechanisms. Position control using metering valve Double acting actuators.

UNIT – VIII:

Speed control, inertia Load position control systems. Programmable sequential control using modular elements. Servo control systems. Trouble shooting and remedial measures in Hydraulic & Pneumatic Systems.

TEXT BOOKS:

1. Fluid Power Systems, by A.B. Goodinain, McMillan Press Ltd.

2. The Control of Fluid Power, by McCloy & Martin, Longman Publications.

REFERENCES:

1. Mechatronics, by Prof. C.V. Venkataramana, SBS Publishers and Distributors.

2. Production Drawing Practice, by Dr.P.Narsimha Reddy, T.A.Janardhan Reddy & C. Srinivas Rao, The Hi-Tech Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

IV YEAR B.Tech. ICE (IInd Semester)

	T	P	C
	4+1	0	4

(IC05440) OPTOELECTRONIC & LASER INSTRUMENTATION
(ELECTIVE-IV)

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.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD

IV YEAR B.Tech. ICE (IInd Semester)

	T	P	C
	4+1	0	4

(IC05322) INSTRUMENTATION & CONTROL IN MANUFACTURING SYSTEMS
(ELECTIVE – IV)

UNIT – I:

Primary and Secondary manufacturing processes, heat treatment, metal forming and machining operations.

UNIT – II:

Numerical control – Basic Principles, NC – Coding and programming, Positional and continuous path systems.

Adoptive control using cutting forces on fibers and acoustic emissions cutting temperatures.

UNIT – III:

Computer integrated manufacturing systems CNC, DNC and machining centers.

UNIT – IV:

Automation – Principles of automation, control systems for automation in machine tools and other applications.

Flexible manufacturing systems introduction to Robotics, Robot Anatomy, Geometric configuration manipulators end effectors, applications of industrial robots and flexible automation.

UNIT – V:

Direct and Inverse kinematics for process configuration.

Instrumentation and controls in press work operation. Press working operations. Mechanical and hydraulic presses. Instrumentation required for management of forces and displacement. Setting of displacement and rate of displacement.

UNIT – VI :

Equipment for measurement of forces, temperatures, pressures, fibers, acoustic emission, displacement and rate of displacement.

UNIT – VII:

Automated inspection and testing: Automated inspection methods, Sensors used, contact and non-contact methods, in-processes gauging, machine vision, optical inspection methods, automatic identification techniques.

REFERENCES:

1. Mikell P.Grover, Automation, Production Systems and Computer Prentice Hall of India Pvt.Ltd. 1995.

2. A.Troitsky Principles of Automation and Automated Production Mir Publ, 1976.

3. C.Ray Astaihe, Robots and Manufacturing automation, John Wile and Sons, New York.