

**COURSE STRUCTURE
AND
DETAILED SYLLABUS**

for

B.Tech Four Year Degree Course

in

ELECTRONICS AND COMPUTER ENGINEERING

(ECM)

(Applicable for the batches admitted from 2014-2015)



SREENIDHI INSTITUTE OF SCIENCE & TECHNOLOGY

(An Autonomous Institution approved by UGC and affiliated to JNTUH)

Yamnampet, Ghatkesar, R.R.District-501 301.

B.Tech ECM 2014 Course Structure

First Year - I Semester

Sl. No.	Code	Subject	L	T	P/D	C	Internal	External
1	4H101	English – I	2	1	-	2	30	70
2	4H111	Engineering Mathematics – I	3	2	-	3	30	70
3	4H121	Engineering Physics – I	3	1	-	3	30	70
4	4H131	Engineering Chemistry – I	3	1	-	3	30	70
5	4F101	Computer Programming	4	1	-	4	30	70
6	4B101	Engineering Drawing – I	2	-	4	4	30	70
7	4H171	English Language Lab – I	-	-	2	1	25	50
8	4H181	Engineering Physics Lab – I	-	-	3/2	1	25	50
9	4H186	Engineering Chemistry Lab	-	-	4/2	2	25	50
10	4F171	Computer Programming Lab	-	-	3	2	25	50
11	4B171	Engineering Workshop – I	-	-	3/2	1	25	50
12	4F172	IT Workshop – I	-	-	3/2	1	25	50
13	4D191	Technical Paper Writing and Seminar - I	-	-	2	1	25	
Total :			17	6	17.5	28	355	720

First Year - II Semester

Sl. No.	Code	Subject	L	T	P/D	C	Internal	External
1	4H202	English – II	2	1	-	2	30	70
2	4H213	Engineering Mathematics-II	4	1	-	4	30	70
3	4H222	Engineering Physics-II	3	1	-	3	30	70
4	4E201	Data Structures & C++	4	1	-	4	30	70
5	4B202	Engineering Drawing - II	2	-	3	3	30	70
6	4H232	Engineering Chemistry – II	3	1	-	3	30	70
7	4AC43	Network Analysis	3	1	-	3	30	70
8	4H272	English Language Lab – II	-	-	2	1	25	50
9	4E271	Data Structures & C++ Lab	-	-	3	2	25	50
10	4B273	Engineering Workshop – II	-	-	3/2	1	25	50
11	4H282	Engineering Physics Lab - II	-	-	3/2	1	25	50
12	4D292	Technical Paper Writing and Seminar - II			2	1	25	
Total :			21	6	13	28	335	690

Second Year - I Semester

Sl. No.	Code	Subject	L	T	P/D	C	Internal	External
1	4H315	Engineering Mathematics-III	3	2	-	3	30	70
2	4CC01	Electronic Devices and Circuits	4	1	-	4	30	70
3	4BC04	Basic Mechanical Engineering	3	2	-	3	30	70
4	4CC02	Switching Theory and Logic Design	4	1	-	4	30	70
5	4EC03	Object Oriented Programming Through Java	4	1	-	4	30	70
6	4DC01	Discrete Structures and Graph Theory	3	1	-	3	30	70
7	4D393	Technical Paper Writing and Seminar - III			2	1	25	
8	4HC73	Functional and Communicative Written English	-	-	3	2	25	50
9	4CC71	Electronic Devices and Circuits Lab	-	-	3	2	25	50
10	4EC74	Object Oriented Programming Through Java Lab	-	-	3	2	25	50
		Total :	21	8	11	28	280	570

Second Year – II Semester

Sl. No.	Code	Subject	L	T	P/D	C	Internal	External
1	4FC04	Design and Analysis of Algorithms	3	1	-	3	30	70
2	4CC05	Pulse & Digital Circuits	4	1	-	4	30	70
3	4HC16	Probability and Statistics	3	1	-	3	30	70
4	4AC42	Electrical Technology	3	1	-	3	30	70
5	4CC04	Signals and Systems	3	1	-	3	30	70
6	4FC03	Database Management Systems	4	1		4	30	70
7	4HC74	Effective English Communication and Soft Skills	-	-	3	2	25	50
8	4D481	Comprehensive Viva-Voce - I	-	-	-	1	-	50
9	4CC73	Pulse & Digital Circuits Lab	-	-	3/2	1	25	50
10	4AC94	Electrical Technology Lab	-	-	3/2	1	25	50
11	4FC74	Database Management Systems Lab			3	2	25	50
12	4D494	Technical Paper Writing and Seminar - IV	-	-	2	1	25	
		Total :	20	6	11	28	305	670

**B.Tech ECM 2014 Course Structure
THIRD YEAR – I SEMESTER**

S. No.	Code	Subject	L	T	P/D	C	Internal	External
1		Open Elective- I	3	0	-	3	30	70
2	4CC09	Linear and Digital IC Applications	3	1	-	3	30	70
3	4DC11	Computer Organization and Architecture	3	1	-	3	30	70
4		Professional Elective – II	4	1	-	4	30	70
5	4ZC01	Managerial Economics & Financial Analysis	3	1	-	3	30	70
6	4D516	Signals and Modulation Theory	3	1	-	3	30	70
7	4HC76	Quantitative Aptitude	-	-	3	2	25	50
8	4D577	Group Project	-	-	3	1	25	50
9	4CC76	Linear and Digital IC Applications Lab	-	-	3	2	25	50
10	4F585	Multimedia and Application Development Lab	-	-	3	2	25	50
11	4D595	Technical Paper Writing and Seminar – V			2	1	25	
		Total :	19	5	14	27	305	620

PROFESSIONAL ELECTIVE – II
Computer Organization and Architecture
Digital System Design and verification through Verilog
Distributed Databases
Software Requirements and Estimation
Multimedia and Application Development (4F520 - Opted)
Metallurgy and Material Sciences
Financial Institutions, Markets and Services

OPEN ELECTIVE – I
Applied Biology
General Management and Entrepreneurship
Banking Operations, Insurance and Risk Management (4ZC03 - Opted)
Product Service and Design (4B515 - Opted)
Operations Research for Allied Branches
Basic Spanish Language
Basic French Language
Basic German Language
SAP – I (4EC26 – Opted)

Third Year – II Semester

S. No.	Code	Subject	L	T	P/D	C	Internal	External
1		Open Elective-II	3	-	-	3	30	70
2	4DC17	Microcontrollers and Applications	3	1	-	3	30	70
3		Professional Elective-III	4	1	-	4	30	70
4	4EC07	Operating Systems	4	1	-	4	30	70
5	4DC04	Data Communications and Computer networks	4	1	-	4	30	70
6	4FC17	Theory of Computation	3	1	-	3	30	70
7	4HC77	Logical Reasoning	-	-	3	2	25	50
8	4D682	Comprehensive viva voce - II	-	-	-	1	-	50
9	4DC71	Microprocessors and Microcontrollers Lab	-	-	3	2	25	50
10	4FC79	Shell Programming and Scripting Languages Lab	-	-	3	2	25	50
11	4D696	Technical Paper Writing and Seminar - VI			2	1	25	
		Total :	21	5	11	29	255	620

PROFESSIONAL ELECTIVE – III
Introduction to Embedded Systems
Introduction to VLSI
Digital Image Processing (4C627)
Shell Programming and Scripting Languages (4FC07)
Unified Modeling Language (4E696)
Human Computer Interaction (4EC17)
Thermodynamics and Heat Transfer (4BC02)
Security Analysis and Portfolio Management

OPEN ELECTIVE – II
Fundamentals of Bio Informatics (4GC42)
Logistics and Supply Chain Management
Project Management and Structured Finance
SAP – II (4EC27)

Fourth Year – I Semester

	Code	Subject	L	T	P/D	C	Internal	External
1	4DC06	Embedded and Real Time Systems	4	1	-	4	30	70
2	4DC07	VLSI Design	4	1	-	4	30	70
3	4FC05	Data Warehousing and Data Mining	4	1	-	4	30	70
4		Open Elective - III	4	1	-	4	30	70
5	4GC33	Culture, Values, Professional Ethics and IPR	2	1		2	30	70
6	4GC06	Environmental Studies	3	1		3	30	70
7		Professional Elective – IV	4	1	-	4	30	70
8	4D779	Main Project Phase - I	-	-	2	1	50	-
9	4D778	Industry Oriented Mini Project	-	-	-	2	25	50
10	4DC72	Embedded and Real Time Systems Lab	-	-	3	2	25	50
11	4DC73	VLSI Lab (VHDL and Verilog)	-	-	3	2	25	50
12	4D797	Technical Paper Writing and Seminar - VII			2	1	25	
		Total:	25	7	10	33	360	640

PROFESSIONAL ELECTIVE – IV
Wireless Sensor Networks
Reconfigurable Computing Design and Architecture
Digital Speech Signal Processing
Information Retrieval Systems (4EC14)
Software Testing (4E709)
Artificial Intelligence (4EC11)
Manufacturing Process - I
Strategic Management Accounting

OPEN ELECTIVE – III
Bio-medical Instrumentation
Enterprise Resource Planning
Legal and Economic Environment of Business
Total Quality Management
Introduction to Nano Technology (4BC25)

Fourth Year – II Semester

	Code	Subject	L	T	P/D	C	Internal	External
1	4ZC02	Management Science	4	1	-	4	30	70
2		Professional Elective - V	4	1	-	4	30	70
3	4D880	Main Project Phase - II	-	-	15	12	50	150
4	4D883	Comprehensive viva voce - III	-	-	-	2	-	50
5	4D898	Technical Paper Writing and Seminar - VIII			2	1	25	
		Total :	8	2	17	23	135	340

PROFESSIONAL ELECTIVE – V
Internet of Things (IoT)
Low power VLSI
Bio-Medical Signal Processing
Big Data Analytics (4FC22) / Cloud Computing (4EC15)
Software Project Management (4EC12)
Image Processing (4FC23)
Manufacturing Process – II
Financial Risk Management

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I Year B. Tech. ECM - I Semester

L T P/D C
2 1 - 2

(4H101) ENGLISH – I
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		

UNIT 1: Refresher Course

Exercises on English Vocabulary and Grammar are practiced and followed up by a Diagnostic Test

- **Grammar - Parts of Speech**
- **Correction of Sentences**
- **Vocabulary**
- **One Word Substitutes**

DIAGNOSTIC TEST 1**REMEDIAL CLASSES**

Exercises on different aspects to improve basic English language learning is provided

WRITING: Guided paragraph**UNIT 2: Short Story**Short Story & Vocabulary (*Devoted Son* by Anita Desai)

Vocabulary: Words from the text

- a. Meanings of Words
- b. Usage of Words
- c. Synonyms of Words
- d. Antonyms of Words
- e. Usage of Sentences

Grammar: Types of Sentences – Simple / Compound / Complex

Conversation of one type into the other / Rules of conversation

Exercises based on simple to compound, simple to complex, compound to complex, complex to compound, complex to simple, etc.

Writing: Paragraph Writing

Speaking: Asking questions to gain information (*working in pairs*)*“Wh” Questions; Tag Questions; Command and Requests; Greeting and Leave Taking; Asking for Permission***UNIT 3: Public Address*****Evolution of Indomitable Spirit in Youth*** by APJ Abdul Kalam

Vocabulary: Words from the text

- a. Meanings of Words
- b. Usage of Words
- c. Homonyms, Homophones and Homographs
- d. Words often confused and sentences with such words

Grammar: Verbs, Types of Verbs, Finite / Infinite, Transitive and Intransitive, Auxiliary, Tenses (Regular and Irregular Verb Tenses)

Exercises based on Verbs and their various usages

Writing: Writing a paragraph on any famous / inspirational person
Speaking: *Greeting and Leave Taking, Apologizing and Inviting (working in pairs)*

DIAGNOSTIC TEST 2

Remedial Activity 2

UNIT 4: Creativity

Lesson: *A Tea Party* by **Ruth Prawar Jhabwala**

Vocabulary: Text based words, meanings and sentences / Affixation, Prefixes, Infixes and Suffixes

Grammar: Sentences Using the Correct Form of given base word

Writing: Informal / Formal Letter Writing (*Salutation, Introduction, Body, Conclusion, Complimentary Close and Signature*)

Speaking: Situational Dialogues

UNIT 5: Inspiring Speech

Moon Shot Speech (1961) by **John F. Kennedy**

Vocabulary: Text Based Words / Meanings

Collocations: Words that go together

Exercises based on Collocations

Phrasal Verbs

Exercises

Grammar: Scrambled Words and Writing Sentences

Writing: Summarizing

Speaking: Topic related short speeches / Narrating an anecdote

Tex Book: Compiled by Faculty - Department of English (SNIST)

*Suggested Reading: Essential English Grammar by Raymond Murphy
Intermediate English Grammar by Raymond Murphy*

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I Year B. Tech. ECM - I Semester

L T P/D C
3 2 - 3

(4H111) ENGINEERING MATHEMATICS - I
(Common to all branches except Bio-Technology)

a	b	c	d	e	f	g	h	i	j	k	l
x											

UNIT-I

Differential Calculus: Rolle's Theorem, Lagrange's and Cauchy mean value theorems (without proofs), Taylor's series and Maclaurin's series.

Applications: Approximating definite integrals.

Functions of several variables: Continuity of function of variables, Partial derivatives of higher order, Euler's theorem, Total differentiation, Jacobians and its properties. Maxima and minima values of a function of several variables- Applications.

UNIT-II

Ordinary Differential Equations Of First Order: Differential equations of first order and first degree – Exact, linear and Bernoulli equations.

Applications: Law of Natural Growth and Decay, Newton's Law of Cooling, Orthogonal Trajectories.

UNIT-III

Ordinary Linear Differential Equations Of Higher Order: Linear differential equations of second and higher orders with constants coefficients – Method of Variation of Parameters – Systems of linear differential equations with constant coefficients.

Application: Bending of beams, Simple harmonic motion and LCR circuit.

UNIT-IV**Multiple integrals**

Double Integrals, Iterated Integrals-Integrals over Rectangular and General Regions, Change of Variables, Polar Coordinates, Triple integrals in Cartesian coordinates, Change of variables.

Applications: Moment of Inertia, Calculation of volumes using triple integrals.

UNIT-V

Vector Differential Calculus: Scalar and Vector Fields, Level surfaces, Curvature and Torsion of a curve in space, Directional Derivative: Gradient of a Scalar Field, Divergence and Curl of a vector field, Laplacian operator and related properties.

Applications: Velocity and Acceleration of a particle.

UNIT-VI

Vector Integral Calculus: Line Integral, Surface Integral, Volume Integral and Verification of problems on Green's Theorem in Plane, Gauss-Divergence Theorem and Stoke's Theorem.

Applications: Finding potential function of Irrotational fields in fluid dynamics.

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering, Kanti B.Datta, CENGAGE Learning.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.
3. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.
4. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 8th Edition.

REFERENCE BOOKS:

1. A Text Book of KREYSZIG's Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications.
2. Advanced Engineering Mathematics, S. R. K. Iyengar and R.K. Jain, Narosa Publishing House, London, 2002.

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I Year B. Tech. ECM - I Semester

L T P/D C
3 1 - 3

(4H121) ENGINEERING PHYSICS - I
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x											

UNIT - I

Crystallography and Crystal Structures: Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, and hcp Structures. Atomic densities along various important directions and planes and comparison of deformability of BCC, FCC and hcp metals.

UNIT-II

Defects in Crystals: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects-Calculation of concentration, Qualitative treatment of line (Edge and Screw Dislocations) Defects, Burger's Vector.

X-ray Diffraction: Basic Principles, Bragg's Law, Powder Method, Applications of X-ray Diffraction.

UNIT- III

Elements of Statistical Mechanics: Phase space, Ensemble, Difference between micro, canonical & grand canonical ensemble, Qualitative explanation of Maxwell - Boltzman Statistics, Bose – Einstein Statistics, and Fermi – Dirac Statistics, Density of states quantitative treatment.

UNIT-IV

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, G. P. Thomson Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation -Physical Significance of the Wave Function - Particle in One Dimensional Potential Box.

UNIT-V

Free electron theory of Metals: Classical free electron theory (Drunde and Lorentz), Electrical conductivity of a metals, Relaxation time, Collision time and mean free path, Success of classical free electron theory, Breakdown of free electron theory, Fermi – Dirac distribution function- variation with temperature, The quantum free electron theory.

UNIT-VI

Band Theory of Solids: Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, velocity $-$ of ,point of inflection, effective mass of an electron and its significance, Origin of Energy e Band Formation in Solids, Classification of Materials into Conductors, Semi Conductors & Insulators.

Text Books:

1. P K Palanisamy, Engineering Physics, Sitech Publications

Reference Books:

1. Charles Kittel, Introduction to Solid State Physics, John Wiley Publisher
2. Neil W. Ashcroft, N. David Mermin., Solid State Physics, Thomson Publisher,
3. Donald Allan McQuarrie, Statistical Mechanics, University Science Books Publisher, California
4. Sathya Prakash, Statistical Mechanics, Pragathi Prakashan Publisher
5. Quantum Mechanics by G. Aruldas
6. John L Powel, Quantum Mechanics, Narosa Publications
7. Ramamurti Shanker, Principles of quantum Mechanics, Springer Publication
8. M Chandrashekar and P Appala Naidu, Applied Physics, VGS Book Links
9. K. Vijaya Kumar, S Chandralingam, Modern Engineering Physics, S Chand Publisher

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I Year B. Tech. ECM - I Semester

L T P/D C
3 1 - 3

(4H131) ENGINEERING CHEMISTRY - I
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x		x	x								

UNIT - I WATER TECHNOLOGY

- (a) **Water quality Parameters:**-Hardness of water – types of hardness (temporary and permanent). Estimation of hardness of water by EDTA Method.
- (b) **Water for Industrial purpose:** Water for steam making, Boiler troubles-Carry over (priming & foaming). Boiler Corrosion, Scale and sludge, caustic embrittlement.
- (c) **Treatment of Water:** Internal Conditioning- Phosphate, Carbonate & Calgon conditioning. External Treatment: Lime- Soda, Zeolite, Ion-exchange process, Desalination-Reverse osmosis and electro dialysis. Methods of Treatment of Water for Domestic purpose-Sedimentation, Coagulation, Filtration, Disinfection-Chlorination, Ozonization. (Numerical problems on calculation temporary and permanent hardness). **Engineering applications: Methodology and working of mineral water plant (ISI) for drinking purpose.**

UNIT - II ELECTROCHEMISTRY

Electro Ionics:- Conductance – conductors (metallic and electrolytic) – Types of conductance – specific, Equivalent, molar conductance – Effect of dilution on conductance – Kohlrausch’s law and its applications i) Determination of equivalent conductance for weak electrolytes ii) Degree of dissociation iii) Solubility of sparingly soluble salts – numerical problems on Kohlrausch’s law.

Electrodeics :- E M F of electrochemical cells – cell notation and cell reaction – electrode potential (oxidation and reduction) Nernst Equation and its applications. Types of electrodes (a) Gas electrode (H₂ electrode) (b) Metal ion electrode (Zn/Zn⁺²) (c) Redox electrode (Quinhydrode electrode) (d) Metal – Metal insoluble salt electrode(SCE) (e) Ion selective electrode. **Engineering Applications – determination of P^H.**

UNIT - III ELECTROCHEMICAL ENERGY SOURCES – BATTERIES**Cell and batteries** – types of batteries

- (a) Primary batteries – Lechalanche cell (dry cell), Lithium cell
- (b) Secondary batteries(Accumulators) – Lead acid battery, Alkaline battery Ni-Cd battery, , Lithium-ion battery
- (c) Fuel cells- H₂ – O₂ fuel cell & Methanol – Oxygen fuel cell
- (d) Photovoltaic Cell- Solar Cell

Engineering applications – future water powered car, solar cells in domestic and automobiles.

UNIT - IV CORROSION AND ITS CONTROL

Corrosion – Basic concepts – Mechanism of chemical, electrochemical Corrosion (absorption of O₂ and evaluation of H₂) – Pilling - Bed worth rule – Types of electrochemical Corrosion – Galvanic Corrosion – Pitting Corrosion – Concentration Cell Corrosion – Factors affecting the rate of Corrosion.

Engineering Applications:

- a) **Corrosion Control Methods-** Cathodic protection – sacrificial anode and impressed current cathode method.
- b) **Protective Coatings --** Surface preparation for metallic coatings like hot dipping (**tinning and galvanizing**) metal cladding (**Al Cladding**) electro plating (**copper plating**) and electroless plating (**Nickel plating**). Methodology and production of gold decorative articles.

UNIT - V PHASE EQUILIBRIA AND ALLOYS

Phase rule:- Introduction, definition of terms with examples, one components system – Water system, reduced phase rule – Two component systems, classification – lead – silver system.

Alloys: - Introduction – Definition – properties of alloys – significance of alloying, functions and effect of alloying elements. **Engineering applications of ferrous alloys – Ni chrome and stainless steel, nonferrous alloys – brass and bronze.**

UNIT - VI NANO CHEMISTRY

Basics – distinction between molecules, nanoparticles and bulk materials, size – dependent properties.

Nano Particles: nano cluster, Nano rod, nano tube (CNT) and nano wire.

Synthesis: Precipitation, thermolysis, hydrothermal, solvothermal, electrode position, laser ablation, wet chemical methods of preparation (micro emulsion – solvent extraction Reduction – chemical oxidation Reduction.

Applications of Nano materials in Medicine and Energy systems - Carbon nanotubes in efficient solar cell and fuel cells.

Text Books:

1. Engineering Chemistry: P.K. Jain and M.K. Jain, Dhanpathrai Publications-14th Edition.

Reference Books:

1. Essentials of Physical Chemistry: Baul & Tuli, S. Chand Publications.
2. Text of Engineering Chemistry by S.S. Dara & Mukkanti, S. Chand & CO, New Delhi (2014).
3. Chemistry of Engineering Materials by C.V. Agarwal, C.P. Murthy, A. Naidu; BS publications.
4. Text Book of Nano Science and Nano Technology by B.S. Murthy and P. Shankar, University press.

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I Year B. Tech. ECM - I Semester

L T P/D C
3 1 - 3

(4F101) COMPUTER PROGRAMMING
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x					x	x		

UNIT – I

Computer fundamentals – Computer Systems, Computer Hardware, Computer Software, Computer Environments – Personal Computing Environment, Time-sharing Environment, Client/Server Environment, Distributed Computing, Computer Languages – Machine Languages, Symbolic Languages, High-Level Languages, Creating and running programs – Writing and Editing, compiling, linking, and executing programs, System Development – SDLC (Pages 1 – 28 of Text Book 1).

Problem solving Techniques – Algorithms, pseudo code, flowcharts – Simple illustrations and domain problems like: Sum of digits of a number, Nature of quadratic equations, Income Tax Problem, Standard Deviation (Pages 1019 – 1032 of Text Book 1).

UNIT – II

Introduction to the C language – Background, C Programs, Structure of a C Program, Comments, the greeting program, identifiers, constants, variables and keywords.

Types – void, integral, and floating-point types. Variables – declarations and initialization. Input / Output – Streams, Formatting input and output (Pages 29 – 76 of Text Book 1).

Expressions – Primary expressions, post-fix expressions, pre-fix expressions, unary expressions, binary expressions, Precedence and associativity, evaluating expressions, type conversions – implicit type conversion, explicit type conversion, statements – statement type, role of semicolon, statements and defined constants (Pages 94 – 134 of Text Book 1).

Decision control structures – Logical data and operators, Two-way selection – if..else, nested if, dangling else, conditional expressions, Multi-way selection – switch statement, else-if (231 – 263 of Text Book 1).

UNIT – III

Repetitive control structures – Pre-test and post-test loops – initialization and updation, event and counter controlled loops, while, do..while, for, break and continue statements, comma expression (Pages 303 – 348 of Text Book 1).

Functions – User-defined functions - Function definition, arguments, return value, prototype, arguments and parameters, inner-function communication. Standard functions – Math functions, Random numbers. Scope – local global (Pages 149 – 199 of Text Book 1).

Parameter passing – Call by value and call by reference.

Recursive functions – Definition, examples, advantages and disadvantages (Pages 349 – 359 of Text Book 1).

Macros – Definition, examples, comparison with functions.

UNIT – IV

Arrays – Definition and declaration, initialization, accessing elements of in arrays, storing values in arrays, inter-function communication – passing individual elements, passing the whole array, array applications, bubble sort, sequential search. Two dimensional and multidimensional arrays (Pages 459 – 487 and 493, 501 of Text Book 1).

UNIT – V

Pointers – Introduction, pointer constants, pointer values, pointer variables, accessing variables through pointers, pointer declaration and definition, declaration versus redirection, initialization of pointer variables, pointer for inter function communication, pointer to pointers (Pages 557 – 577 of Text Book 1).

Arrays and pointers – Pointer arithmetic and arrays, Memory allocation functions – static and dynamic memory allocation, array of pointers (Pages 612 – 633 of Text Book 1).

Strings – Input output functions, string handling functions.

UNIT – VI

Enumerated, Structure, and Union types – The type definition (typedef), enumerated types, Structure, Unions (Pages 745 – 786 of Text Book 1).

Files – File name, file information table, streams, text and binary streams, stream file processing, system created streams, Standard library I/O functions, file open and close, formatting I/O functions, character I/O functions, Binary I/O, Standard library functions (Pages 393 – 441, 821 – 840 of Text Book 1).

Text Books:

1. Computer science, a structured programming approach using C, B.A. Forouzan and R.F. Gilberg, Third edition, Thomson.

References:

1. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education.
2. Let us C by Yashwanth P. Kanetkar 8th edition BPB publications.
3. Computer programming for teens by Mary Farrell.

I Year B. Tech. ECM - I Semester

L	T	P/D	C
2	-	4	4

(4B101) ENGINEERING DRAWING - I
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x											

After completing the subject, students will be able:

- To identify the various drawing tools, concept of scales and understand and draw various engineering curves by free hand.
- To understand the concept and applications of orthographic projections of points and lines
- To draw projections of planes in various positions
- To understand the various solids and draw their projections
- To understand the principle of sectioning of solids and their views
- To understand the concept of intersection of various solids and their views

UNIT – I

Introduction to Engineering Drawing: Drawing Instruments and their uses, types of lines, use of pencils, Lettering, Rules of dimensioning.

Construction of polygons: Inscription and superscription of polygons given the diameter of circle.

Introduction To Scales (Theory Only): Scales Used In Engineering Practice and Concept Of Representative Fraction

Curves used in Engineering Practice and their Constructions:

Conic Sections including Rectangular Hyperbola - General method only.

UNIT – II

Drawing of Projections or Views (Orthographic Projection in First Angle Projection Only): Principles of Orthographic Projections – Conventions – First and Third Angle Projections, Projection of Points, Projection of Lines - inclined to both planes, True lengths, traces.

UNIT – III

Projections of Planes: Projections of regular Planes, traces, Oblique planes, Introduction to Auxiliary planes

UNIT –IV

Projections of Solids: Projections of Regular Solids – Regular Polyhedra, solids of revolution, Axis inclined to both planes.

UNIT –V

Sections of Solids: Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views

UNIT –VI

Intersection of Similar and Dis-similar Solids: Line method, Cutting plane method, Intersection of Prism Vs Prism, Cylinders Vs Cylinder (Under Similar category) and Cylinder Vs Prism (Under Dis-similar category)

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers

2. Engineering Drawing 2nd Edition Basant Agrawal, C. M. Agrawal, Tata McGraw-Hill Education

REFERENCES:

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
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I Year B. Tech. ECM - I Semester

L T P/D C
- - 2 1

(4H171) ENGLISH LANGUAGE LAB – I
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
								x			

Maximum Marks: 75
Internal – 25 / External - 50

Phonetics:

1. *Vowels: Long Vowels*
2. *Vowels: Short Vowels*
3. *Vowels: Diphthongs*
4. *Consonants: Voiced Consonants*
5. *Consonants: Voiceless Consonants*
6. *Stress or Accent*
7. *Intonation*

Communication Skills:

1. *Situational Dialogues*
Speaking Activity – Introducing Oneself; Introducing Others; Meet and Greet
2. *JAM Sessions*
3. *Describing an object/person/situation/place*
4. *Telephonic Conversations*
5. *Giving Directions*
6. *Review of a story/film/novel.*

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- - 3/2 1

(4H181) ENGINEERING PHYSICS LAB – I
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x		x									

1. Calculation of error – Error estimation
2. Determination of wavelength of a given laser Source of light by using diffraction grating
3. To find frequency of tuning fork – Melde’s experiment
4. To find the frequency of ac signal generator – A c Sonometer
5. R C Circuit
6. L C R series and parallel resonance
7. Determination of rigidity modulus of a given wire – Torsional pendulum
8. Determination of Planck’s constant
9. Determination of the acceleration to gravity and radius of gyration by compound pendulum.

Note: Any six of the above nine Experiments are to be conducted.

Prescribed Practical Book by Dr. Y. Aparna, Professor & HOD of Physics Department, JNTUH

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(4H186) ENGINEERING CHEMISTRY LAB

a	b	c	d	e	f	g	h	i	j	k	l
x		x									

The objective of the Laboratory practicals is to make the student to acquire the basic Knowledge used for engineering applications.

1. Determination of Hardness of a **ground water** sample.
2. Preparation of **Thiokol rubber**.
3. Determination of **Viscosity of a lubricant** by Redwood Viscometer..
4. Estimation of Copper in **Brass alloy** (HYPO)
5. Estimation of Calcium in **Portland cement**.
6. Estimation of Iron content in **Ore sample** using Colorimeter (KSCN)
7. Estimation of **rate of Corrosion of Aluminium** in acidic and alkaline medium.
8. Determination of **Mohr's salt** by **Potentiometric** method.
9. Determination of **Calorific value** of Solid fuel by using Bomb Calorimeter.
10. Experiment on Green chemistry; **Aldol condensation** (not by Classic route)
11. Determination of Flash point and fire point of a **lubricant**
12. Determination of strength of Strong Acid using Strong Base (**HCl vs NaOH**) by **Conductometric titrations**.

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I Year B. Tech. ECM - I Semester

L T P/D C
- - 3 2

(4F171) COMPUTER PROGRAMMING LAB
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x						x		

1. Unit I (Cycle 1)

1. Write an algorithm for converting a given Celsius temperature to its equivalent Fahrenheit temperature and draw a flowchart.
2. Write an algorithm to find the largest of three given numbers and draw a flowchart.
3. Write an algorithm and draw a flowchart for finding the roots and nature of roots of a quadratic equation, given its coefficients.
4. Write an algorithm and flowchart for finding the first n Fibonacci numbers, given n.

2. Unit II (Cycle 2)

1. Write an algorithm, flowchart, and C program for:
 1. Finding the area and circumference of a circle of given radius.
 2. Finding the volume of a sphere of given radius.
 3. Finding the lateral surface area of a right circular cone of given base radius and height.
 4. Finding selling price of an item, given its cost price and profit percent.
 5. Finding the interest on a given principal for a given period of time at a given rate of per year.
2. Write a C program to display all the sizes of data types in C.
3. Write a C program to display a given decimal integer into an equivalent octal number and hexadecimal number using %o and %x in printf function.

3. Unit II (Cycle 3)

1. Write a C program to find the roots and nature of the roots of a quadratic equation, given its coefficients.
2. Write a C program for finding the largest of three given numbers.
3. A salesman gets a commission of 5% on the sales he makes if his sales is below Rs.5000/- and a commission of 8% on the sales that exceeds Rs.5000/- together with Rs.250/-. Write an algorithm or a flowchart and develop C program for computing the commission of the salesman, given his sales.

4. Unit III (Cycle 4)

1. Write three C programs to print a multiplication table for a given number using while, do-while, and for loops.
2. Write a C program to compute the sum of:
 1. $1+x+x^2+x^3+\dots+x^n$, given x and n.
 2. $1! + 2! + 3! + \dots + n!$, given n.
 3. $1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10! + \dots$ to n terms where the n^{th} term becomes less than 0.0001.

5. Unit III (Cycle 5)

1. Write a C program in the menu driven style to perform the operations +, -, *, /, % between two given integers.
2. Write a C program to find the largest and the least of some numbers given by the user.
3. Write a C program to find the sum of the digits of a positive integer.

6. Unit III (Cycle 6)

1. Write C functions for the following:
 1. A function that takes an integer n as argument and returns 1 if it is a prime number and 0 otherwise.
 2. A function that takes a real number x and a positive integer n as arguments and returns x^n .
 3. A function that takes a positive integer n as an argument and returns the n^{th} Fibonacci number.
2. Using recursion write C functions for the following:
 1. Factorial of a non-negative integer n .
 2. Number of combinations of n things taken r at a time.
 3. Greatest Common Divisor of two integers.
 4. Least Common Multiple of two integers.

7. Unit III (Cycle 7)

1. Write a menu driven style program to compute the above functions (cycle 6) on the choice of the function given by the user.
2. Define macros for the following and use them to find sum of the squares of the minimum and maximum of two given numbers.
 1. Larger of two numbers.
 2. Smaller of two numbers.
 3. Sum of the squares of two numbers.
3. Write a program to generate Pascal's triangle.
4. Write a program to count the number of letters, words, and lines in a given text.

8. Unit IV (Cycle 8)

1. Write a program to store the numbers given by the user in an array, and then to find the mean, deviations of the given values from the mean, and variance.
2. Write a C program to initially store user given numbers in an array, display them and then to insert a given number at a given location and to delete a number at a given location.
3. Write a program to store user given numbers in an array and find the locations of minimum and maximum values in the array and swap them and display the resulting array.

9. Unit IV (Cycle 9)

1. Write a C program to implement the operations of matrices – addition, subtraction, multiplication.
2. Write a program to find whether a given matrix is symmetric, lower triangular, upper triangular, diagonal, scalar, or unit matrix.

10. Unit V (Cycle 10)

1. Write a function to swap two numbers.
2. Write a function to compute area and circumference of a circle, having area and circumference as pointer arguments and radius as an ordinary argument.

11. Unit VI (Cycle 11)

1. Define a structure for complex number. Write functions on complex numbers (addition, subtraction, absolute value, multiplication, division, complex conjugate) and implement them in a menu driven style.
2. Define a structure point. Write a program to find the distance between two points.
3. Define a structure student having members roll no., name, class, section, marks. Create an array of 10 students give the data and find the average marks, section-wise.

12. Unit VI (Cycle 12)

1. Write a program to:
 1. Create a file by the name given by the user or by command line argument and add the text given by the user to that file.
 2. Open the file created above and display the contents of the file.
 3. Copy a file into some other file, file names given by the user or by command line arguments.
 4. Append a user mentioned file to another file.
 5. Reverse the first n characters of a file.

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(4B171) ENGINEERING WORKSHOP - I
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x		x									

After completing the subject, students will be able:

- To identify the various tools used for basic workshop
- To identify the tools and understand the basic circuit for tube light and calling bell
- To understand the various parts used in home appliances
- To understand the basic welding tools and perform welding of simple joints

1. House Wiring

To connect the Tube Light as per circuit diagram
To connect the Calling Bell as per circuit diagram

2. Home Appliances

Practice of disassembly and assembly of various home appliances such as Fans, Mixers, Washing machines etc.,

3. Welding

Preparation and welding of Lap Joint
Preparation and welding of Butt Joint

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L T P/D C
- - 3/2 1

(4F172) IT WORKSHOP - I

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

Week1:

Introduction to Computer: Identify the peripherals of a computer, components/peripherals in a CPU & its functions. Introduction to the types of Operating System, Install computer with dual boot operating system (windows, Linux with PowerPoint presentation). Comparison of types of OS in different platform.

Week 2: Assembling and Deassembling Praticals

Week 3:

Introduction to Microsoft Windows 7: Software and data, Components of Desktop, Working with windows

Week 4:

Getting Started with Microsoft Windows 7: Using the Start Menu, Obainting Help on Windows
Changing Setting, Using Applications in Windows, Shutting Down Windows

Week 5:

Introduction to Linux Operating system, Linux Commands, DOS commands

Week 6:

Install computer applications in Linux and windows.
Software and hardware trouble shoot, personal computer security settings and application software of the system.

Cyber Ethics: Access websites and email, effectively and securely browse (banksites, https webpages) and share the data, categories of websites (.com, .in, .edu, .org).

TEXT BOOK:

1. "Comdex Information Technology Course Kit" by Vikas Gupta, Dreamtech Press

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(4D191) TECHNICAL PAPER WRITING AND SEMINAR - 1

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing	: 05 marks
Final report	: 05 marks
Presentation before a departmental committee consisting of Head, a Senior Faculty and Supervisor	: 15 marks

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I Year B. Tech. ECM - II Semester

L T P/D C
2 1 - 2

(4H202) ENGLISH – II
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
								x			

Unit 1: Short Story

Next Sunday-R K Narayan

- Activity 1: Talk on places of interest (India & Overseas)
- Writing: Paragraph Writing (Guided and Free writing)
- Grammar: Types of sentences-Simple, compound, complex, transformation of sentences
- Vocabulary: Words often confused

Unit 2 : Interview

Rendezvous with Indira Nooyi

- Activity 2: Storytelling Session
- Writing: Stories
- Grammar: Active and passive voice
- Vocabulary: One word Substitutes

Unit 3: Speech

The Convocation Speech – Narayana Murthy

- Activity 3: Speaking on current affairs
- Writing: Précis Writing
- Grammar: Direct and Indirect Speech
- Vocabulary: Phrasal Verbs

Unit 4: Essay

The Secret of Work by Swami Vivekananda

- Activity 4: Accepting/Rejecting Invitation; Congratulating; Extending Condolences
- Writing: Essay Writing
- Grammar: Comparison of adjectives

Unit 5: Biography

Three Days to See –Hellen Keller

- Activity 5: Playing a role (By choice)
- Writing: Critical appreciation
- Grammar: Common Errors-II

Unit 6: Poetry

Goodbye Party for Miss Pushpa T.S

- Activity 6: Thanksgiving Session – acknowledging parents role in nurturing
- Writing: Writing an abstract
- Grammar: Avoiding grammatical ambiguity

Note: Additional List (TOEFL/GRE Word List) along with exercise will be provided in the workbook.

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4 1 - 4

(4H213) ENGINEERING MATHEMATICS - II
(Common to all branches except Bio-Technology)

a	b	c	d	e	f	g	h	i	j	k	l
x											

UNIT-I

Matrices and Linear Systems: Rank of a Matrix, Echelon Form, Normal Form, Inverse of a Matrix by Gauss-Jordan method, Linear Dependence and Independence of Vectors, Solution of Linear Systems –Gauss Elimination Method, Rank method. Iterative methods-Gauss Jordan and Gauss Seidal Methods.
Applications: Finding the current in electrical circuit.

UNIT-II

Eigenvalues and Eigenvectors: Eigenvalues and Eigenvectors- properties, Cayley-Hamilton Theorem (without proof) and its Applications to find higher power and inverse of a matrix, Diagonalization of a Matrix.

UNIT-III

Partial Differential Equations: Formation of partial differential equations by Elimination of Arbitrary Constants and Arbitrary Functions, Solutions of first order linear equation, Non-linear (Standard type) equations, Method of Separation of Variables. Classification of partial differential equations.
Applications: One dimensional Wave, Heat equations.

UNIT-IV

Laplace Transformations: Laplace transform of standard functions, shifting theorems, change of scale property, Multiplication by powers of t, Division by t, Laplace transform of unit step function, Impulse function and periodic functions. Inverse Laplace transforms: properties, partial fraction method and convolution theorem (without proof).
Applications: Laplace transforms to solve ordinary differential equations with constant coefficients.

UNIT-V**Z- transforms:**

Z- Transforms and Inverse Z-transforms, properties, damping rule, Shifting properties, Initial and final value theorems, Convolution theorem.
Applications-Solution of difference equation by Z- transforms

UNIT-VI

Fourier series: Fourier coefficients, Fourier series to the functions of any period $p=2L$, Fourier series of even and odd functions, Half-range Expansions.
Applications: Fourier series to ordinary differential equations with boundary conditions.

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering, Kanti B.Datta, CENGAGE Learning.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.
3. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.
4. Erwin Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 8th Edition.

REFERENCE BOOKS:

1. A Text Book of KREYSZIG's Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications.
2. Advanced Engineering Mathematics, S. R. K. Iyengar and R.K. Jain, Narosa Publishing House, London, 2002.

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L T P/D C
3 1 - 3

(4H222) ENGINEERING PHYSICS - II
(Common to EEE, ECE, ECM, CSE, IT)

a	b	c	d	e	f	g	h	i	j	k	l
x		x						x			

UNIT-I

Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, calculation of carrier concentration of Intrinsic and Extrinsic Semiconductors, Direct & Indirect Band Gap Semiconductors, Thermistor, Hall Effect in semiconductors and applications.

UNIT-II

Physics of Semiconductor Devices: Formation of PN Junction and working of PN junction. Energy Diagram of PN Diode, I-V Characteristics of PN Junction, LED, Solar cell, applications.

UNIT-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Electric Susceptibility, Electronic and Ionic polarizabilities; Orientation Polarization(qualitative), Internal fields in Solids, Clausius-Mossotti equation, Frequency and temperature effect on Dielectrics(qualitative), Piezo-electricity, Pyro-electricity and Ferro- electricity, Applications.

UNIT - IV

Magnetic Properties Permeability, Field intensity, Magnetic Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their applications, Super conductivity, effect of Magnetic Field, Critical current density, Meissner's effect, Type-I & Type-II superconductors, Introduction to BCS theory of Superconductivity, applications of super conductors.

UNIT - V

Lasers: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Meta-stable State, Population Inversion, Lasing Action, Einstein's Coefficients and Relation between them and significance, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers.

Basics of Fiber Optics: Introduction, Principle of Optical Fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical fibres. Attenuation in Optical Fibers, Optical Fiber in communication system.

UNIT - VI

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Precipitation, Chemical Vapour Deposition; Top-down Fabrication: Thermal evaporation, Ball Milling, Characterization of Nano materials(XRD&TEM), carbon nanotubes, Applications of Nano Materials.

Text Books:

1. P K Palanisamy, Engineering Physics, Sitech Publications

Reference Books: -

1. Introduction to Solid Physics, by Charles Kittel
2. Solid State Physics Neil by W. Ashcroft, N. David Mermin
3. Solid State Physics by S L Singal
4. Physics for semiconductor devices by Michael Shur
5. Engineering Physics P K Palanisamy
6. Nanotechnology: A Gentle Introduction To The Next Big Idea by M Ratner, D Ratner

7. Nano Materials by A K Bandyopadhyay
8. Applied Physics by P.K. Mittal
9. Modern Engineering Physics by S.Chandralingam, K.Vijay Kumar
10. Heat and Thermodynamics by Zemansky

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4 1 - 4

(4E201) DATA STRUCTURES AND C++
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
	x	x	x					x	x		

UNIT I

Introduction to data structures: Abstract data type (ADT), Stacks and Queues circular queues and their implementation with arrays.

Applications of Stack: infix to post fix conversion, postfix expression evaluation.

Applications of Queues

Objective:

On completion of the unit/chapter, a student should be able to: (i) Define what is an abstract data type (ii) Differentiate linear and non-linear data structures (iii) Representation and implementation of stack and queue using arrays. (iv) Convert the given infix expression to post fix notation and evaluate the postfix expression using stack. (v) Understand the applications of stack and queue.

UNIT II

Singly linked lists, Advantages of Linked lists over Arrays, Doubly linked lists, Circular list and their operations, representing stacks and queues with Linked lists.

Objective:

On completion of the unit/chapter a student should be able to:(i) Understand what is a linked list (ii) know how structurally the distinct categories of lists differ from each other (iii) implement various categories of lists such as singly linked lists, doubly linked lists and circular lists (iv) understand how to represent and implement stack and queue using linked list

UNIT III

Trees- Binary trees, terminology, representation, traversals.

AVL trees, AVL tree operations: Insertion, deletion and searching.

Graphs- terminology, representation, graph traversals (DFS & BFS).

Objective:

On completion of the unit/chapter a student should be able to:(i)understand the terminology and uses of trees and graphs(ii)explain distinct representations of trees as well the graphs(iii)analyze binary search tree(iv)construct binary search tree, given the elements and traverse the tree in pre-order, in-order and post-order(v)differentiate Depth First Search(DFS) and Breadth First Search (BFS) techniques and could traverse through the graph using DFS and/or BFS

UNIT IV

Searching - Linear and binary search methods. Hash table representation, hash functions, double hashing.

Sorting - Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort.

Objective:

On completion of the unit/chapter a student should be able to:(i)understand what is meant by searching and could differentiate linear search operation performed on an ordered set of elements and an unordered set of elements(ii)differentiate the linear search and binary search techniques (iii)explain the procedure involved in binary search method(iv)understand the necessity of sorting techniques(v)list and implement different types of sorting techniques(vi)know and compare the time complexity of each sorting technique

UNIT V

Introduction to C++ programming-object oriented programming concepts, Structured Vs OOP.

Classes and objects-class definition, Objects, class scope and accessing members, Constructors-default constructor, parameterized constructor, constructor initialization list, copy constructor. Destructors.

Objective:

On completion of the unit/chapter a student should be able to:(i)differentiate structured programming approach and the object oriented programming approach(ii)understand the terms class, object and could write simple programs in C++ (iii)understand how to use access specifiers (iv)explain the differences between constructor and normal function

UNIT VI

Static class members, this pointer, friend functions, Dynamic memory management with operators new and delete. Overloading-function overloading, Operator overloading, restrictions on operator overloading, overloading unary and binary operators, templates, inheritance: single, multiple and multi level inheritance.

Objective:

On completion of the unit/chapter a student should be able to:(i)describe static class members(ii)make use of this pointer, friend function(iii)demonstrate the dynamic memory allocation and deallocation (iv)understand what is overloading and write programs on function overloading, operator overloading(v)understand and differentiate types of templates (vi)learn inheritance and its usage.

TEXT BOOKS:

1. Data Structure through C by Yashavant Kanetkar.
2. The complete reference C++ By Herb Schildt.
3. Data Structures, A pseudocode Approach with C by Richard F. Gilberg & Behrouz A. Forouzan.

REFERENCES:

1. Alfred V. Aho, Jeffrey D. Ullman, John E. Hopcroft. *Data Structures and Algorithms*. Addison Wesley, 1983.
2. Data Structures using c Aaron M.Tenenbaum , Yedidyah Langsam,Moshe J Augenstein.
3. Introduction to Data Structures In C By Kamtane

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2	-	3	2

(4B202) ENGINEERING DRAWING - II
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x											

After completing the subject, students will be able:

- to draw the various types of scales for different applications and using various types of units.
- to understand the practical applications of development of various solids and draw their developments
- to understand the concept of three dimensional representations of simple and complex objects through isometric projection principle given their orthographic representation
- to convert pictorial (Isometric) views to orthographic views.
- to understand the applications and draw the perspective views of various drawing entities
- to understand the computer aided drafting technique and commands for generation of basic entities of drawing

UNIT – I

Scales: Construction of Plain, Diagonal, Comparative, Vernier Scales and Scale of chords.

UNIT – II

Development of Surfaces: Development of Surfaces of Right Regular Solids – Prisms, Cylinders, Pyramids, Cones and their parts.

UNIT – III

Isometric Projections/views: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines.

Conversion of Orthographic Views to Isometric Views of simple objects.

UNIT –IV

Transformation of Projections: Conversion of isometric views to orthographic views of simple objects.

UNIT –V

Perspective Projections: Principle, Perspective elements, Perspective View of Points, Lines, Plane Figures and Simple Solids - Vanishing Point Method, Visual ray method.

UNIT –VI

Introduction to Computer Aided Drafting: Generation of points, lines, curves, polygons, simple solids, dimensioning.

TEXT BOOKS:

1. Engineering Drawing, N.D. Bhatt / Charotar publishers
2. Engineering Drawing 2nd Edition [Basant Agrawal](#), [C. M. Agrawal](#), Tata McGraw-Hill Education

REFERENCES:

1. Engineering Drawing, K.Venugopal/G.Sreekanjana, New Age International Publishers.

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(4H232) ENGINEERING CHEMISTRY - II
(Common to EEE, ME, ECE, CSE, IT and ECM)

a	b	c	d	e	f	g	h	i	j	k	l
x		x	x								

UNIT - I POLYMER TECHNOLOGY

Polymer, polymerization - Types of Polymerization.

Plastics – thermosetting and thermoplastics , preparation, properties and **Engineering applications** of the following: PVC, Teflon, Bakelite, Nylon 6,6 and epoxy resins.

Rubber – natural and artificial rubber, vulcanization of natural rubber, Buna-S, Buna-N and their **Engineering applications**.

conducting polymers- classification, preparation of polyacetylene, polyaniline and their **Engineering applications**.

UNIT - II SURFACE CHEMISTRY AND COLLOIDS

Surface Chemistry: Adsorption – Types of Adsorption, Isotherms Langmuir adsorption isotherm. **Engineering applications of adsorption**.

Colloids: Classification of colloids, Electrical and optical properties, micelles, gold number, Types of emulsions, preparation, Emulsifier, liquid in solids(gel), classification, preparation and properties **Engineering applications of colloids in industry**.

UNIT - III FUEL TECHNOLOGY

Classification of Fuels- Solid ,Liquid & gaseous fuels. Characteristics of good fuel , calorific value (HCV&LCV) . Determination of calorific value by Bomb & Junkers gas calorimeter. Solid Fuels:- Coal and its chemical composition, Analysis of Coal and their importance. Liquid fuels:-Source –Petroleum-refining of petroleum- Production of petrol by Bergius and Fischer tropesch’s process.- (**the production of synthetic petrol**). Gaseous Fuels:- Natural gas –Analysis of flue gas by Orsat’s apparatus. **Engineering applications of fuels**.

UNIT - IV EXPLOSIVES, PROPELLANTS AND LUBRICANTS

Explosives: Classification, Precautions during Storage, blasting fuses, important explosives and their **Engineering applications**.

Propellants: Classification of Propellants, Solid Rocket propellants **and their engineering applications**.

Lubricants:

Classification- Solid , Semi Solid, Liquid, emulsion- Properties- Selection of lubricants for different purposes.

Lubrication: Mechanism of lubrication (fluid film, boundary and extreme pressure lubrication). Characteristics of Lubricants, Viscosity, viscosity index, Cloud and pour point, flash and fire point, mechanical strength.**Engineering applications of lubricants**.

UNIT – V CHEMISTRY OF ENGINEERING MATERIALS

Refractories : Definition, Classification with examples, criteria of a good refractory material, Causes for the failure of a Refractory material. **Engineering applications of refractories**.

Insulators: Definition & Classification with examples, Characteristics of Insulating materials-Thermal insulators, Electrical insulators- Their Characteristics and **Engineering applications of electrical insulators**.

Glass:- Manufacture of glass –types of glasses-Soft glass- hard glass , **Applications of glass as an Engineering and Architectural material**.

Ceramics : Structural clay products, white wares and chemical stone wares. **Engineering applications of ceramics.**

UNIT - VI GREEN CHEMISTRY

Introduction, Concepts, Principles of green chemistry, development of green chemistry, importance of measurement in green chemistry, Principles of green engineering.

Engineering Applications of green chemistry: Manufacture of polylactic acid for plastic production, Production of **biodegradable polymer (poly hydroxyl alkanates (PHA)).**

Text Books:

1. Engineering Chemistry: P.K. Jain and M.K. Jain, Dhanpathrai Publications-14th Edition.

Reference Books:

1. Essentials of Physical Chemistry: Baul & Tuli, S. Chand Publications.
2. Text of Engineering Chemistry by S.S. Dara & Mukkanti, S. Chand & CO, New Delhi (2014).
3. Chemistry of Engineering Materials by C.V. Agarwal, C.P. Murthy, A. Naidu; BS publications.
4. Sharma, R.K.; Sidhwani, I.T. & Chaudhari, M.K. *Green Chemistry Experiments: A Monograph*, I.K. International Publishing Hopuse Pvt Ltd. New Delhi, Bangalore (2013).
5. Text Book of Nano Science and Nano Technology by B.S. Murthy and P. Shankar, University press.

I Year B. Tech. ECM - II Semester

L	T	P/D	C
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(4AC43) NETWORK ANALYSIS
(Common to ECE & ECM)

a	b	c	d	e	f	g	h	i	j	k	l
x	x							x			

UNIT – I : INTRODUCTION TO ELECTRICAL CIRCUITS:

Circuit concept, R-L-C parameters, Voltage and current sources, Independent and dependent sources, Source transformation, Kirchoff's laws, Network reduction techniques, series, parallel, series – parallel, Star- to-delta and Delta-to-star transformation, Mesh Analysis, Nodal analysis, Super mesh, Super node concept.

UNIT – II: NETWORK TOPOLOGY:

Definitions, Graph, Tree, Basic cutset and Basic Tieset matrices for planar networks, Loop and Nodal methods of analysis of Networks using graph theory, Duality & Dual networks.

UNIT – III : SINGLE PHASE A.C. CIRCUITS:

R.M.S and Average values, Form factor for different periodic wave forms, Steady state Analysis of R, L and C (in series, parallel and series-parallel combinations) with sinusoidal excitation, Concept of self and mutual inductances, Dot convention, Co-efficient of coupling, Series circuit analysis with mutual inductance, Resonance in series and parallel circuits, Concept of band width and Q factor.

UNIT – IV : NETWORK THEOREMS:

Tellegens, Superposition, Reciprocity, Thevenin's, Norton's, Maximum Power Transfer and Millman's Theorems - statements and problems solving using dependent and independent sources with D.C. excitation.

UNIT – V : TWO-PORT NETWORKS AND FILTERS:

Z,Y, ABCD and h-parameters, Conversion of one parameter to another parameter, Condition for reciprocity and symmetry, 2 port network connections in series, parallel and cascaded configurations, Problem solving, Introduction to frequency selective filters (Low pass, high pass, band pass and band elimination filters).

UNIT – VI : TRANSIENT ANALYSIS:

Transient response of R-L, R-C, R-L-C circuits (series combinations only) with D.C. and sinusoidal excitations, Initial conditions, Solution using differential equation approach and Laplace transform methods of solutions.

Text books:

1. Engineering Circuit Analysis – William Hayt and Jack E Kemmerly, McGraw Hill 5th Edition, 1993.
2. Circuits & Networks – A.Sudhakar and Shyamamohan S.Palli, Tata McGraw Hill, 3rd edition.

References:

1. Network Analysis - M.E. Vanvalkenberg, 3rd edition, PHI.
2. Circuit theory (Analysis & Synthesis) – A.Chakravarthy, Dhanpath Rai & Co., 6th edition.

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I Year B. Tech. ECM - II Semester

L T P/D C
- - 2 1

(4H272) ENGLISH LANGUAGE LAB – II
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
								x			

Lab Activities:

1. Reading Comprehension / Vocabulary Activities
2. Reading Comprehension / Vocabulary Activities
3. Reading Comprehension / Vocabulary Activities
4. Reading Comprehension / Vocabulary Activities
5. Reading Comprehension / Grammar
6. Reading Comprehension / Grammar
7. Reading Comprehension / Grammar
8. Reading Comprehension / Grammar

Communication Skills:

1. Speaking Activity: Agreement and Disagreement
2. Speaking Activity: Hobbies / Books
3. Speaking Activity: Hobbies / Movies / Travel
4. Speaking Activity: Picture Perception
5. Speaking Activity: Picture Perception
6. Speaking Activity: Extemporaneous
7. Speaking Activity: Debate

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I Year B. Tech. ECM - II Semester

L T P/D C
- - 3 2

(4E271) DATASTRUCTURES AND C++ LAB
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
	x	x	x					x	x		

Lab Objective:

On completion of all the exercises, a student should be able to:

- Represent and Implement the operations on basic linear and non-linear data structures
- Implement basic C++ programs using object oriented programming concepts

1. Write a C program that implement stack and its operations using arrays
2. Write a C program that implement Queue and its operations using arrays.
3. Write a C program that uses Stack operations to perform the following
 - i) Converting infix expression into postfix expression
 - ii) Evaluating the postfix expression
4. Write a C program that uses functions to perform the following operations on singly linked list:
 - i) Creation ii) Insertion iii) Deletion iv) Traversal
5. Write a C program that uses functions to perform the following operations on doubly linked list:
 - i) Creation ii) Insertion iii) Deletion iv) Traversal in both ways
6. Write a C program that uses functions to perform the following:
 - i) Creating a Binary Tree of integers
 - ii) Traversing the above binary tree in preorder, inorder and postorder.
7. Write C programs that use both recursive and non recursive functions to perform the following searching operations for a Key value in a given list of integers :
 - i) Linear search ii) Binary search
8. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
 - i) Bubble sort ii) Quick sort
9. Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
 - i) Insertion sort ii) Merge sort iii) Selection Sort
10. Write a C++ program that prints all real solutions to the quadratic equation $ax^2+bx+c=0$.
Read in a,b,c and use the quadratic formula. If the discriminant b^2-4ac is negative, display a message stating that there are no real solutions.
11. A Fibonacci Sequence is defined as follows: the first and second terms in the sequence are 0 and Subsequent terms are found by adding the preceding two terms in the sequence. Write a C++ program to generate the first n terms of the sequence.
12. Write a C++ program that checks whether a given string is palindrome or not.

TEXT BOOKS:

1. Data Structure through C by Yashavant Kanetkar.
2. The complete reference C++ by Herb Schildt.
3. Data Structures, A pseudocode Approach with C by Richard F. Gilberg & Behrouz A. Forouzan.

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I Year B. Tech. ECM - II Semester

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- - 3/2 1

(4B273) ENGINEERING WORKSHOP - II
(Common to all branches except CSE & IT)

a	b	c	d	e	f	g	h	i	j	k	l
		x									

After completing the subject, students will be able:

- to understand the various tools used for filing and perform fitting on simple joints.
- to fabricate components made up of tin sheets.
- to make simple wooden joints using carpentry tools

1. Fitting

- To make a Step Fitting as per the dimensions
- To make a Half Round Fitting as per the dimensions

2. Tin Smithy

- Preparation of Funnel
- Preparation of Square box

3. Carpentry

- Make a Cross lap joint
- Make a Dovetail joint

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I Year B. Tech. ECM - II Semester

L T P/D C
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(4H181) ENGINEERING PHYSICS LAB – II
(Common to all branches)

a	b	c	d	e	f	g	h	i	j	k	l
x		x									

1. Energy gap of a semiconductor
2. To study the characteristics of a thermistor
3. Characteristics of laser Diode
4. Numerical aperture of optical fiber and Bending losses of an optical fiber
5. Diffraction Grating.
6. Stewart & Gee's Experiment (Determination of magnetic induction flux density along the axis of a circular coil).
7. Newton's Rings
8. Hall effect
9. Dielectric constant of a given material
10. Dispersive power of Prism

Note: Any six of the above nine Experiments are to be conducted

Prescribed Practical Book by Dr. Y. Aparna, Professor & HOD of Physics Department, JNTUH

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I Year B. Tech. ECM - II Semester

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(4D292) TECHNICAL PAPER WRITING AND SEMINAR - I1

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing	: 05 marks
Final report	: 05 marks
Presentation before a departmental committee consisting of Head, a Senior Faculty and Supervisor	: 15 marks

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II Year B. Tech. ECM - I Semester

L T P/D C
3 2 - 3

(4H315) ENGINEERING MATHEMATICS - III
(Common to all branches except Bio-Technology)

a	b	c	d	e	f	g	h	i	j	k	l
x											

UNIT-I

Special Functions: Beta, Gamma Functions –Properties, Relation between Beta and Gamma functions.
Applications: Evaluation of improper integrals.

UNIT-II

Complex Analysis: Limits, continuity and differentiation, Analytic functions, Cauchy-Riemann equations, Complex integration, Cauchy's integral theorem (without proof), Cauchy's integral formula. Taylor's and Laurent's series, Singularities and zeros, Cauchy's Residue Theorem (without proof).
Applications: Evaluation of real integrals using Cauchy residue theorem.

UNIT-III

Fourier Transform:

Fourier transform of a function, Sine and Cosine transformations, Finite fourier transform, Parseval's identity.
Application : Solution of differential equations using Fourier transform.

UNIT-IV

Solution of algebraic and transcendental equations and Numerical integration:

Introduction – The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method, Trapezoidal rule – Simpson's 1/3 rule , Simpson's 3/8 rule.

UNIT-V

Interpolation:

Introduction-- Finite differences- Forward Differences, Backward differences, Central differences. Newton's formulae for interpolation – Gauss Central Difference Formulae (without proofs), Lagrange's Interpolation formula for unevenly spaced points.

UNIT-VI

Numerical solution of Ordinary Differential equations:

Solution by Taylor's series –Picard's Method of Successive Approximations –Euler's Method, Runge-Kutta Methods, Predictor-Corrector Methods- Milne's method, Adams-Bashforth method.

TEXT BOOKS:

1. Mathematical Methods of Science and Engineering, Kanti B.Datta, CENGAGE Learning.
2. Higher Engineering Mathematics, B.S. Grewal, Khanna Publications, New Delhi.
3. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.
4. Erwyn Kreyszig: Advanced Engineering Mathematics, John Wiley and Sons, 8th Edition.

REFERENCE BOOKS:

1. A Text Book of KREYSZIG's Engineering Mathematics, Dr. A. Ramakrishna Prasad, Wiley Publications.
2. Advanced Engineering Mathematics, S. R. K. Iyengar and R.K. Jain, Narosa Publishing House, London, 2002.

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II Year B. Tech. ECM - I Semester

L T P/D C
4 1 - 4

(4CC01) ELECTRONIC DEVICES AND CIRCUITS
(Common to ECE, ECM & EEE)

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x							

After studying this course, the students will be able to

1. Understand the Principle of operation and applications of CRO.
2. Understand the operation of diode and its application as rectifier.
3. Understand the Fundamentals of BJT operation, Characteristics and different biasing circuits.
4. Understand the Fundamentals of JFET operation, Characteristics and importance of MOSFETs.
5. Understand the Small signal Model of BJT and Amplifier Analysis under CB, CE and CC configurations.
6. Understand the Basic regulator circuits and voltage multipliers.

UNIT-I

ELECTRON DYNAMICS AND CRO: Motion of charged particles in electric and magnetic fields. Simple problems based on electric and magnetic fields. Electrostatic and magnetic focusing. Principle of CRT. Deflection Sensitivity (Electrostatic and Magnetic deflection). Parallel Electric and Magnetic fields.

UNIT- II

PN JUNCTION DIODE: P-N junction diode under forward & reverse bias. Transition capacitance and Diffusion capacitance. Break down of junctions (Avalanche and Zener Break down). Zener Diode Characteristics. Applications: Half wave Rectifier, Full wave Rectifier, Bridge Rectifier: Analysis.
Applications: Construction of a 12-V DC supply

UNIT-III

BIPOLAR JUNCTION TRANSISTOR: Fundamentals of BJT & Operation, Minority carrier profiles. I/P and O/P Characteristics CB, CE and CC configurations. Switching characteristics (Rise time, Fall time, Delay Time and Storage time) .Biasing Methods & Stabilization Fixed Bias, Collector to Base Bias, Voltage Divider Bias and Problems, Thermal runaway in BJTs.

UNIT-IV

FIELD EFFECT TRANSISTOR: Working of JFET, JFET characteristics, Drain current equation, FET Parameters, Small signal model of JFET. Construction and characteristics of MOSFET (Enhancement and depletion mode); Comparison of JFET & MOSFET .SCR: Two transistor Analogy and Characteristics, UJT: Operation and Characteristics.

UNIT- V

TRANSISTOR AMPLIFIERS: Small signal Model of BJT, h-parameter representation-Determination of voltage gain, current gain, input impedance, output impedance .CE Amplifier-its Analysis, Frequency Response. Problems. RC coupled amplifier: Analysis. Approximate analysis of CB and CC Amplifiers.
Applications: Design of a single-stage amplifier with amplification factor of 100 and operating frequency range 20Hz to 20 KHz.

UNIT-VI

VOLTAGE REGULATORS: Terminology, Basic regulator circuit: Zener, Transistor Based: Shunt and Series Voltage regulators. Protection Circuits: Current limiting, Short circuit protection. Specifications of Voltage regulator, Voltage multipliers.

Applications: Design of a Voltage Stabilizer

Text Books

1. Electronic Devices and Circuits-J.Millman, C.C.Halkias and satyabratha jit Tata Mc Graw Hill, 2 Ed. 2007
2. Electronic Devices AND Circuits-R.L.Boylestad & Louis Nashelsky, Pearson/Prentice Hall, 9th edition, 2006.

References:

1. Integrated Electronics- J.Millman, C.C.Halkias, 1991 ed., 2008, TMH.
2. Electronic Devices and Circuits – K.LalKishore, 2 ed., 2005, BSP
3. Electronic Devices and Circuits by Sanjeev Gupta, Dhapat Rai Publications.
4. Electronic Devices and Circuits by S.Salivahanan and N.Suresh Kumar, Tata Mc Graw Hill Publications

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II Year B. Tech. ECM - I Semester

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3 2 - 3

(4BC04) BASIC MECHANICAL ENGINEERING
(Common to All Branches Except Mechanical Engineering)

a	b	c	d	e	f	g	h	i	j	k	l
x											

After completing the subject, students will be able:

- State First law and Second law of thermodynamics and differentiate between S.I. & C.I engines and differentiate between 4-stroke 2&-stroke engines
- Classify different types of Boilers and differentiate impulse turbine and reaction turbine and understand their working principle
- Understand the working principle of vapour compression and vapour absorption Refrigeration systems reciprocating and centrifugal pumps and classify different types of Hydraulic turbines
- Understand the working principles of different types of welding and casting methods
- Understand the cold and hot working processes and sheet metal operations
- Understand the principle of operation of different machine tools like lathe, grinding, milling and shaping machines.

UNIT - I

Thermodynamics: Basic concepts of Thermodynamics, Property of gases, Zeroth Law. First Law of Thermodynamics and its applications, Second Law of Thermodynamics, Carnot cycle, Air standard cycles – Otto, Diesel Cycles.

Internal combustion engines: Internal combustion engines, definition, classification, components, working of two-stroke, four stroke cycle engines, SI and CI Engines, Performance parameters, Need for cooling, and lubrication of IC engines.

UNIT-II

- Steam Power plant, Boiler, Steam Turbines:** Layout of steam power plant, Water tube and Fire tube Boilers :- “Cochron”, Babcock and Wilcox Boiler and High Pressure Boilers. (Benson & Lamont only).
- Steam turbines:- Impulse & Reaction Turbines**
- Gas turbine-power plants :- Closed & Open cycle types**

UNIT- III

- Hydraulic pumps & turbines:-** Centrifugal Pumps, Pelton wheel, Francis turbine and Kaplan Turbine -- Layout of Hydro electric power plant
- Refrigeration & Air conditioning systems:-** Description of Vapour Compression and Vapour Absorption systems

UNIT-IV

Manufacturing Processes:

Foundry Practice:- Patterns, Moulding and Moulding materials, casting methods-Sand Casting, Shell mould Casting, Investment Casting, Die Casting ,Centrifugal casting – Principle and Application of these processes

Welding:- Types of Welding- Electric Arc welding - Coated electrode, TIG welding & MIG welding, Gas welding and cutting, Resistance welding- Spot welding, Soldering and Brazing .

UNIT-V

Mechanical working :- Hot and Cold working, Rolling- Rolling products, Types of Rolling mills, Forging-operations, forging methods, Extrusion-methods, Metal Spinning and Wire Drawing
Press working operations:-Cutting, Bending, Drawing and Squeezing

UNIT-VI

Machine tools: Construction of lathe, shaper, drilling, milling, grinding and CNC machine tools-Advantages, Machine controls, vertical & horizontal spindles.

TEXT BOOKS :

- 1) Mathur, M.L., Mehta, F.S. and Tiwari, R.P., Elements of Mechanical Engineering, Jain Brothers, New Delhi, 2005.
- 2) R.K. Rajput, "Elements of Mechanical Engineering", Laxmi Publications, 1994.

REFERENCES :

- 1) P.N.Gupta, M.P. Poonia, "Elements of Mechanical Engineering", Standard Publishers Distributors Nai Sarak, Delhi.
- 2) R.C.Gupta, "Mechanical Engineering", Khanna Publishers, Delhi.

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II Year B. Tech. ECM - I Semester

L T P/D C
4 1 - 4

(4CC02) SWITCHING THEORY AND LOGIC DESIGN

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x							

After studying this course, the students will be able to

1. Understand the rules of Boolean algebra and use it to simplify Boolean expressions.
2. Understand simplification of Boolean expressions using K-map.
3. Understand operations of combinational circuits such as fulladders, multiplexers, decoders, encoders, codeconverters.
4. Understand the operation of sequential circuits such as flip-flops
5. Understand the operation of counters and registers. Able to design them.
6. Understand the structure of PLD's such as ROM's, PLA' s, PAL s. Understand the basic concepts of State Machine Charts and models.

UNIT – I

Number System: binary, decimal, octal, hexa decimal, weighted and un-weighted codes.

Boolean Algebra: Axiomatic definition of Boolean algebra, Binary operators, postulates of and theorems.

Boolean addition, subtraction, 1's complement, 2's complement. Switching functions, Canonical forms and Standard forms, Simplification of switching functions using theorems.

UNIT – II

Logic gates: Basic gates and universal gates.

Minimization of Switching Functions: Karnaugh map method, Prime implicants, don't care combinations, Minimal SOP and POS forms, Quine-McCluskey Tabular Method, Prime Implicant chart, simplification rules.

UNIT - III

Combinational Logic Design: Single output and multiple output combinational logic circuit design, AND-OR, OR-AND, and NAND/NOR realizations, Exclusive-OR and Equivalence functions, Binary adders/subtractors, Encoder, Decoder, Multiplexer, Demultiplexer, MUX realization of switching functions, Parity bit generator, Code-converters, Contact Networks, Hazards and hazard free realizations.

Applications: Design of a 16-bit Magnitude Comparator.

UNIT - IV

Sequential Circuits 1: Classification of sequential circuits (Synchronous, Asynchronous Pulse mode, and Level mode with examples). Basic flip-flops-Trigging and excitation tables. Conversions of flip flops.

UNIT - V

Sequential Circuits 2:

The sequential circuit model. Asynchronous counters, Design of simple synchronous sequential circuits such as counters. Design of modulo-N counter, Ring counter, twisted ring counter. Shift registers

Applications: Design of 1010 sequence detector

UNIT - VI

Programmable Logic Devices: Basic PLD's-ROM, PROM, PLA, and PLD Realization of Switching functions using PLDs .

Algorithmic State Machines:

State machines and state diagrams.

Applications: Design of a Weighing machine and Binary multiplier.

Text Books:

1. Morris Mano-,*Digital design* –PHI, 2nd Edition.
2. Zvi Kohavi -*Switching & Finite Automata theory* – TMH, 2nd Edition.

References:

1. Fletcher -*An Engineering Approach to Digital Design* – PHI.
2. Charles H. Roth,-*Fundamentals of Logic Design* –Thomson Publications, 5th Edition, 2004.
3. R.P.Jain-*Switching Theory and Logic Design*- TMH Edition,2003.
4. John M. Yarbrough -*Digital Logic Applications and Design* – Thomson Publications, 2006
5. CVS Rao -*Switching Theory and Logic Design* –Pearson Education, 2005

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II Year B. Tech. ECM - I Semester

L T P/D C
4 1 - 4

(4EC03) OBJECT ORIENTED PROGRAMMING THROUGH JAVA
(COMMON TO CSE, IT & ECM)

a	b	c	d	e	f	g	h	i	j	k	l
x	x					x		x			

UNIT I

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

Objective: On the completion of the unit, a student should be able to: i) Write ,compile and execute simple java programs ii) Understand the syntax of classes and objects creation in java iii) Explain the differences between classes and objects iv) differentiate methods and constructors v) Understand constructor and method overloading vi) Understand how to handle strings in java

UNIT II

Inheritance –Definition, single inheritance, benefits of inheritance, Member access rules, super class, polymorphism-method overriding, Dynamic method dispatch, using final with inheritance, abstract classes, Base class object.

Interfaces: definition, variables and methods in interfaces, differences between classes and interfaces, usage of implements and extends keyword, an application using interfaces, uses of interfaces.

Applications using interface

Applications using packages

Objective:

On the completion of the unit, a student should be able to: i) Explain the benefits of inheritance ii) Understand how to access members of super class from subclass iii) Differentiate static and dynamic polymorphism iv) Understand the usage of final keyword in inheritance v) Understand the use of abstract class vi) Understand how to implement multiple inheritance in java vii) Explain the difference between classes and interfaces viii) Create and import packages ix) Understand different streams

UNIT III

Packages: Definition, types of packages, Creating and importing a user defined package.

Introduction to I/O programming: DataInputStream, DataOutputStream, FileInputStream, FileOutputStream, BufferedReader.

Collections: interfaces, Implementation classes, and Algorithms (such as sorting and searching).

Objective:

On the completion of the unit, a student should be able to: i) Understand uses of packages and Collections ii) To study and implement various classes and interfaces of Java Collections Framework.

UNIT IV

Exception handling -exception definition, benefits of exception handling, exception hierarchy, usage of try, catch, throw, throws and finally, built in exceptions, creating own exception sub classes.

Multi-Threading:-Thread definition, types of multitasking, uses of multitasking, thread life cycle, creating threads using Thread class and Runnable interface, synchronizing threads, daemon thread.

Applications of multithreading.

Objective:

On the completion of the unit, a student should be able to: i) Understand benefits of exception handling ii) Handle built-in and user defined exceptions iii) Understand the uses of multi-threading iv) Create multi-threaded programs using either Thread class or Runnable interface v) Know how to synchronize threads

UNIT V

Advantages of GUI over CUI ,The AWT class hierarchy, Introduction to Swings, Swings Elements:- JComponent, JFrame, user interface components- JLabels, JButton, JScrollbar, text components, check box, check box groups, choices, lists panels – scrollpane, menubar, graphics, layout, managers –border, grid, flow, card and grid bag.

Event handling: Delegation event model, closing a Frame, mouse and keyboard events, Adapter classes.

Applications: developing calculator, developing feedback form, developing bio data.

Objective:

On the completion of the unit, a student should be able to: i) Understand the advantages of GUI over CUI ii) Write GUI programs iii) Able to handle events using delegation event model iv) Use Swings elements in programs

UNIT VI

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

Applications: Developing of simple advertisements.

Networking – Basics of network programming, addresses, ports, sockets, simple client server program, multiple clients, sending file from server to client.

Applications: One to one Chat application

Objective:

On the completion of the unit, a student should be able to: i) Write applet programs ii) Understand the concepts of networking iii) Understand socket programming iv) Write client-server applications

TEXT BOOKS:

1. Java; the complete reference, 6th edition, Herbert Schildt, TMH.
2. Introduction to Java programming 6th edition, Y. Daniel Liang, Pearson education.

REFERENCES:

1. Core Java 2, Vol 1, Fundamentals, Cay. S. Horstmann and Gary Cornell, seventh Edition, Pearson Education.
2. Core Java 2, Vol 2, Advanced Features, Cay. S. Horstmann and Gary Cornell, Seventh Edition, Pearson Education

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II Year B. Tech. ECM - I Semester

L T P/D C
3 1 - 3

(4DC01) DISCRETE STRUCTURES AND GRAPH THEORY
(Common to ECM & EEE)

a	b	c	d	e	f	g	h	i	j	k	l
x	x		x								

UNIT – I

Propositional Logic: Statement and notations, Connectives, Well formed Formulas, Truth Tables, Tautology, Equivalence, Implication, Arguments, Normal forms, Proof by contradiction, Conditional Proof

Objective: student will be able to understand statements, their truth value, constructing truth tables and will be able to prove them using different laws such as associative and commutative etc...

UNIT-II

First order logic: Predicates, Quantifiers, Free and Bound variables, Rules of inference, Consistency, Automatic Theorem Proving.

Objective: student will be able to use universal and existential quantifiers to describe predicates and effectively use automatic theorem proving

UNIT – III

Relations: Properties of Binary Relations, Equivalence, transitive closure, Compatibility & Partial Ordering Relations, Hasse Diagrams, lattices, Boolean algebra. Functions: Inverse function, composition of functions, Recursive functions, Lattice and its properties.

Algebraic structures: Algebraic systems, Examples and general properties, Semi groups and Monoids. Groups, Subgroups, Homomorphisms, Isomorphisms

Objective: student will be able to learn different relations and their properties. use of different algebraic structures and their use in mathematics.

UNIT –IV

Elementary Combinatorics:

Basics of counting, Combinations & Permutations with and without repetitions, Constrained repetitions. Binomial coefficients, Binomial, Multinomial theorems, Euler function, Derangements, Principle of inclusion and exclusion, Pigeon hole principle and its applications.

Objective: student will be able to apply permutations and combinations to solve problems. use of pigeonhole principle and inclusion exclusion principles to solve problems.

UNIT V

Recurrence relations: Generating functions. Function of sequences, Calculating the coefficient of generating functions. Recurrence relations, Solving recurrence relations by substitution and generating functions. Characteristic roots. Solution of Inhomogeneous recurrence relations.

Objective: student will learn to solve various recurrence relations by using different techniques.

Unit VI

Graph Theory: Basic concepts, Representation of Graph, DFS, BFS, Spanning trees, Planar graphs, coloring, Isomorphism and subgraphs, Multi graphs and Euler Circuits, Hamiltonian graphs, Chromatic numbers, connectivity, cut vertices, cut edges, Matching and coverings, independent sets.

Objective: student will learn the basics of graph theory, different ways of traversing the graph and different types of graphs and circuits which has important applications in further subjects.

TEXT BOOKS :

1. Elements of Discrete mathematics – A computer Oriented Approach- C L Liu, D P Mohapatra. Third Edition, Tata McGraw Hill.
2. Discrete Mathematics for Computer Scientists & Mathematicians, J.L. Mott, A. Kandel, T.P. Baker, PHI.
3. Discrete mathematics with applications to computer science, J.P.Tremblay and R.Manohar, TMH

REFERENCES :

1. Discrete and Combinational Mathematics- An Applied Introduction-5th Edition – Ralph. P.Grimaldi.Pearson Education
2. Discrete Mathematics and its Applications, Kenneth H. Rosen, Fifth Edition.TMH.
3. Discrete Mathematical structures Theory and application-Malik & Sen, Cengage.

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- - 2 1

(4D393) TECHNICAL PAPER WRITING AND SEMINAR - III

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing	: 05 marks
Final report	: 05 marks
Presentation before a departmental committee consisting of Head, a Senior Faculty and Supervisor	: 15 marks

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(4HC73) FUNCTIONAL AND COMMUNICATIVE WRITTEN ENGLISH

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		

Maximum Marks: 75
Internal – 25 / External - 50

UNIT 1: Speed Reading Strategies

- a. **Vocabulary skills:** Word recognition, guessing the meaning from the context, analysis of word structure (prefix – suffix)
- b. **Prediction Techniques:** Index, headings, sub-headings, nonverbal context and linguistic clues
- c. **Scanning skills:** Speed Reading, Regional practice
- d. **Skimming Skills** for identifying the central idea and recognizing the main ideas
- e. **Identifying** the writing pattern of the passage/text
- f. **Intensive reading:** Identifying difference between facts/opinions and drawing inferences and conclusions

UNIT 2: Group Discussions

- a. **Definitions:** Difference between a Group Discussion and Debate
- b. **Purpose of Group Discussion:** Problem Solving, Decision Making and Personality Assessment
- c. **Features / Characteristics** of successful Group Discussion: Agreement on Group Goals, Goal Oriented, Interactive Agreement for procedures, cooperative and friendly atmosphere
- d. **Evaluation method** in Group Discussion for selection: Subject knowledge, oral communication skills, leadership skills and team management
- e. **Group Discussion strategies:** Appropriate strategy for effective participation in Group Discussion, contributing systematically, creating a friendly and cooperative atmosphere, moving the discussion along, promoting optimal participation, handling conflict and effective closure
- f. **Techniques for Individual contribution:** Topic analysis, Discussing opinions, problems, case studies

UNIT 3: Nature of Technical Communication

- a. Definition of Communication
- b. Stages of Communication; Channels of Communication; Nature of Technical Communication
- c. Aspects of Technical Competence – *Subject, Linguistic, Organizational Competence*
- d. Features of Technical Competence – Audience, Objective Language, Format Style and Visual Aids
- e. Difference between General Communication and Technical Communication
- f. Need and Importance of Technical Communication; Types of Technical Communications
- g. Technical Communication Skills:
 - i. **Listening** - General, Academic and Professional
 - ii. **Speaking** - Asking and Answering Questions, Experiencing Opinion and Comments, Academic and Professional oral Interaction, Academic and Professional Discussions
 - iii. **Reading** – General, Academic, Professional
 - iv. **Writing** - General, Academic, Professional
- h. Barriers to Effective Communication: Improper encoding, Bypassing, Frame of Reference, Physical Distractions, Psychological and Emotional Interference and Intercultural differences

UNIT 4: Presentation Skills

- a. Nature and importance of Oral Presentation
- b. Planning the presentation
- c. Define the purpose
- d. Analysis the Audience and Occasion
- e. Choose a suitable Title/Topic.
- f. Preparing the Presentation: Develop the central idea, main ideas, supporting material, plan and prepare visual aids
- g. Presentation: Introduction, Body and Conclusion
- h. Rehearsing and Presentation: Vocal aspects, body language, Time management, Handling questions, meeting unexpected situations
- i. Handling Stage Fright
- j. DOs and DON'Ts of Presentations

UNIT 5: Writing Strategies

- a. Pre-writing; Writing; Re-writing
- b. Letter Writing - Formal and Informal Letter Writing; Inquiry Letters, Replies to Letters of urging action, Complaint, Bank and Insurance, Business and Industrial Sales, Correspondence, Social Correspondence
- c. E – Correspondence: Purpose, Structure, Layout and Form, Tone, Types,
- d. E-mails: Principles and Fundamentals
- e. E-mail Messages: Advantages of E-mail
- f. Characteristics of successful E-messages
- g. Formatting E-mail messages
- h. Standard E-mail practices
- i. E-mail writing strategies
- j. DOs and DON'Ts in E-Correspondence
- k. Nature and Significance of Report Writing
- l. Types of Reports: Informational and Analytical Reports, Routine and Special Reports, Oral and Written Reports, Formal and Informal Reports
- m. Formats of Reports: Printed, Letter, Memo, Manuscript
- n. Structure of Formal Reports
- o. Writing Strategies: Preparation steps to write a Report

Suggested Books:

1. *Technical communication- Meenakshi Raman and Sangeetha Sharma (Oxford Publications)*
2. *Effective Technical Communication – Ashraf Rizwi*
3. *Developing Communication Skills – Krishna Mohan and Meera Benarjee*
4. *SOFT SKILLS – Dr. K. Alex, S.Chand publications*
5. *Advanced Technical communication - Kavita Tyagi and Padma Mistri*

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(4CC71) ELECTRONIC DEVICES AND CIRCUITS LAB

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x				x			

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, Low power 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:

CRO Varieties and Operations:

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

Dual trace oscilloscope, digital storage oscilloscope, Lissajous method of frequency measurement, standard specifications of CRO, probes for CRO- Active & Passive, attenuator type, Frequency counter, Time and Period measurement.
7. Data sheets of p-n junction diode, zener diode, transistor, FET, UJT and SCR

PART B: (For Laboratory examination – Minimum of 13 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. CE Amplifier
9. CC Amplifier (Emitter Follower).
10. FET amplifier (Common Source)
11. RC Phase Shift Oscillator
12. Feed back amplifier (Voltage Series).
13. Hartley Oscillator

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(4EC74) OBJECT ORIENTED PROGRAMMING THROUGH JAVA LAB
(Common to CSE, IT, ECM, MECH)

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x		x	x		x			

Lab Objective:

- To make the student to learn an object oriented way of solving problems
- To teach the student to write programs in Java to solve the problems
- To introduce the student to GUI programming (AWT), Applets and Network Programming

1.

- A) Write a program to print prime numbers up to a given number.
- B) Write a program to print roots of a quadratic equation $ax^2+bx+c=0$.
- C) Write a program to print Fibonacci sequence up to a given number.

2.

- A) Define a class to represent a bank account and include the following members Instance variables:
 - (i)Name of depositor
 - (ii)Account No
 - (iii)Type of account
 - (iv)Balance amount in the account

Instance Methods:

To assign instance variables (Constructors-Zero argument and parameterized)

To deposit an amount

To withdraw amount after checking the balance

(iv) To display name and address

Define ExecuteAccount class in which define main method to test above class.

- B) In the above account class, maintain the total no. of account holders present in the bank and also define a method to display it. Change the main method appropriately.
- C) In main method of ExecuteAccount class, define an array to handle five accounts.
- D) In Account class constructor, demonstrate the use of "this" keyword.
- E) Modify the constructor to read data from keyboard.
- F) Overload the method deposit() method (one with argument and another without argument)
- G) In Account class, define set and get methods for each instance variable.

Example:

For account no variable, define the methods

getAccountNo() and setAccountNo(int accno)

In each and every method of Account class, reading data from and writing data to instance variables should be done through these variables.

3.

- A) Define Resister class in which we define the following members:

Instance variables:

resistance

Instance Methods:

giveData():To assign data to the resistance variable

displayData(): To display data in the resistance variable
constructors

Define subclasses for the Resistor class called SeriesCircuit and ParallelCircuit in which define methods : calculateSeriesResistance() and calculateParallelResistance() respectively.Both the methods should take two Resistor objects as arguments and return Resistor object as result.In main method , define another class called ResistorExecute to test the above class.

B) Modify the above two methods which should accept array of Resistor objects as argument and return Resistor object as result.

4.

- A) Write a program to demonstrate method overriding.
- B) Write a program to demonstrate the uses of “super” keyword (three uses)
- C) Write a program to demonstrate dynamic method dispatch (i.e .Dynamic polymorphism).

5)

- A) Write a program to check whether the given string is palindrome or not.
- B) Write a program for sorting a given list of names in ascending order.
- C) Write a program to count the no. of words in a given text.

6)

- A) Define an interface “GeomtricShape” with methods area() and perimeter() (Both method’s return type and parameter list should be void and empty respectively.

Define classes like Triangle, Rectangle and Circle implementing the “GeometricShape” interface and also define “ExecuteMain” class in which include main method to test the above class

- B) Define a package with name “sortapp” in which declare an interface “SortInterface” with method sort() whose return type and parameter list should be void and empty.Define “subsortapp” as subpackage of “sortapp” package in which define class “SortImpl” implementing “SortInterface” in which sort() method should print a message linear sort is used.

Define a package “searchingapp” in which declare an interface “SearchInterface” with search() method whose return type and parameter list should be void and empty respectively.

Define “searchingimpl” package in which define a “SearchImpl” class implementing “SearchInterface” defined in “searchingapp” package in which define a search() method which should print a message linear search is used.

Define a class ExecutePackage with main method using the above packages(classes and its methods).

Use ArrayList class of Collections Framework to and use algorithms to search and sort the elemnt of an array.

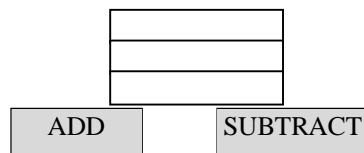
7) Modify the withdraw() method of Account class such that this method should throw “InsufficientFundException” if the account holder tries to withdraw an amount that leads to condition where current balance becomes less than minimum balance otherwise allow the account holder to withdraw and update the balance accordingly.

8)

- A) Define two threads such that one thread should print even numbers and another thread should print odd numbers.
- B) Modify the Account class to implement thread synchronization concept.
- C) Define two threads such that one thread should read a line of text from text file and another thread should write that line of text to another file. (Thread communication example).
- D) Write a program to implement thread priority.

9) Design the user screen as follows and handle the events appropriately.

Add Window
First Number
Second Number
Result



- 10) Write a program to simulate a calculator
- 11) Write a Java program for handling mouse events and key events.
- 12) a) Write a program for handling window events.
b) Develop an applet that displays a simple message..
- 13) Develop a client that sends data to the server and also develop a server that sends data to the client (two way communication)
- 14) Develop a client/server application in which client read a file name from keyboard and send the file name to the server, and server will read the file name from client and send the file contents to the client.

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(4FC04) DESIGN AND ANALYSIS OF ALGORITHMS

a	b	c	d	e	f	g	h	i	j	k	l
x	x							x	x		

UNIT I:

Introduction: Algorithm, Pseudo code for expressing algorithms, Performance Analysis-Space complexity, Time complexity, Asymptotic Notation- Big oh notation, Omega notation, Theta notation and Little oh notation, Probabilistic analysis, Amortized analysis.

Objectives:

At the end of this unit the student understands the importance of an algorithm, its complexity, and different measures to judge the efficiency of such algorithms.

UNIT II:

Divide and conquer: General method, applications-Binary search, Quick sort, Merge sort, Strassen's matrix multiplication.

Objectives:

At the end of this unit the student will understand the divide and conquer technique and will be able apply that technique to various problems in the real life applications.

UNIT III:

Greedy method: General method, applications-Job sequencing with dead lines, 0/1 knapsack problem, Minimum cost spanning trees, Single source shortest path problem.

Objectives:

At the end of this unit the student will understand the greedy method and will be able apply that technique to various problems in the real life applications.

UNIT IV:

Dynamic Programming: General method, applications-Matrix chain multiplication, Optimal binary search trees, 0/1 knapsack problem, All pairs shortest path problem, Travelling sales person problem, Reliability design.

Objectives:

At the end of this unit the student will understand the dynamic programming technique and will be able apply that technique to various problems in the real life applications.

UNIT V:

Backtracking: General method, applications-n-queen problem, sum of subsets problem, graph coloring, Hamiltonian cycles.

Branch and Bound: General method, applications - Travelling sales person problem, 0/1 knapsack problem- LC Branch and Bound solution, FIFO Branch and Bound solution.

Objectives:

At the end of this unit the student will understand the backtracking, branch and bound techniques and will be able apply that technique to various problems in the real life applications.

UNIT VI:

NP-Hard and NP-Complete problems: Basic concepts, non deterministic algorithms, NP-Hard and NP-Complete classes, Cook's theorem.

Objectives:

At the end of this unit the student will understand the classification of problems in view of polynomial time complexity in an abstract way.

TEXT BOOKS :

1. Fundamentals of Computer Algorithms, Ellis Horowitz, Satraj Sahni and Rajasekharam, Galgotia publications pvt. Ltd.
2. Algorithm Design: Foundations, Analysis and Internet examples, M.T. Goodrich and R. Tomassia, John Wiley and Sons.

REFERENCES :

1. Introduction to Algorithms, second edition, T.H. Cormen, C.E. Leiserson, R.L. Rivest, and C. Stein, PHI Pvt. Ltd./ Pearson Education
2. Introduction to Design and Analysis of Algorithms A strategic approach, R.C.T. Lee, S.S. Tseng, R.C. Chang and T. Tsai, Mc Graw Hill.
3. Data structures and Algorithm Analysis in C++, Allen Weiss, Second edition, Pearson education.
4. Design and Analysis of algorithms, Aho, Ullman and Hopcroft, Pearson education.
5. Algorithms – Richard Johnson baugh and Marcus Schaefer, Pearson Education

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(4CC05) PULSE & DIGITAL CIRCUITS

a	b	c	d	e	f	g	h	i	j	k	l
x	x			x				x			

After studying this course, the students will be able to

1. Understand the responses and applications of RC and RL circuits
2. Understand basic operations of clippers, Clampers and their applications
3. Understand and Design the switch using transistor
4. Understand different types multivibrators, their analysis, designing and applications
5. Understand different sweep generators and comparisons
6. Understand types of Logic gates and Sampling gates.

UNIT I

LINEAR WAVE SHAPING

RC high pass, low pass circuit response for sinusoidal, step, pulse, square, ramp & exponential inputs- Differentiator – Double differentiator – Integrator. RL, RLC circuits ,Ringing circuit.

UNIT II

NON LINEAR WAVE SHAPING

Diode clippers- Transistor clipper- clipping at two independent levels – Emitter coupled clipper- comparator- Diode differentiator comparator. Clamping operation – clamping with source, diode resistances- clamping circuits theorem- practical clamping circuits.

Applications: Design of 10V Voltage comparator.

UNIT III

STEADY STATE SWITCHING CHARACTERISTICS OF TRANSISTOR

The transistor as a switch – the transistor at cutoff- the transistor in saturation- Analytic expression for transistor characteristics-Analysis of cutoff & saturation regions transistor switching times. Design of transistor switch.

UNIT IV

MULTIVIBRATORS

Stable states of Bistable Multivibrator A fixed bias transistor Bistable Multivibrator -A self biased transistor Bistable Multivibrator - commutating capacitor – unsymmetric triggering of Bistable Multivibrator - triggering through a unilateral device- symmetrical triggering – Schmitt trigger circuit.

General operation of monostable multivibrator, collector coupled monostable multivibrator - wave forms of collector coupled monostable multivibrator - Emitter coupled monostable multivibrator - triggering of monostable multivibrator. Astable multivibrator, collector coupled Astable multivibrator -Emitter coupled Astable multivibrator. Designing of Bistable, Monostable and Astable Multivibrator.

Applications: Design of visitors counter using suitable multivibrator.

UNIT V

TIME BASE GENERATORS

General features of time base signals-sweep circuit using a transistor switch- General considerations & principles of miller & boot strap time base generators- the transistor miller time base- the transistor boot strap time base generator- A simple current sweep transistor current time base generator.

Applications: Design of time-base generator (50% Duty cycle) for CRO.

UNIT VI

SAMPLING GATES

Basic operating principle unidirectional, Bidirectional sampling gates using diodes, transistors- reduction of pedessed sampling scope.

LOGIC GATES

Digital operation of a system- the OR gate- the AND gate- the Not circuit or gate circuit- NAND & NOR gates (DTL Logic) – RTL Logic, TTL logic. Introduction to logic families, performance parameters and comparison. .

Text Books:

1. Pulse digital and switching wave forms-J. Millman and H. Taub, Tata McGraw-Hill, New Delhi,2001.
2. **Solid State Pulse circuits - David A. Bell, PHI, 4th Edn., 2002 .**

References:

1. Pulse and Digital Circuits – A. Anand Kumar, PHI, 2005.
2. Wave Generation and Shaping - L. Strauss.

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(4HC16) PROBABILITY AND STATISTICS
(Common to All Branches)

a	b	c	d	e	f	g	h	i	j	k	l
x											

UNIT-I

Probability:

Introduction, Sample Space and Events – Counting, Probability, The Axioms of probability, Addition theorem, Conditional, Multiplication theorem, Theorem of Total Probability, Baye’s Theorem.

UNIT-II

Probability Distributions:

Random variable – Discrete and Continuous, Distribution functions of probability- mass and density, Expectation, Probability distributions - Binomial, Poisson and Gaussian (Normal) distribution–Related properties.

UNIT-III

Sampling Distributions:

Populations and samples, Sampling distribution of the Mean (known) and The sampling distribution of the mean (unknown), proportions, sums and differences. Central limit theorem and its applications. Estimation-Point Estimation, Interval Estimation, Bayesian Estimation.

UNIT -IV

Inferences Concerning Means and Proportions:

Tests of Hypothesis, Type-I and Type-II Errors, Hypothesis testing concerning to One mean and two means of large and small size samples. Test of Hypothesis Concerning to Proportions.

UNIT-V

Test of significance: Student t-test, F-test, χ^2 test- Goodness of fit, Independence of Attributes.

UNIT-VI

Quality Control:

Control Charts for Measurements, Control Charts for Attributes, Tolerance Limits, Acceptance Sampling.

Text Books:

1. Probability and Statistics for Engineers: Miller and John E. Freund, PHI Publishers, 9th Edition.
2. Probability and Statistics, V.Srinivas and R.Umamaheshwar Rao, Paramount Publishing House.

REFERENCE BOOKS:

1. Fundamentals of Mathematical Statistics: Gupta and Kapoor – S. Chand and Co.
2. Engineering Mathematics, B. V. Ramana, Tata McGraw Hill Publishing Company Ltd.

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(4AC42) ELECTRICAL TECHNOLOGY
(Common to ECE & ECM)

a	b	c	d	e	f	g	h	i	j	k	l
x	x										

UNIT – I: D.C. GENERATORS:

Principle of operation, Constructional features, E.M.F equation, Types of D.C generators, build up of e.m.f, O.C. characteristics, Load characteristics of shunt, series and compound generators, simple problems.

UNIT –II: D.C. MOTORS:

D.C. Motors - Principle of operation, Back E.M.F, Torque equation, Characteristics and application of shunt, series and compound motors, Speed control of D.C. motors, Armature voltage and field flux control methods, Principle of 3 point starter, Losses, efficiency, Simple Problems.

UNIT-III: TRANSFORMERS:

Single Phase Transformers, types, constructional details, E.M.F equation, Operation on no load and on load, Phasor diagrams, Equivalent circuit, S.C. & O.C. tests - Losses and efficiency, Regulation. Introduction to three phase supply, phase sequence, star and delta connected loads, three phase transformer (star – delta, delta – star transformers).

UNIT-IV: THREE PHASE INDUCTION MOTORS:

Construction details of cage and wound rotor machines, Production of a rotating magnetic field, Principle of operation, rotor E.M.F, rotor frequency, rotor reactance, rotor current and pf at standstill and running operation, Torque derivation for standstill and running conditions, Slip – torque characteristics.

UNIT-V: SYNCHRONOUS MACHINES:

Constructional Features of round rotor and salient pole machines. E.M.F Equation, Synchronous reactance and impedance, S.C. & O.C. tests and regulation by synchronous impedance method - Principle of operation of Synchronous motor.

UNIT – VI: SINGLE PHASE MOTORS:

Single phase induction motor, Constructional features, Double revolving field theory, Split phase motor, Shaded pole motor, Principle of operation of A.C. series motor, Universal motor, Stepper motor and Tacho.

TEXT BOOKS:

1. Electrical Machines – S.K.Battacharya, Tata McGraw – Hill Publishers, 2nd edition.
2. Electric Machines – I.J. Nagrath & D.P. Kothari, Tata McGraw – Hill Publishers, 3rd edition, 2004.

REFERENCE BOOKS:

1. Principles of Electrical Engineering – V.K.Mehta, S.Chand publications, 2nd edition.
2. Electrical Technology – Edward Huges, Pearson publishers, 8th edition.

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(4CC04) SIGNALS AND SYSTEMS

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x		x							

After studying this course, the students will be able to

1. Understand the concepts of Signals, Classification of Signals, Signal Approximation and Orthogonal Functions.
2. Understand the concepts of Fourier series. Properties of Fourier series, Fourier Transforms and Properties of Fourier Transforms.
3. Understand the concepts of Systems, Classification of Systems, Filter Characteristics of Linear Systems, Ideal LPF, HPF and BPF Characteristics and Relationship between Bandwidth and Rise Time.
4. Understand the Concept of Convolution in Time Domain and Frequency Domain, Convolution Properties., Cross Correlation and Auto Correlation of Functions, Laplace Transforms, inverse Laplace Transforms and Region of Convergence (ROC) for Laplace Transforms.
5. Understand the concept of Sampling Theorem, Aliasing and Effect of Under Sampling.
6. Understand the Concept of Z- Transform of a Discrete Sequence, Distinction Between Laplace, Fourier and Z Transforms and Region of Convergence in Z-Transform

UNIT I

SIGNALS

Signals. Classification of Signals. Periodic. Non-periodic. Energy and Power Signals. Exponential and Sinusoidal Signals. Concepts of Impulse Function. Unit Step Function. Signum Function.

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.

UNIT-II

FOURIER REPRESENTATION OF CONTINUOUS TIME SIGNALS

PERIODIC SIGNALS - Fourier Series. Properties of Fourier Series. Dirichlet's Conditions. Trigonometric. Exponential & Compact (Cosine) Fourier Series. Fourier Spectrum.

NON- PERIODIC SIGNALS - Fourier Transforms. Deriving Fourier Transform from Fourier Series. Fourier Transform of Arbitrary Signal. Standard Signals. Fourier Transform of Periodic Signals. Properties of Fourier Transforms. Fourier Transforms Involving Impulse and Signum Functions. Introduction to Hilbert Transform.

Applications: Implementation of Signum function in Matlab.

UNIT-III

SIGNAL TRANSMISSION THROUGH LINEAR SYSTEMS

Systems. Classification of Systems. Linear System. Impulse Response (IR) 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-IV

CONVOLUTION AND CORRELATION OF SIGNALS

Concept of Convolution in Time Domain and Frequency Domain. Graphical Representation of Convolution. Convolution Properties. 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.

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 LT. Relation between LT and FT of a Signal. Laplace Transform of Certain Signals using Waveform Synthesis. Laplace Transform of a Periodic Signals.

Applications: *Pole-zero calculation of 1 KHz butterworth filter.*

UNIT-V

SAMPLING

Sampling Theorem. Graphical and Analytical Proof for Band Limited Signals. Impulse(Ideal) Sampling. Natural(Chopped) Sampling and Flat Top(S&H) Sampling. Reconstruction of Signal from its Samples. Effect of Under Sampling . Aliasing. Introduction to Band Pass Sampling.

Applications: *Design of a 8 KHz audio sampler*

UNIT-VI

Z-TRANSFORMS

Fundamental Difference Between Continuous and Discrete Time Signals. Discrete Time Signal Representation using Complex Exponential and Sinusoidal Components. Periodicity of Discrete Time using Complex 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. Introduction to Discrete Time Systems.

Applications: *DT Systems Analysis and Synthesis.*

Text Books

1. Linear Systems and Signal Processing – B.P Lathi Oxford Publications.
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.

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3 1 - 3

(4FC03) DATA BASE MANAGEMENT SYSTEMS

a	b	c	d	e	f	g	h	i	j	k	l
x	x		x								

UNIT I :Data Base Systems:

Data Vs Information, Data base System Applications, data base System VS file System – View of Data – Data Abstraction –Instances and Schemas – data Models – the ER Model – Relational Model – Other Models – Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor, History of Data base Systems.

Data base design and ER diagrams – Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model –Data Modeling checklist.

Application- ER diagram for a tiny college

UNIT II:

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

Application-Student database design.

UNIT III:

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers, Embedded SQL.

Application-working with Aviation company database.

UNIT IV:

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

Application-Faculty Evaluation Report.

UNIT V :

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity, Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems,

Application-Production Management System.

UNIT VI :

Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure, Query Optimization techniques.
Application – Creating B+ tree on Instructor File.

. TEXT BOOKS :

1. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill 3rd Edition
3. Database Management Systems, Peter Rob, A.Ananda Rao,Carlos Coronel ,CENGAGE Learning

REFERENCES :

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education

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(4HC74) EFFECTIVE ENGLISH COMMUNICATION AND SOFT SKILLS

Maximum Marks: 75
Internal – 25 / External - 50

UNIT 1: The Art Of Communication

Introduction: Analytical Communication for leaders

1. Non-verbal Communication
 - a. Body Language
 - b. Listening
 - c. Writing
2. Oral Communication (Speaking)

8 detrimental facts to Communication:

1. At peace with self
2. Awareness
3. Transparency (Being yourself)
4. Helping Hand
5. Realistic Response (Unemotional)
6. Resolving Misunderstandings
7. Overcoming Fear
8. Blamelessness

UNIT 2: Soft Skills

1. What are Soft Skills?
2. Importance of Soft Skills
3. Attributes regarded as Soft Skills
4. Social Skills
5. Exhibiting; Identifying and Improving your Soft Skills
6. Top 60 soft skills
7. Practicing soft skills

Attitude: “ATTITUDE IS EVERYTHING!”

1. Meaning; Features of attitudes
2. Attitude and Behavior
3. Formation of attitudes
4. Change of Attitudes: How to change Attitude for the betterment?
5. Attitude in a workplace
6. The power of positive attitude - Developing positive attitude
7. Positive attitude and its benefits; Negative attitude and its results
8. Examples of negative attitudes
9. Overcoming negative attitude

Exercise 1: Measure your soft skills

Exercise 2: Measure your attitude

UNIT 3: Time Management; Goal Setting; Team Dynamics

Time management

Introduction:

1. The 80:20 rule
2. Take a good look at the people around you
3. Examine your work
4. Sense of time management
5. Features of time; Three secrets of time management
6. Time management matrix: Analysis of time matrix; Effective scheduling; Grouping of activities
7. Five steps to successful time management
8. Difficulties in time management: Evils of not planning; Overcoming procrastination
9. Time management tips for students
10. Interesting facts about time
11. Ideal way of spending a day
12. Time wasters – Time savers

Goal Setting

Introduction:

1. The purpose of goal setting
2. Types of Goals
3. How to set goals
4. Qualities of effective goals: Steps toward setting effective goals
5. How to achieve goals-Reasons for not meeting the goals.

Team Dynamics

Introduction:

1. Meaning
2. Aspects of team building: Skills needed for teamwork
3. A model of team building: Team Vs Group
4. Characteristics of an effective team: Role of a team leader and team members
5. Inter-Group collaboration: Advantages of inter-group collaboration; Difficulties faced in inter-group collaboration; Factors shaping inter-group collaboration.

Exercise 1: Test your time management skills

Exercise 2: Test your goal setting

Exercise 3: Test your teamwork skills

UNIT 4: Etiquettes and Manners

Etiquette: Introduction:

1. Modern etiquette
2. Benefits of etiquette
3. Classification of etiquette
4. Accompanying women
5. Taboo topics
6. Proposing the toast.

Manners: Introduction:

1. Why should you practice good manners?
2. Poor manners noticed in youth
3. Practicing good manners
4. Manners at the wheel : Driving and Manners in the flight
5. Respecting the sacred : Visiting holy places, Dealing with the challenged, Attending funeral
6. Professional manners: Social skills (manners), Getting along with people, Manners to get respect from others
7. Annoying office habits.

Exercise 1: Test your etiquette

Exercise 2: Test your manners

UNIT 5: Résumé writing and Interview skills

Résumé: Introduction:

1. Types of Résumé
2. Difference among Bio-data, Curriculum Vitaé and Résumé
3. The terms: The purpose of Curriculum Vitaé writing
4. Types of Résumés
5. Tips to write Résumé: Curriculum Vitaé / Résumé preparation
6. The DOs and the DON'Ts of Résumé preparation
7. Resume check up
8. Design of a Curriculum Vitaé: Entry level Résumé, Content of the Résumé
9. References, Power words
10. Key skills that can be mentioned in the Résumé
11. Cover letter: Cover letter tips

Interview skills: Introduction:

1. Why an Interview?
2. Types of interviews (*Face to Face / Panel Interviews*, etc.)
3. Types of questions asked
4. Reasons for selecting a candidate / Reasons for rejecting a candidate
5. On the day of interview
6. Attending job fair
7. Common mistakes
8. What not to ask during an Interview
9. Dress code at an interview
10. FAQs
11. Quick / Basic Interview and job search related tips

Exercise 1: Write a resume

Exercise 2: Conduct Mock Interviews

Books recommended:

1. *Soft Skills - Dr.K.Alex, published by S.Chand*
2. *Technical communication- Meenakshi Raman and Sangeetha Sharma (Oxford Publications)*
3. *Effective Technical Communication – Ashraf Rizwi*

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(4CC73) PULSE & DIGITAL CIRCUITS LAB

a	b	c	d	e	f	g	h	i	j	k	l
x	x			x				x			

1. Linear wave shaping.
2. Non Linear wave shaping – Clippers.
3. Non Linear wave shaping – Clampers.
4. Transistor as a switch for resistive and capacitive..
5. Transistor as a clipper and clamper.
6. Study of Logic Gates with discrete components .
7. Sampling Gates.
8. Astable Multivibrator.
9. Monostable Multivibrator.
10. Bistable Multivibrator.
11. Schmitt Trigger.
12. UJT Relaxation Oscillator.
13. Bootstrap sweep circuit.

Equipment required for Laboratories:

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

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(4AC94) ELECTRICAL TECHNOLOGY LAB
(Common to ECE & ECM)

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x									

From the following experiments any six to be conducted:

1. Verification of superposition and Thevenin's theorems.
2. Verification of maximum power transfer theorem.
3. OC & SC tests on Single – Phase transformer (Predetermination of efficiency and regulation at given power factors).
4. Brake test on 3-phase induction motor (performance characteristics).
5. Speed control of DC shunt motor by
 - a) Armature Voltage Control
 - b) Field flux control method
6. Brake test on DC shunt motor
7. Swinburn's test on DC shunt machine
8. Regulation of alternator by Synchronous impedance method.

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(4FC74) DATABASE MANAGEMENT SYSTEMS LAB

a	b	c	d	e	f	g	h	i	j	k	l
	x	x	x						x		

1. Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.
2. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints.
Example: - Select the roll number and name of the student who secured fourth rank in theclass.
3. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.
4. Queries using Conversion functions (to_char, to_number and to_date), string functions (Concatenation, lpad, rpad, ltrim, rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next_day, add_months, last_day, months_between, least, greatest, trunc, round, to_char, to_date)
5. i)Creation of simple PL/SQL program which includes declaration section, executable section and exception – Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)
ii)Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.
6. Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.
7. Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.
8. Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.
9. Program development using creation of stored functions, invoke functions in SQL Statement and write complex functions.
10. Program development using creation of package specification, package bodies, private objects, package variables and cursors and calling stored packages.
11. Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.
12. Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

TEXT BOOKS :

1. ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3 Edition
2. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc- Graw Hill.
3. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.

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(4D494) TECHNICAL PAPER WRITING AND SEMINAR - IV

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing	: 05 marks
Final report	: 05 marks
Presentation before a departmental committee consisting of Head, a Senior Faculty and Supervisor	: 15 marks

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(4D484) COMPREHENSIVE VIVA VOCE - I

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students are assessed in the courses they have undergone till the completion of that academic year.
- They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

There shall be a Comprehensive Viva-Voce in II year II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of an external examiner, Head of the Department and two Senior Faculty members of the Department.

The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech course of study up to II Year. The Comprehensive Viva-Voce is valued for 50 marks by the Committee.

There are no internal marks for the Comprehensive Viva-Voce.

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(4ZC03) BANKING OPERATIONS, INSURANCE AND RISK MANAGEMENT
(OPEN ELECTIVE – I)

a	b	c	d	e	f	g	h	i	j	k	l	m
					x			x		x	x	

Course Objectives: The objective of the course is to provide to students an understanding of Banking Operations, Insurance Market, and Risk Management Principles and techniques to control the risk & the major Institutions involved and the Services offered within this framework.

Course Outcomes:

- 1) Describe the new dimensions and products served by the banking system in INDIA.
- 2) Explain the credit control system and create awareness on NPA's
- 3) Apply the knowledge of Insurance concepts in real life scenarios
- 4) Recognize the importance of regulatory and legal frame work of IRDA
- 5) Identify the risk management process and methods.
- 6) Calculate the diversity of risk and return

UNIT I

INTRODUCTION TO BANKING BUSINESS: Introduction to Banking sectors-History of banking business in India, Structure of Indian banking system: Types of accounts, advances and deposits in a bank New Dimensions and products- E-Banking, Mobile-Banking, Net Banking, CRM, cheque system and KYC system.

UNIT II

BANKING REFORMS AND REGULATIONS: Banking regulation Act-1949, Reserve Bank of India Act-1934, Establishment of RBI, Functions and credit control system; Role of commercial banks and its functions. Banking sector reforms in India and deficiencies in Indian banking including problems accounts and Non-Performing Assets.

UNIT III

INTRODUCTION TO INSURANCE: Introduction to insurance, Need and importance of Insurance, principles of Insurance, characteristics of insurance contract, branches of insurance and types of insurance; life insurance and its products: Role of Agents and brokers.

UNIT IV:

INSURANCE BUSINESS ENVIRONMENT: Regulatory and legal frame work governing the insurance sector, history of IRDA and its functions: Business and economics of insurance, need for changing mindset and latest trends.

UNIT V

INTRODUCTION TO RISK MANAGEMENT: Introduction to Risk, meaning and types of risk in business and individual, Risk management process, methods: Risk identification and measurement, Risk management techniques; Non insurance methods

UNIT VI

FINANCIAL RISK MANAGEMENT: Introduction to Financial markets. Financial risk management techniques – Derivatives, Hedging and Portfolio management techniques: Derivatives and types of Derivatives-Futures, options and swaps: Shares, Commodity and Currency trading in India.

Books Recommended:

1. Varshney, P.N., Banking Law and Practice, Sultan Chand & Sons, New Delhi.
2. General Principles of Insurance Harding and Evariantly
3. Mark S. Dorfman: Risk Management and Insurance, Pearson, 2009.
4. Reddy K S and Rao R N: Banking and Insurance, Paramount publishers, 2013

References:

1. Scott E. Harringam Gregory R. Nichanus: Risk Management & Insurance, TMH, 2009.
2. Geroge E. Rejda: Principles of risk Management & Insurance, 9/e, pearson Education. 2009.
3. G. Koteswar: Risk Management Insurance and Derivatives, Himalaya, 2008.
4. Gulati: Principles of Insurance Management, Excel, 2009.
5. James S Trieschmann, Robert E. Hoyt & David N. Sommer: Risk Mgt. & Insurance, Cengage, 09
6. Dorfman: Introduction to Risk Management and Insurance, 8/e, Pearson, 2009.
7. P.K. Gupta: Insurance and Risk Management, Himalaya, 2009.
8. Vivek & P.N. Asthana: Financial Risk Management, Himalaya, 2009.
9. Jyotsna Sethi & Nishwan Bhatia : Elements of Banking and Insurance, 2/e,PHI, 2012.

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(4CC09) LINEAR AND DIGITAL IC APPLICATIONS
(Common to ECE/ECM/ EEE)

Prerequisites: EDC, ECA, STLD, PDC

Course Objectives:

The objectives of this course are

- To maintain the right blend of theory and practice in analyzing and designing a wide variety of applications using IC 741 op-amps.
- To acquaint the learners with a wide variety of Digital ICs families, and their applications in various digital circuits and systems.

Course Outcomes: After studying this course, the students will be able to

CO1	Demonstrate the concepts of Differential Amplifier and Operational Amplifier and their characteristics.
CO2	Design the basic circuits using Operational Amplifiers.
CO3	Explore, design and analyze Filters, Timers, Voltage Controlled Oscillator and Phase Locked Loop.
CO4	Demonstrate the design and analyze Oscillators, D/A Converters and A/D Converters.
CO5	Classify and characterize the various Logic Families.
CO6	Explore the combinational and sequential logic ICs in design of various digital systems.

Mapping of Course Outcomes with Program Outcomes

	a (PO1)	b (PO2)	c (PO3)	d (PO4)	e (PO5)	f (PO6)	g (PO7)	h (PO8)	I (PO9)	j (PO10)	k (PO10)	l (PO12)	m (PO13)
CO1	3		2										
CO2		2	3										
CO3		2	3						2				
CO4		2	3						2				
CO5					2								
CO6			3		3				2				2
Overall	X	x	x		x				x				x

Syllabus Content

Unit-I: OPAMP & ITS CHARACTERISTICS

Differential Amplifiers and its Characteristics. Op-Amp Block Diagram, Ideal OP-AMP Characteristics, DC and AC Characteristics. 741 Op-Amp and its Features and Characteristics. Parameters Measurement: Offset Voltage and Current, Slew Rate and CMRR. Frequency Compensation.

Unit-II: BASIC APPLICATIONS OF OP-AMPS

Adder/Subtractor, Difference Amplifier, Instrumentation Amplifier, Differentiator, Integrator, V/I & I/V Converters, Comparators, Multivibrators, Square and Triangular Waveform Generators, Clippers, Clampers, Peak Detector, S/H circuit.

Unit-III: FILTERS, TIMERS & PLLs

Filters: Introduction, Butterworth Filters- First and Second Order Active Filters- LPF, HPF, BPF, BRF. Introduction to 555 Timer, Functional Block, 555 timers as Monostable and Astable Multivibrators and Applications, Schmitt Trigger. Voltage Controlled Oscillator (IC 566), Phase Locked Loop.

Applications: Design of visitors counter using 555 timer.

Unit-IV: OSCILLATORS, D/A AND A/D CONVERTERS

Oscillators: Introduction, Design and Analysis of Wein Bridge, RC Phase shift Oscillators using op-amp.

D/A Converters: Introduction, Characteristic Parameters, R-2R Ladder, Weighted Resistor, Inverter R-2R type D/A Converter, IC 1408 DAC. A/D Converters: Introduction, Characteristic Parameters, Counter Type, Dual Slope, Successive Approximation and Flash types A/D Converters.

Unit-V: LOGIC FAMILIES

Classification of IC Logic Families. Standard TTL NAND & NOR Gate-Analysis & Characteristics, TTL Open Collector Outputs. Tristate TTL. MOS & CMOS Logic, Open Drain and Tristate Outputs. ECL. Comparison of Various Logic Families. IC interfacing, TTL driving CMOS & CMOS driving TTL.

Course Outcomes: The students learnt and explored the knowledge of classifying and characterizing the logic circuits of various Logic Families.

UNIT VI: TTL-74XX Series ICs: COMBINATIONAL AND SEQUENTIAL CIRCUITS

Decoders. Priority Encoders, Multiplexers, Arithmetic Circuit ICs-Parallel Binary Adder. Flip-flops- D flip-flop, JK flip-flop, T flip-flop and Master-slave JK flip-flop. Synchronous and Asynchronous Counters. Decade counters. Universal Shift Register.

Applications: Design of Digital clock

Text Books -

1. D. Roy Chowdhary, *Linear Integrated Circuits*, New Age Publications (P) Ltd, 2nd Edition, 2003
2. Ramakanth A. Gayakwad, *Op-Amps & Linear ICs*, PHI, 1987.
3. John F. Wakerly, *Digital Design Principles & Practices*, PHI/ Pearson Education Asia, 3rd Ed., 2005.

References -

1. Sergio Franco, *Design with Operational Amplifiers & Analog Integrated Circuits*, McGraw Hill, 1988.
2. R.F.Coughlin & Fredrick Driscoll, *Operational Amplifiers & Linear Integrated Circuits*, PHI, 6th Edition.
3. K. Lal Kishore, *Linear Integrated Circuit Application*, Pearson Educations, 2005.
4. Millman, *Micro Electronics*, McGraw Hill, 1988.
5. C.G. Clayton, *Operational Amplifiers*, Butterworth & Company Publ. Ltd. Elsevier, 1971.

III Year B. Tech. ECM - I Sem

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(4DC11) COMPUTER ORGANIZATION AND ARCHITECTURE**Course Objectives:** Students will learn about

1. Various basic computer architectures, data representations and instruction sets.
2. Arithmetic unit, control unit and efficient computation using pipelining
3. Memory organization and optimization
4. I/O Communications and interfaces

Course Outcomes: After completing this course, student should be able to

1. Use data types with instruction set of specific architecture.
2. Analyze performance aspects with control unit along with pipelining
3. Evaluate memory access in terms of latency.
4. Utilize communication protocols for interfacing

Mapping of Course Outcomes with Program Outcomes

	a (PO1)	b (PO2)	c (PO3)	d (PO4)	e (PO5)	f (PO6)	g (PO7)	h (PO8)	i (PO9)	j (PO10)	k (PO10)	l (PO12)	m (PO13)
CO1	3	3	2		2								
CO2	3	3	3		3		2						
CO3	2	3	3		3		2						
CO4	2	3	3		2								
Overall	x	x	x		x		x						

UNIT – I

Computing and Computers: Nature of Computing – Elements of Computers, Limitations of Computers, **Evolution of Computers** – Mechanical Era, Electronic Computers, Later generations, **VLSI Era** – Integrated Circuits, Processor Architecture, System Architecture

UNIT – II Processor Basics: CPU Organization – Fundamentals, additional features, **Data Representation** – basic formats, fixed point numbers, floating point numbers, Instruction formats, Addressing modes, **Instruction Sets** – Instruction formats, Instruction types, Programming considerations

UNIT – III Data path Design: Execution of a Complete Instruction, Fixed-Point Arithmetic – Addition and Subtraction, Multiplication, Division Algorithms and Hardware, **Arithmetic-Logical Units** – Combinational ALUs, Sequential ALUs, **Floating point arithmetic**

UNIT – IV Control Design – Hardwired control, Design examples, **Micro programmed Control** – basic concepts, Multiplier Control Unit, CPU Control unit

Instruction level parallelism (ILP), Pipeline Control – Instruction Pipelines, RISC Pipeline, Hazards, Pipeline performance, Superscalar Processing

UNIT – V Memory Organization: Memory Technology – Memory device characteristics, **RAMs** – Organization, Memory types, Semiconductor RAMs, RAM Design, **Serial Access Memories** – Memory Organization and Memory types, **Memory Systems** – Multilevel memories, Address translation, Memory allocation – Replacement Policies, **Caches** – Main features, Address mapping, Structure versus performance

UNIT – VI System Organization: Communication Methods – Basic concepts, Bus control, **IO and System Control** – Serial Communication, Introduction to PCI, Introduction to USB, IEEE 1394, Programmed IO, DMA and Interrupts, IO processors, Operating Systems, **Parallel Processing** – Processor level Parallelism, Multiprocessors

TEXT BOOKS:

1. “Computer Architecture and Organization”, John. P. Hayes, 3rd Edition, TMH Publications
2. “Computer Organization” – Carl Hamacher, Zvonks Vranesic, SafeaZaky, 5th Edition, McGraw Hill
3. “Computer Systems Architecture” – M. Moris Mano, 3rd Edition, Pearson/PHI
4. “Computer Organization and Architecture” – William Stallings Sixth Edition, Pearson/PHI.

REFERENCES:

1. Computer Architecture - a quantitative approach – Henessey, Patterson, Fourth Edition, Elsevier.
2. Computer Architecture: Fundamentals and principles of Computer Design, Joseph D. Dumas II, BS Publication.

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III Year B. Tech. ECM - I Sem

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(4F520) MULTIMEDIA AND APPLICATION DEVELOPMENT
(PROFESSIONAL ELECTIVE – II)

a	b	c	d	e	f	g	h	i	j	k	l	

UNIT-I

Fundamental concepts in Text and Image: Multimedia and hypermedia, world wide web, overview of multimedia software tools. Graphics and image data representation graphics/image data types, file formats, Color in image and video: color science, color models in images, color models in video.

UNIT-II

Fundamental concepts in video and digital audio: Types of video signals, analog video, digital video, digitization of sound, MIDI, quantization and transmission of audio.

UNIT-III

Multimedia data compression: Lossless compression algorithm: Run-Length Coding, Variable Length Coding, Dictionary Based Coding, Arithmetic Coding, Lossless Image Compression, Lossy compression algorithm: Quantization, Transform Coding, Wavelet-Based Coding, Embedded Zerotree of Wavelet Coefficients Set Partitioning in Hierarchical Trees (SPIHT).

UNIT-IV

Action Script I: ActionScript Features, Object-Oriented ActionScript, Datatypes and Type Checking, Classes, Authoring an ActionScript Class

UNIT-V

Action Script II: Inheritance, Authoring an ActionScript 2.0 Subclass, Interfaces, Packages, Exceptions

UNIT VI

Application Development: An OOP Application Frame work, Using Components with ActionScript MovieClip Subclasses.

TEXT BOOKS:

1. Fundamentals of Multimedia by Ze-Nian Li and Mark S. Drew PHI/Pearson Education.
2. Essentials ActionScript 2.0, Colin Moock, SPD O,REILLY.

REFERENCE BOOKS:

1. Digital Multimedia, Nigel chapman and jenny chapman, Wiley-Dreamtech
2. Macromedia Flash MX Professional 2004 Unleashed, Pearson.
3. Multimedia and communications Technology, Steve Heath, Elsevier (Focal Press).
4. Multimedia Applications, Steinmetz, Nahrstedt, Springer.
5. Multimedia Basics by Weixel Thomson.
6. Multimedia Technology and Applications, David Hilman , Galgotia.

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L	T	P/D	C
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(4ZC01) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS

a	b	c	d	e	f	g	h	i	j	k	l	m
					x			x		x	X	

Course Objective: To make the students understand the concepts and principles of Business Economics at micro level and basic principles of Financial Accounting and Analysis, which facilitate them in making better planning and decisions.

Course Outcomes

1. Recall basics of Economics at micro level
2. Review production patterns and various types of costs involved in business
3. Examine different types of markets and pricing strategies
4. Explain basic concepts of financial accounting
5. Evaluating feasibility of long-term investment proposals
6. Analyzing financial statements for a better understanding financial position of an entity

UNIT I

INTRODUCTION TO MANAGERIAL ECONOMICS: Definition, Nature and Scope of Business Economics– Demand Analysis: Demand Determinants, Law of Demand and its exceptions, Elasticity of Demand and Demand Forecasting.

UNIT II

THEORY OF PRODUCTION AND COST ANALYSIS: Production Function – Isoquants and Isocosts, Internal and External Economies of Scale, Laws of Returns. Cost Analysis: Cost concepts, different types of costs, cost control and cost efficiency, Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems).

UNIT III

INTRODUCTION TO MARKETS: Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Pricing strategies, transfer pricing and performance measurement, Price-Output Determination in case of Perfect Competition and Monopoly

UNIT IV

FUNDAMENTALS OF FINANCIAL ACCOUNTING: Concepts and conventions, principles of Double-Entry, Book Keeping, Journal, Ledger, Trial Balance, Final Accounts - Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments.

UNIT V

CAPITAL BUDGETING TECHNIQUES: Nature and scope of Capital Budgeting, Methods of Capital Budgeting: Traditional methods and Discounting Cash Flow methods.

UNIT VI

RATIO ANALYSIS: Introduction to Ratio analysis – Leverage ratios – Liquidity ratios – Turnover ratios – Profitability ratios, Du-pont chart. (Simple problems)

Books Recommended:

1. Aryasri: Managerial Economics and Financial Analysis, 2/e, TMH, 2005.

References:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, PHI, 4th Ed.
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystel, Economics, Oxford University Press.

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3 1 - 3

(4D516) SIGNALS AND MODULATION THEORY

a	b	c	d	e	f	g	h	i	j	k	l	m
x	x	x	x	x								x

Course Objectives: In this course the student will learn about

1. Familiarize various signals and their processing through linear systems.
2. Applications of Fourier series and Fourier transform.
3. Controlling parameters like amplitude, frequency and phase in analog modulations.
4. Sampling and Quantization techniques

Course Outcomes: After completing this course, student should be able to

1. Represent linear systems and find response.
2. Use Fourier series and Fourier transform to analyze signals appropriately.
3. Understand various analog modulation schemes
4. Analyze usage of sampling and quantization in pulse and digital modulation schemes

Mapping of Course Outcomes with Program Outcomes

	a (PO1)	b (PO2)	c (PO3)	d (PO4)	e (PO5)	f (PO6)	g (PO7)	h (PO8)	i (PO9)	j (PO10)	k (PO10)	l (PO12)	m (PO13)
CO1	3	2	2	2	2								2
CO2	3	3	2	2	2								2
CO3	2	2	3	2	3								2
CO4	2	3	3	2	3								2
Overall	x	x	x	x	x								x

UNIT-I

Fourier series and Fourier Transform of signals: Basic signals, Exponential and Sinusoidal signals, Concepts of Impulse function, Unit Step function, Signum function, Representation of Fourier series, Dirichlet's conditions, Deriving Fourier Transform from Fourier Series, Fourier Transform of arbitrary signal, Fourier Transform of standard signals, Fourier Transform of Periodic Signals, Properties of Fourier Transform, Fourier Transforms involving Impulse function and Signum function.

UNIT –II

Linear Systems:

Linear System, Impulse response, Response of a Linear System, Linear Time Invariant (LTI) System, Transfer function of a LTI system, concept of convolution in Time domain and Frequency domain, Cross correlation and Auto Correlation of functions, 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.

UNIT –III

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

UNIT –IV

Angle modulation: Frequency & Phase Modulations, advantages of FM over AM, Bandwidth consideration, Narrow band and wideband FM, Comparison of FM & PM.

UNIT –V

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

UNIT –VI

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

TEXT BOOKS:

1. Signals, Systems & Communications – B.P. Lathi, 2009, BSP
2. Communication Systems Analog and Digital – R.P.Singh, SD Sapre, TMH, 20th reprint, 2004.
3. Principle of Communications – Taub & Schilling, TMH,2003.

REFERENCES:

1. Signals and Systems – A.V. Oppenheim, A.S. Willsky and S.H. Nawab, 2ed., PHI
2. Signals & Systems – Simon Haykin and Van Veen, Wiley, 2 ed
3. Electronic Communication Systems – Kennedy & Davis, TMH, 4th edition, 2004.
4. Communication Systems Engineering – John G.Proakins, Masoud and Salehi, 2nd edition, PHI/Pearson

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(4HC76) QUANTITATIVE APTITUDE
(Common to All Branches)

a	b	c	d	e	f	g	h	i	j	k	l
x	x			x							x

Unit I

Number System: Test for Divisibility, Test of prime number, Division and Remainder – HCF and LCM of Numbers - Fractions.

Unit II

Average: Average of different groups, Replacement of some of the items - Percentage - Profit and Loss.

Unit III

Ratio and Proportion: Properties of Ratio, Comparison of Ratios, Useful Simple Results on Proportion – Partnership and Share.

Unit IV

Simple Interest: Effect of change of P, R and T on Simple Interest - Compound Interest: Conversion Period, Difference between Compound Interest and Simple Interest.

Unit V

Time and Work- Pipes and Cisterns, Time and Distance- Problems on Trains- Boats and Streams, Allegation or Mixtures.

Unit VI

Mensuration: Area of Plane Figures, Volume and Surface Area of Solid Figures.
Data Interpretation: Tabulation, Bar Graphs, Pie Charts, Line Graphs.

Text Books:

1. Quantitative Aptitude by R.S.Agarwal
2. Quantitative Aptitude by Abhijit Guha

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(4D577) GROUP PROJECT

a	b	c	d	e	f	g	h	i	j	k	l	m
x	x	x	x	x	x	x	x	x	x	x	x	X

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students use the concepts learned in the courses, so far, in conceptualizing, designing and executing the modules of the projects.
- They also exhibit the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing the software.
- They also inculcate an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
- Through this course, communicative skills and team skills largely improve.
- The students learn the ability to work as an individual and in a team.

A group project shall be carried out by a group of students consisting of 2 to 3 in number in third year first semester. This work shall be carried out under the guidance of the teacher and shall involve design, fabrication, software development or any other significant activity. This can be of interdisciplinary nature also.

There will be 75 marks in total with 25 marks of internal evaluation.

The **internal evaluation** shall consist of:

Day to day work	:	10 marks
Report	:	05 marks
Demonstration / presentation	:	10 marks
End examination	:	50 Marks.

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

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(4CC76) LINEAR AND DIGITAL IC APPLICATIONS LAB

A	b	c	d	e	f	g	h	i	j	k	l
X	x	x	x	x				x			x

Prerequisites: EDC, PDC, STLD, ECA**Course Objectives:**

The objectives of this course are

- To Design and analyze the various circuits and systems using IC 741 op-amp.
- To Design and analyze the various circuits and systems using Digital ICs.

Course Outcomes: After studying this course, the students will be able to

CO1	An ability to explore the applications of IC 741 OP-AMP.
CO2	An ability to understand and implement generate square and Triangular waveforms using 555 Timers
CO3	An ability to design D to A converters and its applications
CO4	An ability to implement combinational designs using TTL Ics.
CO5	An ability to understand and implement sequential designs using TTL Ics

Mapping of Course Outcomes with Program Outcomes

	a (PO1)	b (PO2)	c (PO3)	d (PO4)	e (PO5)	f (PO6)	g (PO7)	h (PO8)	I (PO9)	j (PO10)	k (PO10)	l (PO12)	m (PO13)
CO1	3	3		3					3				
CO2	2				3								
CO3													
CO4	2	3		3	2				3				
CO5		3		3					3				
Overall	x	x		x	x				x				

Syllabus Content**Part A (Linear IC Application Lab):** (At least Six Experiments)**Design and testing of**

- OP AMP Applications – Adder, Subtractor, Comparator Circuits.
- Active Filter Applications – LPF, HPF (first order)
- Function Generator using OP AMPs.
- 4 bit DAC using OP AMP.
- IC 555 Timer – Monostable and Astable Operation Circuit.
- IC 566 – VCO Applications.
- Phase Locked Loop

Part B (Digital IC Application Lab): (At least Six Experiments)

Verify the operations of the Digital ICs (Hardware) in the Laboratory

- 3x8 Decoder using IC 74x138
- 8 x1 Multiplexer using IC 74x151
- 4-bit Binary Adder using IC 74x283
- Priority encoder using 74x148
- D Flip-Flop IC 74x74
- Decade counter using IC74x90
- Shift registers using 74x194

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(4F585) MULTIMEDIA AND APPLICATION DEVELOPMENT LAB

A	b	c	d	e	f	g	h	i	j	k	l

1. Assigning Actions to an Object, and a Button
2. Creating Loops
3. Generation Random Numbers
4. Creating a Function, Calling a Function
5. Detecting the Player Version
6. Detecting the Operating System
7. Checking the System language
8. Detecting Display Settings
9. Tinting a Movie Clip's Color
10. Drawing a Circle
11. Drawing a Rectangle
12. Filling a Shape with a Gradient
13. Scripting Masks
14. Converting Angle Measurements
15. Calculating the Distance Between the Two Points
16. Formatting Currency Amount
17. Converting Between Units of Measurement
18. Determining Points Along a Circle
19. Sorting or Reversing an Array
20. Implementing a Custom Sort
21. Creating a Text Field
22. Making a Password Input field

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(4D595) TECHNICAL PAPER WRITING AND SEMINAR - V

a	B	c	d	e	f	g	h	i	j	k	l	m
								x	x		x	

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing : 05 marks

Final report : 05 marks

Presentation before a departmental committee
consisting of Head, a Senior Faculty and Supervisor : 15 marks

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(4GC42) FUNDAMENTALS OF BIO INFORMATICS

(OPEN ELECTIVE – II)

a	B	c	d	e	f	g	h	i	j	k	l	m
x	X	x	x	x				x			x	x

UNIT I : SCOPE OF BIOINFORMATICS and BIOLOGICAL DATABASES History, definition, importance and applications of bioinformatics in information technology, Introduction to biological data, Organization and management of databases, Nucleotide databases (Genbank), Protein Databases(UNI PROT)

UNIT II: SEQUENCE ALIGNMENT Database searching, Basic concepts of sequence homology Dynamic Programming, Dot Matrix analysis, Smith-Waterman Algorithm, Neddleman-Wunsch Algorithm, Scoring matrices: PAM and BLOSUM matrices

UNIT III: SEQUENCE-BASED DATABASE SEARCHES BLAST and FASTA algorithms, various versions of basic BLAST and FASTA, Use of these methods for sequence analysis including the on-line use of the tools and interpretation of results.

UNIT IV: MULTIPLE SEQUENCE ALIGNMENT Basic concepts of various approaches for MSA algorithms (e.g. progressive, hierarchical etc.). Algorithm of CLUSTALW and its application

UNIT V: PHYLOGENETIC ANALYSIS Definition and description of phylogenetic trees. Distance based and character based algorithms of phylogenetic analysis

UNIT VI: GENE AND PROTEIN STRUCTURE PREDICTION Biological sequence/structure, Human Genome Project, Gene structure and DNA sequences, Pattern recognition and prediction, Protein Secondary structure prediction methods, Algorithms of Chou Fasman, GOR methods. Protein homology modeling.

TEXT BOOKS:

1. Bioinformatics. David Mount, 2000. CSH Publications

REFERENCES:

1. Bioinformatics: A Machine Learning Approach P. Baldi. S. Brunak, MIT Press 1988.
2. Genomics and Proteomics-Functional and Computational aspects. Springer Publications. Editor-Sandor Suhai.
3. Bioinformatics- Methods and Protocols-Human Press. Stephen Misener, Stephen A. Krawetz.
4. Bioinformatics – A Practical guide to the Analysis of Genes and Proteins – Andreas D.Baxevanis, B.F. Francis Ouellette.

COURSE OUTCOMES (CO)

- CO:1 Demonstrate knowledge and understanding of the biological, computational, Engineering and mathematical sciences relevant to biotechnology
- CO:2 Analyze and interpret homology by using basic bioinformatics problems and their solutions
- CO:3 Demonstrate the ability to solve biological problems using basic computer science Programming tools, software
- CO:4 Develop the ability to identify the computational problems within the living Systems at molecular level
- CO:5 Develop the ability to evaluate the evolutionary relationships among various Organisms using computational methods.
- CO:6 Gain an understanding of working in interdisciplinary teams of biologists, Biochemists, medical researchers, geneticists, and allied engineering branches.

COURSE SYNOPSIS

Bioinformatics is the field of science in which biology, computer science, and information technology merge into a single discipline. Bioinformatics is the application of information sciences to biology. This specialized stream of science deals with the creation and maintenance of databases of biological information, which includes nucleic acid sequences, and protein sequences. It also includes the software's that are required for the detailed analysis of the genes and proteins. The field of bioinformatics emerged, primarily because of the significant advances made by the Human Genome Project and other systematic sequencing projects, and the necessity for all biologists to be able to apply—at some level—these techniques to their own research. Bioinformatics occupies a unique niche amongst the sciences, lying at the intersection of biology, genetics, biochemistry, computer science, mathematics, statistics, and numerous other allied fields. The inherent strength of the field of bioinformatics comes from the relationships between investigators in these allied fields; collaborations between these individuals have led to the development of novel methods and approaches, furthering advances in each of these areas.

Bioinformatics was applied in the creation and maintenance of a database to store biological information at the beginning of the "genomic revolution", such as nucleotide and amino acid sequences. In order to study how normal cellular activities are altered in different disease states, the biological data must be combined to form a comprehensive picture of these activities. Therefore, the field of bioinformatics has evolved such that the most pressing task now involves the analysis and interpretation of various types of data, including nucleotide and amino acid sequences, protein domains, and protein structures. The actual process of analyzing and interpreting data is referred to as computational biology.

Important sub-disciplines within bioinformatics and computational biology include: Genomics – Genome annotation, Gene finding, Genome assembly, Prediction of gene expression- Micro arrays , Genome-wide association studies; Proteomics - Protein structure prediction, Protein-protein interactions, drug design, drug discovery Phylogenetic analysis – Sequence alignment, Sequence database search, protein structure alignment , Computational evolutionary biology, Modeling of evolution.

The key challenge for the next few years will be to quickly and efficiently identify the most promising drug candidates from the constantly increasing plethora of possibilities with cost-effectiveness. Current research activities aim at going beyond the realm of human genome sequencing to expand the list of identified proteins and genes. The subject containing SIX units covers from the basic database search protocols to most important concepts of Bioinformatics.

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(4ZC11) LOGISTICS AND SUPPLY CHAIN MANAGEMENT (Same as 4Z319)

(OPEN ELECTIVE – II)

a	b	c	d	e	f	g	h	i	j	K	l	m

Course Outcomes:

1. Provide students an exposure to Logistics and Supply Chain Management.
2. Demonstrate and ability to understand the relationship between demand forecasting and aggregate planning in supply chain.
3. Create a preliminary understanding of supply chain drivers and metrics, warehouse management.
4. Explain awareness about mapping the supply chain and channel relationships.
5. To examine the global logistics interlinked global economy and global supply chain business processes.
6. Evaluate the application of technology in Logistics and Supply Chain Management.

UNIT I

INTRODUCTION TO LSCM: Logistics and Competitive strategy Understanding the Supply Chain. Objective and Importance of Supply Chain Process View of Supply Chain. Competitive and Supply Chain Strategies, Achieving Strategic Fit, Challenges of SCM

UNIT II

SUPPLY CHAIN DRIVERS AND METRICS: Drivers for Supply Chain Performance, Framework for Structuring drivers. Facilities, inventory, transportation, information, sourcing and pricing. Obstacles to Achieving fit. Designing the Supply Chain Network. Role of distribution in the Supply Chain, Factors influencing network design, the role of network in the Supply Chain.

UNIT III

DEMAND FORECASTING & AGGREGATE PLANNING IN SUPPLY CHAIN: Demand Forecasting in Supply Chain Components of forecast and forecasting methods. Role of IT in forecasting. Aggregate Planning in Supply Chain Planning Supply and Demand in A Supply Chain, Managing Predictable Variability.

UNIT IV

LOGISTICS AND SUPPLY CHAIN RELATIONSHIPS: Benchmarking the logistics process and SCM operations –Mapping the supply chain processes – SCOR model – Supplier and distributor benchmarking –setting benchmarking priorities –identifying logistics performance indicators – Channel structure – channel relationships – Transportation, Inventory Planning & Managing - logistics service alliances.

UNIT V

WAREHOUSE MANAGEMENT: Importance, Structure, Business process of warehouse management, product unit used for packaging and shipping, supply chain relevant for warehouse management, Goods receipt, Issue & Transfer within the warehouse, Warehouse management automation & IT integration, RFID.

UNIT VI

MANAGING GLOBAL LOGISTICS AND GLOBAL SUPPLY CHAINS: Performance of Logistics and Supply chain in India, Logistics in a global economy – views of global logistics- global operating levels – interlinked global economy – The global supply chains -Global supply chain business processes.

Books Recommended:

- Sunil Chopra and Peter Meindl: *Supply chain Management: Strategy, Planning and Operation, 3/e*, Pearson Education, New Delhi 2007.
- Donald J. Bowersox and David J. Closs, *Logistical Management: The Integrated Supply Chain Process*, Tata McGraw Hill, 2006.

References:

- Martin Christopher, *Logistics and Supply Chain Management*, Pitman, London.
- B.S. Sahay, *Supply Chain Management for Global Competitiveness*, Macmillan, New Delhi, 2003.
- Philip B. Schary, Tage Skjott-Larsen: *Managing the Global Supply Chain*, Viva, Mumbai, 2006.
- Monczka: *Purchasing and Supply Chain Management* Thomson, 2006.
- Ballou, *Business Logistics/Supply chain Management 5/e* Pearson Education.
- David Simchi-Levi, Philip Kaminsky, Edith Simchi-Levi, *Designing and Managing The Supply Chain 2nd ed.* Tata McGraw Hill Publishing Company Ltd., 2006
- Amit Sinha, Herbert Kotzab, *Supply Chain Management A managerial Approach*, Tata McGraw Hill Education Private Ltd, 2012.

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(4ZC19) PROJECT MANAGEMENT AND STRUCTURED FINANCE

a	b	c	d	e	f	g	h	i	J	k	l
x		x						x	x	x	

Course Objective: The course has been designed to create an awareness of the need for systematic management of projects. This application-oriented course provides the skills in project planning, financing, implementing and controlling, starting from project identification, till project termination.

Course Outcomes:

1. Explain project management concepts including objectives, management, types of projects, project organizational structure, project life cycle, functions of a project manager, challenges in project management.
2. Identify and apply knowledge of Project Ideas, Project Identification, Project Rating Preliminary, Analysis of Market, Financial, Economic and Ecological and develop Project Estimates and Techno- Economic Feasibility Reports.
3. Implement project, monitor and assess project performance, performance measurement, evaluate and control planned cost and schedule performance, quality management tools and techniques at different stages of project.
4. Describe and plan project financing and deal Debt-Equity Financing, Formal & Informal Agencies in Financing, Government grants and Subsidies, Seed, Angel & Venture Capital, DCF Techniques: NPV, IRR, PI and Non DCF Methods: BP, ARR for Project evaluation.
5. Assess project risk in terms of probabilistic cash flow approaches, sources, measures and perspectives of standalone risk analysis, Sensitivity Analysis, Scenario Analysis, Break-Even-Analysis, Simulation managing risk, Project selection Analysis.
6. Plan project closeout and termination including Harvesting the Benefits, Project Reviewing.

UNIT I

INTRODUCTION TO PROJECT MANAGEMENT: Concept and characteristics of a project - types of projects - Objectives of project management - Project Organizational structure - Project life cycle - Challenges and problems of project management - Qualities & functions of a project manager.

UNIT II

PROJECT FORMULATION: Generation of Project Ideas; Monitoring the environment; Tools for identification of Investment Opportunities; Preliminary Screening of Projects; Detailed Project Report: Market, Technical, Financial, Economic and Ecological feasibility report; Project Estimates; Project Selection.

UNIT III

PROJECT IMPLEMENTATION AND CONTROL: Pre-requisites for Successful Project Implementation; Forms of Project Organizations; Project Planning; Human Aspects of Project Management; Control of in-progress Projects; Post-audit; Abandonment Analysis.

UNIT IV

INTRODUCTION TO STRUCTURED FINANCE AND CMBS: Nature and Scope of Structured finance - Definition and characteristics of Commercial Mortgage Backed Securities (CMBS) – CMBS Vs other mortgage backed securities – Phases in development of CMBS market: Design, Engineering, Manufacturing and Recycle phases, CMBS securitization market: Property level - Loan level - Bond level - Subordination level.

UNIT V

CMBS – SERVICING BUSINESS OVERVIEW: Servicing overview - History of Servicing – The securitization process – Originations and Refinancing overview, CMBS – Multifamily servicing – Role of servicer – Servicing approaches — Ethics in commercial servicing – Servicer Specialization – Servicer Compensation.

UNIT VI

LIFE CYCLE OF COMMERCIAL REAL ESTATE (CRE) AND MULTIFAMILY LOAN: History of Commercial Real Estate - The loan cycle – Key Players in loan cycle – Property types & Characteristics – Property Performance - CMBS – Servicing Agreements and loan documents pooling – Servicing aspects – Sub Servicing Agreement - Borrower Lender loan documents – Property Related Documents.

Books Recommended:

- Projects by Prasanna Chandra, McGraw-Hill Publishing Co. Ltd
- Mortgage Valuation Models - Embedded options, Risk and Uncertainty - 1 Edition by Andrew Davidson – Alexander Levin (Author)
- Mortgage – Based Securities: Products, Structuring & Analytical Technique - Frank J Fabozzi (Author)
- Commercial Real Estate for Beginners : The Basics of Commercial Real Estate Inventory - By Peter Harris (Author)
- An Introduction to Real Estate Investment Deal Analysis - By J. Scott (Author)
- Mortgage Loan Servicing - By Lawrence V. Conway (Author)
- Foundation of Real Estate Financial Modeling By Roger STAIGER
- The State Mortgage Loan Originator National Exam Study Guide - Second Edition by PATRICIA O CONNOR

References:

- Jack Meredith, Samuel J. Mantel Jr, “Project Management-A Managerial Approach”, John Wiley Sons
- John M Nicholas “Project Management for Business and Technology” Prentice Hall of India Pvt. Ltd.
- James P Lewis “Project Planning, Scheduling and Control Tata McGraw-Hill Publishing Co. Ltd
- Financial Management: M Y Khan & P K Jain, Text, Problem and Cases 6/e Tata McGraw-Hill Publishing Co. Ltd
- Project Management: Engineering, Technology and Implementation, Shtub, Bard and Globerson, PH Inc.
- Project Management Handbook, Lock, Gower.
- Project Management: Systems approach to Planning Scheduling and Controlling, H. Kerzner.
- Project Scheduling and Monitoring in Practice, S. Choudhury, SAP.
- Total Project Management: The Indian Context, P. K. Joy, Macmillan India Ltd.
- The Management of Construction - A Project Life Cycle Approach by F. Lawrence Bennett
- The Complete Real Estate Documents by Mazyar M. Hedayat, John J. Oleary
- The Fundamentals of Listing and Selling Commercial Real Estate - By Keim K. Loren (Author)
- Structural Finance & Collateralised Debt Obligation - By Janet M. Tavakoli (Author)

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(4DC17) MICROCONTROLLERS AND APPLICATIONS

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x	x	x							x	x

Course Objectives: In this course the student will learn

1. The 8051 and ARM Microcontroller architecture and instruction set.
2. To acquire the knowledge of interfacing of memory and I/O devices.
3. The 8051 and ARM based embedded applications.

Course Outcomes: After completing this course, Students will be able to

1. Write assembly language and Embedded C programs for different applications.
2. Interface memory and I/O devices to 8051/ARM.
3. Design an embedded system based on a microcontroller for various applications.

UNIT-I

8051 Microcontroller: Introduction to Microcontroller, Overview of 8051 family, Internal Architecture of 8051, PSW, Pin description, I/O Ports, Memory organization and expansion. 8051 Instruction set: Addressing modes and Bit addressable features, Data transfer, Arithmetic, Logical, Program branching and bit manipulation instructions.

UNIT-II

8051 Programming (Assembly): Introduction to 8051 programming development tools, basic programming using instruction set, SFRs, 8051 Timer Programming in Assembly, 8051 Serial port Programming in Assembly, 8051 Interrupt Programming in Assembly.

UNIT-III

8051 Programming in C: Introduction to 8051 Programming in C, Data types and time delay in 8051C, I/O programming, Logic operations, Data conversion programming, Accessing code ROM space, Accessing external data memory, Data serialization (Serial port programming), Interrupt and Timer programming

UNIT-IV

8051 Interfacing: 8051/8031 interfacing to external memory(RAM, ROM), 8255(PPI) interfacing, LCD and Keyboard Interfacing, Digital to Analog converter, Analog to Digital converter and sensor interfacing, Relay and PWM, DC Motor interfacing, Stepper Motor interfacing.

UNIT-V

ARM: ARM Design Philosophy, ARM Processor families, Architecture-revisions, Registers, Current Program Status Register, pipeline, exception, interrupts and the vector table; core extensions, introduction to ARM instruction set.

UNIT-VI

Applications of Microcontrollers: Design and development of the applications in the area of communications (GSM module, GPS, Zigbee), Keil IDE features and RTOS with 8051 in the area of automotive applications.

Text Books:

1. Mazidi M.A, Mazidi JG, & Rolin D. Mckinlay, "The 8051 Microcontroller & Embedded Systems using Assembly and C", 2/e, Pearson Education, 2007.
2. Andrew N.Sloss, Domonic Symes, Chris Wright "ARM System Developers Guide Designing and optimizing system software" Elsevier 1st Edition 2004.

References:

1. Ayala, K.J., "The 8051 Microcontroller Architecture, Programming and Applications", Penram International, 2007.
2. Rajkamal, "Microcontrollers Architecture, Programming Interfacing and system Design", Pearson Education 2007.
3. Steve Furber., "ARM System-on-Chip Architecture" 2nd Edition Addison-Wesley, 2000.

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(4DC52) INTRODUCTION TO EMBEDDED SYSTEMS
(PROFESSIONAL ELECTIVE – III)

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x	x	x								x

Course Objectives - The student will learn about

- The constraints and challenges of an Embedded System design
- The 8051 Architecture, Assembly Language Programming , Interfacing and Interrupt handling mechanism
- Modern Embedded System Design case studies

Course Outcomes – After completing this course, student shall be able to

- ✓ Write ALP for 8051 architecture
- ✓ Implement interfaces for Embedded System using various protocols and hardware modules.
- ✓ Identify the design constraints and challenges of an embedded system with case studies.

UNIT – I: Introduction to Embedded Systems

Embedded Systems, Comparing Embedded and General Computing, Complex System Design and Processors, Classification of Embedded Systems, Embedded System Design Process, Formalization of System Design, Embedded SOC and VLSI Circuit Technology, Application examples of Embedded Systems.

UNIT – II: 8051 Architecture, Memory Organization and Programming

8051 Architecture, features, Addressing modes, Instruction set, Input/Output Ports and Circuits, External Memory, Counter and Timers, Serial data, Input/Output, Interrupts; The Assembly Language programming Process, Programming the 8051, Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, use of C programming for 8051.

UNIT – III: 8051 Real World Interfacing

Part A - Real World Interfacing, Performance metrics, Memory map, Processor and Memory selection,
Part B - IO Subsystem, Sensors and Actuators, LED and LCD Interfacing, Keyboard Interfacing, Stepper Motor Interfacing, DC motor Interfacing Using PWM

UNIT – IV: Embedded Communication Interface

Serial and Parallel Communication, Timer and Counting Devices, Watchdog Timer, Real Time Clock, I²C, SPI protocol, ISA , PCI, Internet Enabled Systems, Wireless and Mobile Systems Protocols

UNIT – V: Interrupts Service Mechanism and Embedded Programming

ISR Concepts, Context switching, interrupt Latency, Deadline, Embedded Firmware Design Approaches, Programming Concepts, Programming in Embedded C and Program Modeling Concepts

Objective: At the end of this unit the student should be able to know the concepts of Embedded Programming and Interrupts

UNIT – VI: Embedded System Case Studies – Embedded Industry Trends, Digital Clock, Battery operated Smart Card Reader, Automated Meter Reading System (AMR), Digital Camera

TEXT BOOKS:

1. Embedded Systems- Architectuer, Programming and Design 2E, Raj Kamal, TMH
2. Introduction to Embedded Systems, K.Shibu, Tata McGraw-Hill
3. The 8051 Microcontroller And Embedded Systems Using Assembly And C – Mazidi, Pearson Education India, 2nd edition, 2008.

REFERENCES:

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. Computers and Components: principles of embedded *computing* system design, Wayne Wolf, Elseveir.
3. 8051 Application Notes by Atmel.

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(4DC53) INTRODUCTION TO VLSI DESIGN
(PROFESSIONAL ELECTIVE – III)

a	b	c	d	e	f	g	h	i	j	k	l	m
x	x	x	x	x								x

Course Objectives: The student will learn about the

- i. IC fabrication process of various technologies and to understand the electrical properties of MOS transistor.
- ii. Various Layers and layouts for a different technology design rules and how scaling impacts its performance.
- iii. Design of various combinational and sequential circuits using MOS transistors and about CMOS testing

Course Outcomes: After completing the course, student shall be able to

- i. Design the complex digital VLSI circuits at transistor level and layouts.
- ii. Draw layouts for a digital circuit for a specified technology and verify design rules and validate them.
- iii. Test the circuit various level for different fault models.

UNIT I

INTRODUCTION TO MOS AND IC FABRICATION TECHNOLOGY:

MOS, PMOS, NMOS, CMOS & BiCMOS, VLSI Design Flow, Oxidation, Lithography, Diffusion, Ion Implantation, Metallization, Encapsulation, Probe testing, Integrated Resistors and Capacitors

Application – CMOS IC Manufacturing

UNIT II

BASIC ELECTRICAL PROPERTIES: Basic Electrical Properties of MOS and BiCMOS Circuits: V-I characteristics, I_{ds} - V_{ds} relationships, MOS transistor threshold Voltage, gm, gds, Figure of Merit (ω_o), Z_{pu}/Z_{pd} , Latch-Up in CMOS

INVERTERS: NMOS Inverter, Various Pull-Ups, CMOS Inverter Analysis & Design, Bi-CMOS Inverters

UNIT III

CIRCUIT DESIGN PROCESSES: MOS Layers, Stick Diagrams, Lambda-based CMOS Design rules for Wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling

GATES: CMOS Logic Gates and Structures, Switch logic, NAND, NOR, Compound gates, Multiplexers, Layout Diagrams Gates

Application – IC Physical Design – NAND and NOR

UNIT IV

PART A - CIRCUIT CHARACTERIZATION AND PERFORMANCE

Switching characteristics – fall time, Rise time, Delay time, CMOS Gate sizing, Power consumption (Static and Dynamic), Charge sharing

PART B – CMOS CIRCUIT AND LOGIC DESIGN

Logic structures / styles – Pseudo NMOS, Dynamic, Clock CMOS, Domino logic, CVSL, Modified domino logic, Pass transistor logic, transmission gate

UNIT V

MEMORY: Latches and Registers, Clocking strategies (Single Phase), Memory cells (SRAM & DRAM), Row decoders, Column decoders, Read/Write circuitry, LIFO

UNIT VI

SUBSYSTEM DESIGN: Adders, parity generators, comparators, binary counters, multipliers, Shifter, ALUs

TEXTBOOKS:

1. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, 2nd Edition, 2009.
2. Digital Integrated Circuits: A Design Perspective - John M. Rabaey, 2nd Edition, 2002.

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. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Edition.
4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
5. VLSI Technology – S.M. SZE, 2nd Edition, TMH, 2003.

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(4C627) DIGITAL IMAGE PROCESSING
(PROFESSIONAL ELECTIVE – III)

a	b	c	d	e	f	g	h	i	j	k	l	m
x	x		x									x

Course objectives :

A student who successfully fulfills the course requirements will have demonstrated:

1. Familiarity with pixel relationships, imaging geometry, image sampling
2. Familiarity with image transforms and properties
3. An understanding of image enhancement in spatial and frequency domain like histogram processing, image smoothing and sharpening
4. Familiarity with various image restoration techniques
5. Understanding of edge linking and boundary detection techniques
6. Understand lossless and lossy compression techniques in spatial and frequency domain and compression metrics

UNIT I

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

UNIT II

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

UNIT III

Image enhancement : Point processing. Histogram processing. Spatial filtering.

Enhancement in frequency domain : Image smoothing, Image sharpening.

UNIT IV

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

UNIT V

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

UNIT VI

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

TEXT BOOK :

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

REFERENCES :

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

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**(4E609) UNIFIED MODELING LANGUAGE
(PROFESSIONAL ELECTIVE – III)**

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x	x					x	x		x	x

Course Objectives:

- Introduce UML principles and software life cycle.
- Learn Structural , Class, behavioral and object diagrams.
- Learn architectural modeling for application development.

Course Outcomes:

- 1 Describe elements of Unified Modeling Language paradigm for problem solving.
- 2 Demonstrate basic structural and advanced structural modeling through examples.
- 3 Design Unified Modeling Language (UML) diagrams that represent number of modeling views.
- 4 Devise various UML models.
- 5 Describe and apply advanced behavioral modeling techniques
- 6 Apply architectural and develop applications.

UNIT I

Introduction to UML: Importance of modelling, principles of modelling, object oriented modelling, conceptual model of the UML, Architecture, Software Development Life Cycle, Modelling Tools.

UNIT II

Basic Structural Modelling: Classes, Relationships, common Mechanisms, and diagrams.

Advanced Structural Modelling: Advanced classes, advanced relationships, Interfaces, Types and Roles, Packages.

UNIT III

Class Diagrams: Terms, concepts, modelling techniques for Class Diagrams.

Object Diagrams: Terms, concepts, modelling techniques for Object Diagrams.

Applications: Drawing class and object diagrams for ATM system.

UNIT IV

Basic Behavioural Modelling-I: Interactions, Interaction diagrams, Use cases, Use case Diagrams, Activity Diagrams.

Applications: Drawing interaction, use case and activity diagrams for ATM system.

UNIT V

Advanced Behavioural Modelling: Events and signals, state machines, processes and Threads, time and space, state chart diagrams.

Applications: Drawing state chart diagram for ATM system.

UNIT VI

Architectural Modelling: Component, Deployment, Component diagrams and Deployment diagrams.

Application: Drawing design diagrams on Unified Library Management system.

TEXT BOOKS

1. The Unified Modelling Language User Guide by Grady Booch, James Rumbaugh, Ivar Jacobson, Pearson Education.
2. UML 2 Toolkit by Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, WILEY- Dreamtech India Pvt. Ltd.

REFERENCES

1. Fundamentals of Object Oriented Design in UML by Meilir Page-Jones, Pearson Education.
2. Modeling Software Systems Using UML2 by Pascal Roques, WILEY-Dreamtech India Pvt. Ltd.
3. Object Oriented Analysis & Design by Atul Kahate, The McGraw-Hill Companies.
4. Practical Object-Oriented Design with UML by Mark Priestley, TATA McGrawHill
5. Applying UML and Patterns: An introduction to Object – Oriented Analysis and Design and Unified Process by Craig Larman, Pearson Education.

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(4EC17) HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE – III)

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x	x								x	x

- 1 To expose the students to understand the importance of the design for any software that acts as an interface between Man and Machine
- 2 To make the students should also consider the characteristics of the humans while designing the Software /Hardware.
- 3 To teach the students to understand the characteristics required to build an effective GUI
- 4 To explain the students understand the significance of the software tools and learn about different interaction devices.

Course Outcomes:

1. Explain role of user Interface, its importance and Benefits of good design .
2. Describe the concept of direct manipulation, graphical system, Web user role and Principles of user interface.
3. Describe Human interaction with computers, importance of human characteristics human consideration in Design and relate business functions.
4. Apply and explain Screen Designing formalities such as Screen planning, purpose, organizing screen elements, ordering of screen content, screen navigation, focus and emphasis and Technological considerations in interface design.
5. Explain Windows–Navigation schemes and screen based controls. Apply Components – text and messages, Icons and increases – Multimedia, colors, uses problems and choosing colors in real time application.
6. Develop applications with the aide of Software tools, interface Building Tools and use Interaction Devices.

UNIT I

Introduction: Importance of user Interface – definition, importance of good design. Benefits of good design - A brief history of Screen design.

UNIT II

The graphical user interface – popularity of graphics, the concept of direct manipulation, graphical system, Characteristics, Web user – Interface popularity, characteristics- Principles of user interface.

UNIT III

Design process – Human interaction with computers, importance of human characteristics human consideration in Design, Human interaction speeds, understanding business functions.

UNIT IV

Screen Designing: Design goals – Screen planning and purpose, organizing screen elements, ordering of screen data and content – screen navigation and flow – Visually pleasing composition – amount of information – focus and emphasis – presentation information simply and meaningfully – information retrieval on web – statistical graphics – Technological consideration in interface design.

UNIT V

Windows – New and Navigation schemes selection of window, selection of devices based and screen based controls.

Components – text and messages, Icons and increases – Multimedia, colours, uses problems, choosing colors.

Case studies: windows GUI.

UNIT VI

Software tools – Specification methods, interface – Building Tools.

Interaction Devices – Keyboard and function keys – pointing devices - speech recognition digitization and generation – image and video displays – Printers.

TEXT BOOKS:

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamaTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann , Pearson Education Asia.

REFERENCES:

1. Human – Computer Interaction. ALAN DIX, JANET FINCAY, GRE GORYD, ABOWD, RUSSELL BEALG, PEARSON.
2. Interaction Design PRECE, ROGERS, SHARPS. Wiley Dreamtech,
3. User Interface Design, Soren Lauesen , Pearson Education

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(4BC02) THERMODYNAMICS AND HEAT TRANSFER
(PROFESSIONAL ELECTIVE – III)

Course Objective:

- By this subject students will get the awareness on basic thermodynamic principles, skills to perform the analysis and design of thermodynamic systems, First law and second law of thermodynamics and its applications to a wide variety of systems.
- To understand the fundamentals of heat transfer mechanisms in fluids and solids and their applications in various heat transfer equipment in process industries.

Course Outcomes:

After studying this course, the students will be able to:

- understand the concepts like system surrounding, thermodynamic properties
- understand and apply the fundamental laws of thermodynamics
- understand limitations of first law and the importance of second law of T.D
- Students must be in a position differentiate forced and natural convection problems correlations; and demonstrate the use of Biot, Nusselt, Reynolds, Grashof, Rayleigh and Prandtl numbers; basic radiative heat transfer, basic principles of mass transfer
- To make the students capable of employing the heat transfer principles in real life situation
- To bring in confidence to apply the principles in industrial appliances and machinery like Power Plants, Heat Exchangers, coolers etc

UNIT – I

Introduction: Basic Concepts : System, Control Volume, Surrounding, Boundaries, Universe, Types of Systems, Macroscopic and Microscopic view points, Concept of Continuum, Thermodynamic Equilibrium, State, Property, Process, Cycle – Reversibility – Quasi – static Process, Irreversible Process, Causes of Irreversibility – Energy in State and in Transition, Types, Work and Heat, Point and Path function.

UNIT – II

zeroth law of thermodynamics – Concept of quality of Temperature – Principles of Thermometry – Reference Points – Const. Volume gas Thermometer – Scales of Temperature, Ideal Gas Scale – PMM-I - Joule’s Experiments – First law of Thermodynamics – Corollaries – First law - applied to a Process and applied to a flow system – Steady Flow Energy Equation.

UNIT – III

Limitations of the First Law – Thermal Reservoir, Heat Engine, Heat pump, Parameters of performance, Second Law of Thermodynamics, Kelvin-Planck and Clausius Statements and their Equivalence / Corollaries, PMM of Second kind, Carnot’s principle, Carnot cycle and its specialties,

UNIT – IV

Introduction: Modes and mechanisms of heat transfer – Basic laws of heat transfer –General discussion about applications of heat transfer.

Conduction Heat Transfer: Fourier rate equation – General heat conduction equation in Cartesian, Cylindrical and Spherical coordinates.

UNIT – V

Simplification and forms of the field equation – steady, unsteady and periodic heat transfer – Initial and boundary conditions. **One Dimensional Steady State Conduction Heat Transfer:** Homogeneous slabs, hollow cylinders and spheres – overall heat transfer coefficient – electrical analogy – Critical radius of insulation

One Dimensional Steady State Conduction Heat Transfer: Variable Thermal conductivity – systems with heat sources or Heat generation. Extended surface (fins) Heat Transfer – Long Fin, Fin with insulated tip and Short Fin, Application to error measurement of Temperature.

UNIT – VI

Free Convection: Development of Hydrodynamic and thermal boundary layer along a vertical plate – Use of empirical relations for Vertical plates and pipes.

Radiation Heat Transfer:

Emission characteristics and laws of black-body radiation – Irradiation – total and monochromatic quantities – laws of Planck, Wien, Kirchoff, Lambert, Stefan and Boltzmann– heat exchange between two black bodies – concepts of shape factor – Emissivity – heat exchange between grey bodies – radiation shields – electrical analogy for radiation networks.

TEXT BOOKS:

1. Engineering Thermodynamics / PK Nag /TMH, III Edition
2. Fundamentals of Engg. Heat and Mass Transfer / R.C.SACHDEVA / New Age Internationa

REFERENCE BOOKS:

1. Fundamentals of Thermodynamics – Sonntag, Borgnakke and Van Wylen / John Wiley & Sons (ASIA) Pvt. Ltd.
2. Heat Transfer / HOLMAN/TMH

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(4EC07) OPERATING SYSTEMS

a	b	c	d	e	f	g	h	i	j	k	l	m
	x		x					x				

Course Objectives :

1. Learn basics of operating Systems
2. Understand process management and synchronisation.
3. Learn principles of memory, I/O and file management in a secured environment.

COURSE OUTCOMES:

After completing the subject, students will be able to:

1. Describe the basic functionalities and structure of the Operating System
2. Explain the concepts and implementations of: Processes, Process Scheduling. Describe, contrast and compare various types of Operating systems like Windows and Linux.
3. Comprehend the concepts of Synchronization and Deadlocks in the Operating System
4. Discuss the concepts of Memory Management(Physical and Virtual memory)
5. Explain the concepts of File System with regard to directory and disk management algorithms.
6. Students understand the concepts of I/O systems, protection and security in a case study given

UNIT I

Introduction to Operating System, Computer System Architecture: Single Processor System, Multiprocessor System, Clustered System, Multiprogramming System, Multitasking (Time sharing) system, Operating System Services, System Calls, Types of System Calls, System Programs, Operating System Structure: single structure, layered approach, micro kernels, modules.

UNIT II

Process Management: Process concept, process scheduling, operation on processes; CPU scheduling, scheduling criteria, scheduling algorithms -First Come First Serve (FCFS), Shortest-Job-First (SJF), Priority Scheduling, Round Robin(RR), Multilevel Queue Scheduling.
Engg. Applications – Process scheduling in Windows, Linux.

UNIT III

Process-Synchronization & Deadlocks: Critical Section Problems, semaphores; Monitors; Deadlock Characterization, methods for handling deadlocks-deadlock prevention, Avoidance & Detection; Deadlock recovery.

UNIT IV

Memory Management: Logical & Physical Address Space, swapping, Contiguous memory allocation, Paging and Segmentation techniques, Segmentation with paging; Virtual memory: Demand Paging, Page-Replacement Algorithms, Thrashing.
Engg. Applications – Memory management in Windows, Linux.

UNIT V

File System: Different types of files and their access methods, directory structures, various allocation methods, disk scheduling and management and its associated algorithms.

UNIT VI

I/O Systems: I/O Hardware, Application I/O Interface, Kernel, Transforming I/O requests, Performance Issues.

Protection and Security: Goals of protection, Principles of protection, Access matrix, Access control list, Capability List. Security Attacks, Program threats.

TEXT BOOKS:

1. Operating System Concepts by Silberchatz Galvin, 8th edition.
2. Modern Operating Systems by A. Tanenbaum, 1992, Prentice-Hall.
3. Operating Systems Internals and Design Principles by William Stallings, 4th edition, 2001, Prentice-Hall

REFERENCES:

- Operating System By Peterson , 1985, AW.
- Operating System By Milankovic, 1990, TMH.
- Operating System Incorporating With Unix & Windows By Colin Ritchie, 1974, TMH.
- Operating Systems by Mandrik & Donovan, TMH
- Operating Systems By Deitel, 1990, AWL.
- Operating Systems – Advanced Concepts By Mukesh Singhal , N.G. Shivaratri, 2003, T.M.H

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(4D404) DATA COMMUNICATIONS AND COMPUTER NETWORKS

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x		x						x	x	x

Course Objective: In this course the student will learn about

- (i) Data Communications & Networks in Network models
- (ii) The OSI model & functionalities of each layer in detail.

Course Outcomes: After completing this course, student should be able to

- (i) Identify & summarize the functionalities of each layer in the OSI model.
- (ii) Implement Error detection & Error correction techniques.
- (iii) Develop Network layer routing algorithms.
- (iv) Design a mechanism which can detect, prevent or recover from a security attack.

Mapping of Course Outcomes with Program Outcomes

	a (PO1)	b (PO2)	c (PO3)	d (PO4)	e (PO5)	f (PO6)	g (PO7)	h (PO8)	i (PO9)	j (PO10)	k (PO10)	l (PO12)	m (PO13)
CO1		3	2		2						3	3	2
CO2		3	3		3						2	2	3
CO3		3	3		3						2	2	2
CO4		3	3		2						3	2	2
Overall		x	x		x						x	x	x

UNIT - I

Introduction to Data Communications; Networks, the Internet, protocols and standards, Network models: layered tasks, the OSI model, Layers in the OSI model, TCP/IP protocol suite, addressing

UNIT - II

Physical layer and media: Data and signals: Analog and digital, periodic analog signals, digital signals, Transmission impairment, Data rate limits, Performance.

Digital transmission: Digital – to – digital conversion, Analog – to – digital conversion, Transmission modes.

Analog transmission: Digital – to – analog conversion, Analog – to – analog conversion.

Bandwidth utilization: Multiplexing and spreading; Multiplexing, Spread spectrum

UNIT - III

Transmission media: Guided media, and unguided media Switching: Circuit – switched networks, Datagram networks, Virtual – circuit networks, Structure of a switch.

UNIT - IV

Data link layer: error detection and correction; Introduction, Block coding, Linear block codes, Cyclic codes, Checksum Data link control: Framing, Flow and error control, Protocols, Noiseless channels, Noisy channels, HDLC, Point – to – point protocol

UNIT - V

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

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

UNIT –VI

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

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

TEXT BOOKS :

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

REFERENCES :

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition, Pearson Education
2. Understanding communications and Networks, 3rd Edition, W.A. Shay, Thomson
3. Data Communications, William Stallings, Seventh edition.

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(4FC17) THEORY OF COMPUTATION

Course Objectives:

- Ability to construct and interpret finite state diagrams and DFSA Proficiency with mathematical tools and formal method Technical knowhow on applying the techniques to computing.

Course Outcomes:

- CO1. Discuss principles of Finite state machine , finite automation models, and transition diagrams.
- CO2. Design NFA , DFA and FSM transition with suitable examples expressions which are useful in text editors.
- CO3. Describe regular languages, regular expressions , grammars and derivations of strings with suitable examples.
- CO4. Describe context free grammars, syntax analysis useful in designing compilers.
- CO5. Discuss computational functions and type of Turing machine.
- CO6. Describe computational theory , Chomsky hierarchy, LR(0) , Correspondence , reducibility and solve problems on NP problems.

UNIT - I

Fundamentals : Strings, Alphabet, Language, Operations, Finite state machine, definitions, finite automaton model, acceptance of strings, and languages, deterministic finite automaton and non deterministic finite automaton, transition diagrams and Language recognizers.

UNIT - II

Finite Automata: NFA with ϵ transitions - Significance, acceptance of languages. Conversions and Equivalence : Equivalence between NFA with and without ϵ transitions, NFA to DFA conversion, minimization of FSM, equivalence between two FSMs, Finite Automata with output- Moore and Melay machines.

UNIT - III

Regular Languages: Regular sets, regular expressions, identity rules, Constructing finite Automata for a given regular expressions, Conversion of Finite Automata to Regular expressions. Pumping lemma of regular sets, closure properties of regular sets (proofs not required). Regular grammars-right linear and left linear grammars, equivalence between regular linear grammar and FA, inter conversion, Context free grammar, derivation trees, sentential form. Right most and leftmost derivation of strings.

UNIT - IV

Context Free Grammars: Ambiguity in context free grammars. Minimization of Context Free Grammars. Chomsky normal form, Greiback normal form, Pumping Lemma for Context Free Languages. Enumeration of properties of CFL (proofs omitted). Push down automata, definition, model, acceptance of CFL, Acceptance by final state and acceptance

by empty state and its equivalence. Equivalence of CFL and PDA, interconversion. (Proofs not required). Introduction to DCFL and DPDA.

UNIT - V

Turing Machine: Turing Machine, definition, model, design of TM, Computable functions, recursively enumerable languages. Church's hypothesis, counter machine, types of Turing machines (proofs not required).

UNIT - VI

Computability Theory : Chomsky hierarchy of languages, linear bounded automata and context sensitive language, LR(0) grammar, decidability of, problems, Universal Turing Machine, undecidability of posts. Correspondence problem, Turing reducibility, Definition of P and NP problems, NP complete and NP hard problems.

Text Books :

1. Introduction to Automata Theory Languages and Computation. Hopcroft H.E. and Ullman J. D. Pearson Education
2. Introduction to Theory of Computation. Sipser 2nd edition Thomson

References :

1. Introduction to Computer Theory, Daniel I.A. Cohen, John Wiley.
2. Introduction to languages and the Theory of Computation ,John C Martin, TMH
3. Elements of Theory of Computation, Lewis H.P. & Papadimition C.H. Pearson /PHI.
4. Theory of Computer Science Automata languages and computation -Mishra and Chandrashekar, 2nd edition, PHI

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(4HC77) LOGICAL REASONING
(Common to All Branches)

a	b	c	d	e	f	g	h	i	j	k	l
x											

Unit – I

Series Completion: Number Series, Alphabet Series, Alpha – Numeric Series.

Analogy: Completing the Analogous Pair, Simple Analogy, Choosing the Analogous pair, Double Analogy, Word Analogy, and Number Analogy.

Unit – II

Classification / Odd One Out: Word Classification, Number Classification, Letter Classification.

Coding – Decoding: Letter Coding, Number Coding, Matrix Coding, Substitution, Deciphering Message Word Codes, Jumbled Coding.

Unit – III

Blood Relations, Deciphering Jumbled up Descriptions, Relation Puzzle – Direction sense test.

Number, Ranking & Time Sequence Test – Arithmetical Reasoning – Mathematical Operations.

Unit – IV

Directions, Arithmetical Reasoning.

Puzzle Test: Classification Type Questions, Seating Arrangements Comparison Type Questions, Sequential Order of Things, Selection Based on given conditions, Family – Based Puzzles, Jumbled Problems.

Unit – V

Assertions and Reason– Logical Venn Diagrams – Alpha Numeric Sequence Puzzle.

Cubes and Dice – Analytical Reasoning .Logical Deduction: Logic, Statement – Arguments,

Unit – VI

Clocks & Calendar .Data Sufficiency and Syllogism.

Text Book: Verbal and Non Verbal Reasoning by R.S.Agarwal

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III Year B. Tech. ECM - II Sem

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(4D682) COMPREHENSIVE VIVA-VOCE - II

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students are assessed in the courses they have undergone till the completion of that academic year.
- They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

There shall be a Comprehensive Viva-Voce in every II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of an External Examiner, Head of the Department and two Senior Faculty members of the Department.

The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech course of study till II-semester. The Comprehensive Viva-Voce is valued for 50 marks by the Committee.

There are no internal marks for the Comprehensive Viva-Voce

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(4DC71) MICROPROCESSORS AND MICROCONTROLLERS LAB
(Common to ECM & EEE)

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x	x	x					x	

Course Outcomes :

Analyze and apply working of 8086.
Compare the various interface techniques. Analyze and apply the working of 8255, 8279, 8259, 8251, 8257 ICs and design and develop the programs.
Learning the Communication Standards.

Course Objectives :

- Familiarize the architecture of 8086 processor, assembling language programming and interfacing with various modules.
- The student can also understand of 8051 Microcontroller concepts, architecture, programming and application of Microcontrollers.
- Student able to do any type of VLSI, embedded systems, industrial and real time applications by knowing the concepts of Microprocessor and Microcontrollers.

Cycle - I

Introduction to MASM/TASM, KIEL IDE, Familiarization with 8086, 8051 Kits

8086 ALP using kit and MASM

- Basic arithmetic and logical operations
- Code conversion decimal arithmetic programs
- String manipulation programs
- Display a message on the screen of a computer using DOS / BIOS interrupts.

Cycle – II

Following peripherals and interfacing experiments to be implemented on 8086 and 8051 kits

- A/D and D/A interfacing
- Serial interfacing with PC
- Keyboard and display interfacing
- Stepper motor controller
- Traffic light controller
- Real Time clock interface with 8051 using 1²C

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(4D696) TECHNICAL PAPER WRITING AND SEMINAR - VI

a	b	c	d	e	f	g	h	i	j	k	l
								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing	: 05 marks
Final report	: 05 marks
Presentation before a departmental committee consisting of Head, a Senior Faculty and Supervisor	: 15 marks

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(4DC06) EMBEDDED AND REAL TIME SYSTEMS

a	b	c	d	e	f	g	h	i	j	k	l	m
x	x	x	x	x								x

Course Objective - In this course the student will learn about

- i. Embedded System design process using ARM Processor
- ii. ARM Architecture and Programming (Assembly and C)
- iii. ARM interfacing with various bus protocols
- iv. Concepts and constraints related to real-time systems

Course Outcomes - After completing this course, student should be able to

- i. Identify and summarize the characteristics and challenges of designing an embedded system
- ii. Utilize and apply ARM architecture for Embedded System Design
- iii. Design simple input output hardware interfaces using ARM
- iv. Explain the concepts and design requirements related to a real time systems

Mapping of Course Outcomes with Program Outcomes

	a (PO1)	b (PO2)	c (PO3)	d (PO4)	e (PO5)	f (PO6)	g (PO7)	h (PO8)	i (PO9)	j (PO10)	k (PO10)	l (PO12)	m (PO13)
CO1		2	3	3	2								3
CO2		2	3	2	3								2
CO3		2	3	2	3								2
CO4		3	2	2	2								3
Overall		x	x	x	x								x

UNIT – I

Embedded Systems and its Applications: Embedded System Design Process, Design challenge, Applications of Embedded Systems (Chapter 1 Vahid) ARM Architectures: ARM Design Philosophy, Registers, Program Status Register, Instruction Pipeline, Interrupts and Vector Table, Architecture Revision, ARM Processor Families (Chapter 1 & 2 Andrew N. Sloss)

UNIT – II

ARM Instruction Set: Data Processing Instructions, Addressing Modes, Branch, Load, Store Instructions, PSR Instructions, Conditional Instructions. (Chapter 3 Andrew N. Sloss)

UNIT-III

Thumb Instruction Set: Register Usage, Other Branch Instructions, Data Processing Instructions, Single-Register and Multi Register Load-Store Instructions, Stack, Software Interrupt Instructions (Chapter 4 Andrew N. Sloss)

UNIT – IV

ARM Programming: Simple C programs using function calls, pointers, structures, integer and floating point Arithmetic, Assembly code using instruction scheduling, Register Allocation, Conditional Execution and Loops.(chapter 5 Andrew N. Sloss)

UNIT – V

Interfacing with ARM: LCD Interfacing, Stepper Motor Interfacing, DC motor Interfacing Using PWM, I2C and SPI protocol.

Networked Embedded Systems: Bus Protocols, I2C bus, CAN bus, SPI protocol, Ethernet Enabled Systems, Design Example- Elevator Controller. (chapter 8 Wolf)

UNIT – VI

Introduction to Real-Time Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues, Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations, Saving Memory and Power, An example RTOS uC-OS / Vx-Works / RT Linux;

TEXT BOOKS:

1. Computers and Components: principles of embedded computing system design, Wayne Wolf, Elsevier.
2. Embedded System Design – A Unifies Hardware/Software introduction - Frank Vahid, Tony D. Givargis, John Wiley, 2002.
3. ARM Systems Developer's Guides- Designing & Optimizing System Software – Andrew N. Sloss, Dominic Symes, Chris Wright, Elsevier
4. An Embedded Software Primer, David E. Simon, Pearson Education.
5. ARM reference manual.

REFERENCES:

1. Embedded Systems, Raj Kamal, TMH.
2. LPC2148 ARM7 Microcontroller Manual.
3. ARM Microcontroller Interfacing Hardware and Software, Warwick A Smith, Elkator
4. ARM Microcontroller Part 1: 35 Projects for Beginners, Bert Van Dam, Elkator

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IV Year B. Tech. ECM - I Sem

(4DC07) VLSI DESIGN

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4 1 - 4

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x	x	x							x	x

Course Objective - In this course the student will learn about

- i. IC fabrication process of various technologies and to understand the electrical properties of MOS transistor.
- ii. Various Layers and layouts for a different technology design rules and how scaling impacts its performance.
- iii. Design of various combinational and sequential circuits using MOS transistors and about CMOS testing

Course Outcomes - After completing this course, student should be able to

- iv. Design the complex digital VLSI circuits at transistor level.
- v. Draw layouts for a digital circuit for a specified technology and verify design rules and validate them.
- vi. Test the circuit various level for different fault models by applying test generation procedures.

UNIT I**INTRODUCTION TO MOS TECHNOLOGIES:** MOS, PMOS, NMOS, CMOS & BiCMOS**INTRODUCTION TO IC TECHNOLOGY AND FABRICATION PROCESS:** VLSI Design Flow, Oxidation, Lithography, Diffusion, Ion Implantation, Metallisation, Encapsulation, Probe testing, Integrated Resistors and Capacitors [T1-CH1, 2 & 3].**Application** – CMOS IC Manufacturing**UNIT II****BASIC ELECTRICAL PROPERTIES:** Basic Electrical Properties of MOS and BiCMOS Circuits: Ids-Vds relationships, MOS transistor threshold Voltage, gm, gds, Figure of Merit (ω_0), Z_{pu}/Z_{pd} , Latch-Up in CMOS, Pass Transistors [T1-CH2]**INVERTERS:** NMOS Inverter, Various Pull-Ups, CMOS Inverter Analysis and Design, Bi-CMOS Inverters [T1-CH2]**UNIT III****CIRCUIT DESIGN PROCESSES:** MOS Layers, Stick Diagrams, Lamda-based CMOS Design rules for Wires, Contacts and Transistors, Layout Diagrams for NMOS and CMOS Inverters and Gates, Scaling of MOS circuits, Limitations of Scaling. [T1-CH3]**GATES:** CMOS Logic Gates and Structures, Switch logic, Layout Diagrams Gates [T1-CH5]**Application** – IC Physical Design – NAND and NOR**UNIT IV****DELAYS:** Sheet Resistance R_s and its concept to MOS, Area Capacitance Units, Calculations - $\square C_g$,

τ -Delays, Driving large Capacitive Loads, Wiring Capacitances, Fan-in and fan-out [T1- CH 4 & 5, T2-CH4]

UNIT V

MEMORY AND SUBSYSTEM DESIGN: Latches and Registers [T2-CH7], Clocking strategies (Single Phase) [T1-CH5.5], Memory cells (SRAM & DRAM), Adders, Shifter, Multipliers and ALUs [T1- CH8]

Applications – SRAM Based FPGAs and Multiply and Accumulate (MAC) Units

UNIT VI

INTRODUCTION TO CMOS TESTING: CMOS Testing, Need for testing, Test Principles, Design Strategies for Test, Chip level Test Techniques, System-level Test Techniques [T1-CH7]

Applications – Implementation of basic ATPG

TEXTBOOKS:

1. Principles of CMOS VLSI Design - Weste and Eshraghian, Pearson Education, Second Edition, 2009.
2. Digital Integrated Circuits: A Design Perspective - John M. Rabaey, 2/E, 2002

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. Essentials of VLSI circuits and systems – Kamran Eshraghian, Eshraghian Douglas and A. Pucknell, PHI, 2005 Edition.
4. Modern VLSI Design - Wayne Wolf, Pearson Education, 3rd Edition, 1997.
5. VLSI Technology – S.M. SZE, 2nd Edition, TMH, 2003.

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(4FC05) DATA WAREHOUSING AND DATA MINING

a	b	c	d	e	f	g	h	i	j	k	l	m
x	x	x	x	x				x	x		x	x

Course Objectives:

- To understand the principles of Data warehousing and Data Mining.
- To know the Architecture of a Data Mining system and Data preprocessing Methods.
- To perform classification and prediction of data.

Course Outcomes

- CO1. understand the fundamentals of Data Warehousing and issues of mining with respect to architectures , technologies such as OLAP , Data Cube .
- CO2. identify the techniques used in the data preprocessing and the Data Mining Query language primitives.
- CO3. learn the significance and methods used for Characterization and the comparison of different classes of mining.
- CO4. apply the algorithms for mining Association rules in large databases.
- CO5. discuss and apply the models of classification and use those models for prediction of the new samples.
- CO6. apply various clustering techniques available for numerous applications. identify the optimal clustering technique for a particular application

UNIT – I

Introduction: Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining

Data Preprocessing: Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation. Data Mining Primitives, Data Mining Query Languages, Architectures of Data Mining Systems.

Applications: Medical / Pharmacy, Insurance and Health Care.

UNIT – II

Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation

UNIT – III

Concepts Description: Characterization and Comparison: Data Generalization and Summarization-Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.

Applications: Telecommunication Industry, Social Network Analysis, Intrusion Detection

UNIT – IV

Mining Association Rules in Large Databases: Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases,

Applications: Financial/banking Data Analysis. Retail Marketing Industry

UNIT – V

Classification and Prediction: Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, k-nearest neighbor classifier, Prediction, Classifier Accuracy.

Applications: DNA Data Analysis, Biomedical Data Analysis

UNIT - VI

Cluster Analysis Introduction: Introduction to machine learning, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis. **Applications:** Climate and Ecosystem Data (Spatial and temporal), Graph based mining (graphs for chemical model structures).

TEXT BOOK:

1. Data Mining – Concepts and Techniques - JIAWEI HAN & MICHELINE KAMBER Harcourt India.

REFERENCES:

1. Data Mining Introductory and advanced topics –MARGARET H DUNHAM, PEARSON EDUCATION
2. Data Mining Techniques – ARUN K PUJARI, University Press.
3. Data Warehousing in the Real World – SAM ANAHORY & DENNIS MURRAY. Pearson Edn Asia.
4. Data Warehousing Fundamentals – PAULRAJ PONNAIAH WILEY STUDENT EDITION.
5. The Data Warehouse Life cycle Tool kit – RALPH KIMBALL WILEY STUDENT EDITION
6. Introduction to Data Mining - First Edition, by Pang-Ning Tan, Michael Steinbach and Vipin Kumar, ISBN-13: 978 0321321367

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**(4GC36) BIO-MEDICAL INSTRUMENTATION
(OPEN ELECTIVE – III)****Course outcomes:**

1. *Demonstrate a breadth of knowledge in medical instrumentation*
2. *To understand the Electro-physiology of various systems and recording of the bioelectric signals*
3. *To understand the working principles of various Imaging techniques*
4. *To understand the design aspects of various assist and therapeutic device*

Unit I Introduction to Medical Instrumentation: Block Diagram of medical Instrumentation system, origin and characteristics of Biopotential. Problems encountered with measurement from human beings. Generalized medical instrument specifications, types of electrodes external, internal and Microelectrodes, Recording Electrodes – Electrode-tissue interface

Unit II Central Nervous and Cardio-Vascular System Receptors, Motor systems, Neural and neuromuscular measurements, Evoked response of EEG, Structure of Heart, Rhythmicity, ECG theory, Electrocardiograph, Measurement of blood pressure and blood flow, ECG electrodes.

Unit III Biosignal Amplifiers and Signal Processing Electrodes and transducers for biomedical applications, Basic requirements of op-Amp circuits and Instrumentation amplifiers in biomedical applications, ECG data acquisition and biomedical signal Processing

Unit IV Intensive Care Instrumentation and Patient Safety Bedside and central station monitoring systems, Introduction to bio-medical telemetry, Surgical Diathermy, Physiological effects of electricity, Macro shock and Micro shock hazards, Basic approaches to protection against shock

Unit V Imaging and Display System X ray machine, CT- scanners, Ultrasound scanner, nuclear methods, Recorders and displays: Inkjet, Thermal array, Fiber optic face plate CRT, Non fade CRO

Unit VI Therapeutic and Prosthetic devices Cardiac Pacemakers, Defibrillators, Ventilators and Infant Incubators

Text books

1. Leslie Cromwell, Fred J. Weibell and Erich A. Pfeifer, “Biomedical Instrumentation and Measurements”, 2nd Edition, PHI, 2006
2. Khandpur.R.S, “Handbook of Biomedical Instrumentation”, 2nd edition, 12th reprint, Tata McGraw Hill, 2008.
3. Joseph J. Carr and John M. Brown, “Introduction to Biomedical Equipment Technology”, 4th edition, Pearson Education, 2008.
4. John G. Webster, “Medical Instrumentation Application and Design”, 3rd edition, Wiley India, 2008.

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(4ZC09) TOTAL QUALITY MANAGEMENT
(OPEN ELECTIVE – III)

a	b	c	d	e	f	g	h	i	j	k	l
				x	x		x			x	x

Course Outcomes:

1. Describe quality and philosophies of total quality management and importance of top management in TQM.
2. Importance of statistical quality control charts, internal customer conflict and marketing in TQM.
3. Explains evolution of TQM organizing, Bench marking and its process.
4. Describes leverage of productivity and quality and business process re-engineering.
5. Explains the costs of the quality and accounting system.
6. Importance of ISO9000 and documentation process involved in ISO9000.

UNIT I

INTRODUCTION: The basic Management concepts, Quality and Total Quality Management, Principles and Philosophies of Quality Management, Quality and Business performance, attitude and involvement of Top management.

UNIT II

MANAGEMENT OF PROCESS QUALITY AND CUSTOMER FOCUS AND SATISFACTION: Definition of quality, Quality Control, a brief history, Quality Gurus, Product Inspection Vs., Process Control, Statistical Quality Control, Control Charts and Acceptance Sampling. Process Vs. Customer, Internal Customer Conflict, Quality Focus, Customer Satisfaction, Role of Marketing and Sales, Buyer - Supplier relationships.

UNIT III

ORGANIZING FOR TQM: The systems approach, Organizing for Quality Implementation, making the transition from a traditional to a TQM organizing, Quality Circles. Bench Marketing: Evolution of Bench Marketing; Meaning of Bench Marking, Benefits of Bench marking, the Bench marking process, pitfalls of bench marking.

UNIT IV

PRODUCTIVITY, QUALITY AND REENGINEERING: The leverage of Productivity and Quality, Management systems V s. Technology, Measuring Productivity, Improving Productivity Re-engineering.

UNIT V

THE COST OF QUALITY: Definition of the Cost of Quality, Quality Costs, Measuring Quality Costs, use of Quality Cost Information, Accounting Systems and Quality Management.

UNIT VI

ISO 9000: Universal Standards of Quality: ISO around the world, The ISO 9000 ANSI /ASQCQ-90. Series Standards, benefits of ISO9000 certification, the third party audit, Documentation ISO 9000 and services, the cost of certification implementing the system.

Books Recommended:

- Shridhara Bhat K, TQM – Text & Cases, First Edition 2002., Himalaya Publications
- "Total Quality Management" by Joel E.Ross.

Reference:

- A.R.Aryasri, Management Science, TATA Mc,Graw Hill
- TQM – Sundararajan
- Poornima M Charantimoth, TQM, Pearson Education, First Indian Reprint 2003
- Rose JE, TQM , Kogan Pak India Pvt. Hyderabad 1993
- "Statistical Quality Control" by E.L.Grant.

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(4BC25) INTRODUCTION TO NANO TECHNOLOGY
(OPEN ELECTIVE – III)

Course Objective:

The course aims at providing an overview of basic physics of solids and advanced topics in solid state materials of technological value, a working knowledge of the foundations, techniques, and key results of quantum mechanics and the basic principles of thermodynamics and to lay emphasis on the fundamentals

Course Outcomes:

1.	To show how diverse properties (electronic, thermal, optical) of solid materials can be related to interactions at the atomistic level.
2.	To deduce and verify macroscopic properties of solids using standard theoretical models and understand their significance in wider context of solid materials
3.	To show how solid state physics forms vital part of developing materials of technological value
4.	To achieve an understanding of the theory of quantum mechanics, and an ability to apply the quantum theory to important physical systems
5.	The objective of this course is to make the students acquire depth of knowledge in the concepts of statistical mechanics and thermodynamics.

Unit-I: Introduction to Nanotechnology, Crystal Structure: Introduction, arrangement of atoms, two dimensional crystal structures

Unit-II: Three dimensional crystal structures, some examples of three dimensional crystals, planes in crystals and crystallographic directions,

Unit-III: Reciprocal lattice Bragg's law, reciprocal lattice vectors, diffraction conditions, Laue and Powder methods; Quasicrystals, Type of bonds – ionic, covalent and metallic bonds

Unit-IV: Why quantum mechanics? Matter waves, Length scales, De-Broglie hypothesis, Wave particle duality, Heisenberg's uncertainty principle, Schrodinger wave equation, Particle in one dimensional box

Unit-V: Finite Potential Wells and barriers: Periodic lattice, Energy gaps, Qualitative Description of the theory of conduction in Solids, Particle in 2-D box, Quantum Fluctuation and Discrete Quantum states, Concepts of Quantum Confinement

Unit-VI: Thermodynamics, phase diagrams and phase transformations

Textbooks:

1. Introduction to Nanotechnology by Charles P. Poole Jr and Frank J. Owens, Wiley India Pvt. Ltd.
2. Nano physics and nanotechnology by E.L. Wolf willely VCH
3. A Textbook of Quantum Mechanics by P.M. Mathews and K. Venkatesan, TMH Publishing Co Ltd.
4. Modern Quantum Mechanics by J.J. Sakurari, Addison Wesley Longman Inc.
5. Solid state Physics by Kittel
6. Nanotechnology: Principles and Practices by S.K. Kulkarni, Capital Publishing Company
7. Quantum mechanics by Pawling and Wilson
8. The Feynman lectures on Physics; Vol I to III
9. "Nanoscience and Nanotechnology: Fundamentals to Frontiers" by M.S. Ramachandra Rao and Shubra Singh, Wiley Publishers, 2013.

Reference Books:

1. Nanotechnology and Nano Electronics – Materials, devices and measurement techniques by WR Fahrmer, Springer
2. Nanotechnology – science, innovation and opportunity by Lynn E Foster, Prentice Hall - Pearson education.
3. Encyclopedia of Nanotechnology by H.S. Nalwa

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(4GC33) CULTURE, VALUES, PROFESSIONAL ETHICS AND IPR

a	b	c	d	e	f	g	h	i	j	k	l
					x		x				x

UNIT-1 INDIAN CULTURE: A Introduction to Culture Values and Ethics, Bharata, The Indian Concept of Human Life, Indian Civilization, Sanskrit and Indian Languages, Festivals, Sculpture, Music, Dance, Drama, Ayurveda, Family and its Importance, Indian Marriage System, Status of Women in Indian Society, Education, Purpose, Ancient System, Value Education, Interfaith Understanding, Happiness, Modernism and its Effect on Lifestyle, Mind and its Operation, Control of Mind, Yoga, Exemplary Life Sketches-Albert Einstein, Abraham Lincoln

UNIT-II VALUE SYSTEM: Human Value System, Truthfulness, Righteousness, Peace, Non-Violence, Love, Kindness and Compassion, Humility, Faith, Courage, Optimism, Forgiveness, Ceiling on Desires (Control of Sense organs), Exemplary Life Sketches-M K Gandhi, Abdul Kalam

UNIT-III ETHICS: Ethics in Ancient India, Ethics, Morals, Ethics and Human Life, Core Areas for Ethics, Values, Morality, Integrity, Honesty, Character, Loyalty, Trustworthiness, Courage and Confidence, Confidentiality, Secrecy and Transparency, Justification, Contracts and Spirit Promises and Schedules, Quarrels, Selfishness, Obstacles, Supporting Measures, Reputation and its sale, Decision Making in Ethics, Exemplary Life Sketches-Vishveshwaraiah, Jagadeesh Chandra Bose, Meghanad Saha

UNIT- IV PROFESSIONAL ETHICS: Occupation, Profession, Professional, Professional Organization, Obligations Of a Professional, Temptations, Aptitude, Importance of Professional Ethics for Engineers, Code of Ethics, Need for a Code, Impact of Ethical Behaviour, The Code of Ethics for Engineers, Fundamental Principles and Cannons, Commerce and Ethics, Marketing Ethics, Finance and Ethics, Science, Religion and Ethics, Medical Ethics, Genetics and Ethics, Politics and Ethics, Genders and Ethics, Media and Ethics, Computer Ethics, Exemplary Life Sketches- Narayan Murthy, Homi Jahangir Bhabha

UNIT –V INTELLECTUAL PROPERTY RIGHTS (IPR): Invention and Creativity, Basic Types of Property, Need for Protection of IPR, IP Types Industrial Property (Patents, Trade Marks, Trade Secrets, Industrial Designs and Integrated Circuits), Copyrights and Related Rights, Geographical Indications.

UNIT-VI WIPO Mission and Activities, GATT & Trips, Indian Position on WTO and strategies, Indian IPR legislations- commitments to WTO-Patent Ordinance and the Bill, Draft of a National Intellectual Property Policy, Case Studies on IP

REFERENCES:

1. The ABCs of Ethics by Michael. L. Buckner, Universe. Inc, New York Lincoln, Shanghai
2. Science, Faith and Ethics by Denis Alexander and Robert.S.White, Hendrickson Publishers, Massachusetts, USA, March 2006
3. Vedic Science Primer by PSR Murthy, BS Publications, Hyderabad
4. Medical Ethics-Global View Points, Edited by Diane Andrews, Hennig Feld, Green Haven Press
5. Divine Stories, Human Value Stories, Volume I and II, Sri Satya Sai Books and Publications
6. IPR, Nalsar Law University Course modules

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(4GC06) ENVIRONMENTAL STUDIES

OBJECTIVE

To gain comprehensive knowledge in environmental science, environmental issues and the management and to use professional engineering solutions in environmental context to respond effectively to the needs of sustainable development.

UNIT I: ECOSYSTEMS

Ecosystem definition, concept, Structure and Function, food chain and food web, Ecological pyramids, Biogeochemical cycles, Ecological niche and succession, Classification (Forest, Grassland, Desert, Pond, River, Marine, Estuarine, Wetlands)

UNIT II: NATURAL RESOURCES

Definition, classification, Forest resources-use and over-exploitation, deforestation, Forest Conservation Act, Energy resources-energy demand, renewable and non-renewable energy resources, alternate energy resources, Case studies. Food Resources-World Food problems, effects of modern agriculture, fertilizer-pesticide problems, Mineral resources: Use and exploitation environmental effects of extracting and using mineral resources

UNIT III: ENVIRONMENTAL COMPONENTS

Atmosphere- Definition, layers, state (weather and climate) acid rain, green house effect, ozone layer depletion, Seasons in India, Global warming, Kyoto protocol, Montreal protocol, Carbon trading, Hydrosphere-Definition, Types (surface and groundwater), distribution, Water conservation, use and over-exploitation, floods, drought, dams-benefits and problems, Lithosphere- Chemical composition of the earth (core, mantle, crust)

UNIT IV: BIO DIVERSITY AND ITS CONSERVATION

Introduction, Definition, Genetic species and Eco system diversity, Value of bio diversity, Hot spots, Threats to bio diversity, Conservation strategies: Insitu and Exsitu conservation

UNIT V: ENVIRONMENTAL POLLUTION AND CONTROL

Air pollution: Definition, causes, effects and Control measures, Case study: Bhopal Gas Tragedy, London smog, Chernobyl disaster, Water Pollution- Definition, types, Water quality parameters, Drinking water treatment and standard, Definition, causes, effects and Control measures: Soil Pollution, Noise Pollution and Marine Pollution, Waste Management- Solid Waste, Hazardous waste and E-waste management.

UNIT VI: SUSTAINABLE DEVELOPMENT

Concept of Sustainable development, Threats to sustainability-population explosion, urbanization, over-exploitation of resources, Strategies for Sustainable development- Wasteland reclamation, Environmental Laws- Environment Protection Act, Air (Prevention and Control of Pollution) Act, 1981., Water (prevention and control of Pollution) Act, 1984, National Biodiversity Act, 2002

TEXT BOOKS:

1. INTRODUCTION TO ENVIRONMENTAL SCIENCE –by Dr.Y.Anjaneyulu, B.S.Publications 2004.
2. ENVIRONMENTAL STUDIES by Erach bharucha 2005, University grants commission, University press.
3. ENVIRONMENTAL SCIENCES-A NEW APPROACH by Purohit, shammi and Agarwal, Agrobios (India) 2004.
4. ENVIRONMENTAL SCIENCES-A Text book for Undergraduate by Dr. K.Mukkanti, S. Chand & Company Ltd., 2010.

COURSE OUTCOMES(CO)	
CO:I	Ability to demonstrate the knowledge of Components of Ecology And Ecosystems and Environmental organizations, Environmental activists
CO:II	Ability to demonstrate the knowledge of Metal Ions In Biological System like Nitrogen Fixation, Oxygen transport
CO:III	Ability to demonstrate the knowledge of Environmental Chemistry in atmosphere, Hydrosphere, Litho sphere.
CO:IV	Ability to demonstrate the knowledge of Bio Diversity And Its Conservation
CO:V	Ability to demonstrate the knowledge and regulatory issues and case studies in Air and water
CO:VI	Ability to demonstrate the knowledge in Waste water treatment, soil, noise, marine and waste management.

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(4DC54) RECONFIGURABLE COMPUTING ARCHITECTURE AND DESIGN
(PROFESSIONAL ELECTIVE – IV)

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x		x								x

Course Objectives: The student will learn about

1. The basics of reconfigurable computing and different architectures.
2. The basic FPGA design tools like placement and routing and RTL synthesis.
3. The features of parallel processing, pipelining, high level synthesis.
4. Hybrid architecture, system design strategies and case studies.

Course Outcomes: After completing this course, student shall be able to

1. Describe reconfigurable architecture classification and metrics related
2. Identify the implementation tools and important aspects of reconfigurable architecture
3. Describe few case studies with advance topics related to reconfigurable architecture

UNIT I Introduction:

Goals and motivations - History, state of the art, future trends - Basic concepts and related fields of study - Performance, power, and other metrics - Algorithm analysis and speedup projections - RC Architectures - Device characteristics - Fine-grained architectures - Coarse-grained architectures .

UNIT II FPGA Design:

FPGA Physical Design Tools -Technology mapping - Placement & routing - Register transfer (RT)/Logic Synthesis - Controller/Data path synthesis - Logic Minimization.

UNIT III Parallel Processing:

RC Application Design - Parallelism - Systolic arrays -Pipelining - Optimizations - Bottlenecks - High-level Design - High-level synthesis - High-level languages - Design tools.

UNIT IV Architectures-I

Hybrid architectures- Communication - HW/SW partitioning - Soft-core microprocessors- System architectures -System design strategies - System services –

UNIT V Architectures-II

Small-scale architectures - HPC architectures - HPEC architectures - System synthesis - Architectural design space explorations.

UNIT VI Case Study

Case Studies- Signal and image processing - Bioinformatics - Security - Special Topics - Partial Reconfiguration - Numerical Analysis -Performance Analysis/Prediction - Fault Tolerance

TEXT BOOKS

1. M. Gokhale and P. Graham, Reconfigurable Computing: Accelerating Computation with FieldProgrammable Gate Arrays, Springer, 2005, ISBN: 978-0-387-26105-8.
2. C. Bobda, Introduction to Reconfigurable Computing: Architectures, Algorithms and Applications, Springer, 2007, ISBN: 978-1402060885.
3. P. Lysaght and W. Rosenstiel (eds.), New Algorithms, Architectures and Applications for Reconfigurable Computing, Springer, 2005, ISBN: 978-1402031274.

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(4E709) SOFTWARE TESTING

Course Objective:

To Understand the Basic concepts in Software testing, concepts of Flow graphs, Path testing and Data Flow Testing, understand the concept of metrics and their types

To clearly understand and implement various testing techniques and to make a thorough study on various testing tools

To set a strategy for testing environment and to learn the testing methodologies in detail

Course Outcomes:

- CO1** Describe concepts of Software testing
- CO2** Describe and apply the concepts **Flow graphs, Path testing and Data Flow Testing.**
- CO3** Practice Software testing strategy and Environment with economics and apply Software Metrics useful in software development and maintenance.
- CO4** Software Testing Methodology, finding defects hard to find, Verification and validation, Functional and structural, Workbench concept, Eight Consideration of software testing methodology, checklist. Describe Agile computing with agile testing
- CO5** Demonstrate Software Testing Techniques such as JADs, Pareto Analysis, Regression Testing, Structured walkthroughs, Thread testing, Performance testing and White box testing.
- CO6** Describe Graph matrices and applications, and practice and apply automated testing tools such load Runner, UFT and QTP.

UNIT I

What is Testing, Characteristics of Test Engineers, Software Testing Life Cycle, Levels of Testing, Testing Approaches, Test Cases: Format for Writing Test Case, Test plan: Format to prepare Test plan; Purpose of testing, Dichotomies, Consequences of bugs

UNIT II

Flow graphs and Path testing: Basics concepts of path testing, predicates, path predicates and achievable paths, application of path testing. Data Flow Testing: Basics of Data flow Testing Logic Based Testing : Decision Tables

UNIT III

Software testing strategy and Environment, Establishing testing policy, structured approach to testing, Test factors, Economics of SDLC testing. Software Metrics: Software Quality, Metrics for Analysis Model, Metrics for Design Model, Metrics for source code, Metrics for testing, Metrics for maintenance.

UNIT IV

Software Testing Methodology, Defects hard to find, Verification and validation, Functional and structural, Defects and

Failures, Testing that parallels the software Development process, Workbench concept, Eight Consideration of software testing methodology, testing tactics checklist. Importance of Agility, Building an Agile Testing Process

UNIT V

Software Testing Techniques, Black-box, Boundary value, Branch coverage, Cause Effect graphing, CRUD, Database, Histogram, Gray box, Inspections, JADs, Pareto Analysis , Prototyping , Random Testing, Risk based testing , Regression Testing, Structured walkthroughs, Thread testing , Performance testing, Stress Testing, Accepting Testing, White box testing, Alpha and Beta Testing.

UNIT VI

Graph matrices and application: Motivational overview, matrix of graph, relations, power of a matrix, node reduction algorithm. Need for Automated testing tools, Taxonomy of Testing Tools, Exposure to Software Testing Tools: Load Runner, UFT and QTP.

TEXT BOOKS

1. Software testing techniques – Boris Beizer, Dreamtech, second edition.(Unit 1,2,6)
2. Software testing tools – by Dr. K.V.K.K Prasad Dreamtech (Unit 1,6)
3. Effective Methods for Software Testing, 2nd Edition by William E.Perry, Wiley publications.(Unit 3,4)
4. Software Testing and continuous Quality Improvement, by William E.Lewis,Gunasekaran,2nd Edition Auerbach publications (Unit 5,Refer Internet)
5. Software Engineering A practitioner's Approach, Roger S Pressman, 6th edition. McGrawHill International Edition (Unit 3)

REFERENCES

1. Software Testing Techniques ,by Bories Beizer, Second Edition,Dreamtech Press
2. Testing and Quality Assurance for Component based software ,by Gao,Tsao and Wu,Artech House Publishers
3. Managing the Testing Process,by Rex Black,Wiley.
4. Handbook of Software Quality Assurance, by G.Gordon Schulmeyer,James I.McManus,2nd Edition,International Thomson Computer Press

**(4EC11) ARTIFICIAL INTELLIGENCE
(PROFESSIONAL ELECTIVE – I)**

Course Objectives :

Understand AI problems and pattern recognition patterns.

Learn issues of linear discriminant functions to resolve Linear Separable cases and neural learning concepts tools to solve real time AI problems

Course Outcomes

1. Apply searching strategies to solve well posed AI problems.
2. Solve problems on First order logic, Inference in first order logic and unification with forward /backward chaining.
3. Describe pattern recognition concepts for solving modern day Artificial Intelligence problems.
4. Apply probability to solve classification problems.
5. Apply linear discriminant functions to resolve Linear Separable cases.
6. Apply neural learning concepts tools to solve real time AI problems .

UNIT I

Introduction: AI problems, foundation of AI and history of AI intelligent agents: Agents and Environments. **Searching:** Searching for solutions, uniformed search strategies – Breadth first search, depth first Search. Search with partial information (Heuristic search) Greedy best first search.

UNIT II

Knowledge Representation & Reasons logical Agents, Knowledge – Based Agents, the Wumpus world, logic, propositional logic, Resolution patterns in propositional logic, Resolution, Forward & Backward, Chaining. First order logic. Inference in first order logic, propositional Vs. first order inference, unification & lifts forward chaining, Backward chaining, Resolution.

UNIT III

Pattern recognition in AI introductory concepts of Machine Perception involving pre-processing, feature extraction and classification, using linear separability, and generalization. Example in sorting of fish (see chapter 1 of text book, Duda,Hart and Stork). Connection of pattern recognition with related fields- image processing and associative memory. Sub-problems in Classification noise, overfitting, segmentation and complexity.

UNIT IV

Bayesian decision theory:Introduction, Bayesian Decision Theory- Continuous features. Two Category classification. Minimax Criteria. Classifiers, Discriminants and Decision surfaces – Two layer and Multilayer. Normal Density and discriminant functions for two layer. Bayes Decision theory applied to Discrete features.

UNIT V

Linear Discriminant Functions: Two category and multi-category cases.Concept of Linearly Separable Cases. Generalized linear Discriminant functions. Two category Linear Separable case. Gradient descent simple concept.

UNIT VI

Multilayer Neural networks: Introduction. Concept of a simple processing element.

A single layer Neural Network. A multi-layer neural network. And classifications performable by such networks. The Backpropagation Learning Algorithm.

TEXT BOOKS

1. Artificial Intelligence – A Modern Approach. Second Edition, Stuart Russel, Peter Norvig, PHI/ Pearson Education.
2. Pattern Classification by Richard Duda, Peter Hart and David Stork, 2nd Edition.

REFERENCES

1. Artificial Intelligence , 2nd Edition, E.Rich and K.Knight (TMH).
2. Information Theory, Inference and Learning Algorithms, David J. Mackay Cambridge Univ. Press, 2003.
3. Elements of Statistical Learning by Trevor Hastie, Robert Tibsirani and Jerome Friedman, Springer 2nd ed. 2008.
4. PROLOG Programming for Artificial Intelligence. Ivan Bratka- Third Edition – Pearson Education.

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-	-	2	1

(4D779) MAIN PROJECT PHASE - I

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x	x	x	x	x	x	x	x	x

Pre-Requisites: All Courses till this semester**Course Outcomes:**

- Students identify a topic from the current technical topics of their choice in the computer science domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

A pre-project seminar in fourth year first semester will be evaluated for 50 marks as follows. This is aimed at the students to identify a project on which they are likely to continue for their project in final year second semester.

Preliminary Report on progress of the work	: 10 marks
Mid Semester presentation	: 10 marks
Final report	: 10 marks
Final Presentation and Defense before a departmental Committee consisting of head, a senior faculty and supervisor	: 20 marks

There shall be no external evaluation in Project Phase – I

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(4D778) INDUSTRY ORIENTED MINI PROJECT

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x	x	x	x	x	x	x	x	x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students used the concepts learned in the courses, so far, in executing the modules of the projects.
- They also exhibited the interest in learning the modern tools and technologies through the bridge courses arranged in the college, beyond the curriculum, and hence developing.
- They also inculcated an enthusiasm to use the creative ideas to build the innovative projects which are meeting the current needs of the market and society as a whole.
- Through this course, communicative skills and team skills are largely improved.
- The students learnt the ability to work as an individual and in a team.

There shall be an industry-oriented mini-Project in their specialization that may be carried out in collaboration with an industry / R & B organization / Academic Institution, to be taken up during the vacation after III year II Semester examination. However, the mini project and its report shall be evaluated during IV year I Semester. The industry oriented mini project shall be evaluated for a total of 75 marks with 25 marks for internal assessment and 50 marks for end examination. The mini project must be submitted in report form and should be presented before a committee, consisting of an external examiner, head of the department, a senior faculty member of the department and supervisor of the mini project.

The **internal evaluation** shall consist of:

Day to day work	:	10 marks
Report	:	05 marks
Demonstration / presentation	:	10 marks
End examination	:	50 Marks.

The end examination will be carried out by a committee consisting of an external examiner, head of the department, a senior faculty member and the supervisor.

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L	T	P/D	C
-	-	3	2

(4DC73) VLSI LAB

a	b	c	d	e	f	g	h	i	j	k	l
x	x		x	x				x	x		x

Lab Objective:

- To familiarize students with VLSI CAD Tools (Xilinx, Microwind and NG SPICE).
- To make students understand and implement digital logic gates and circuits using SPICE and Verilog HDL.
- To introduce the student to physical design by implementing layouts using Microwind.
- To make students implement combinatorial and sequential designs on FPGA boards (SPARTAN 3) using Xilinx tools.

Tools to be used: Xilinx, MicorWind, SPICE**Part-A**

1. Perform I-V characteristic analysis of transistors using SPICE.
2. Perform inverter voltage transfer characteristics and logic gate delay analysis using SPICE.
3. Design combinatorial circuit design using subckts in SPICE (NAND/NOR based)

Part-B

1. Introduction to Microwind and Analysis of CMOS 0.25 micron Technology MOSFETs
2. CMOS 0.25 micron Technology Inverter Characteristics and layout in Microwind
3. Layout of Basic Gates and a Complex Gate using CMOS 0.25 and layout in Microwind
4. Layout of Multiplexers

Part-C

1. Implement combinatorial digital blocks (Adders - Half, Full, Binary & its applications) using FPGA.
2. Implement Sequential digital blocks (Counter, Shifters and Sequence Detectors) using FPGA
3. Implement Complex memory modules - RAM, FIFO, LIFO

Part-D Lab Project –

1. FPGA based traffic light controller using Verilog HDL
2. FPGA based Beverage Vending Machine
3. FPGA based UART serial communication interface
4. Implement 8-bit 3-stage pipeline processor
5. Using SPICE Implement 6T SRAM memory with read and write logic

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(4D797) TECHNICAL PAPER WRITING AND SEMINAR - VII

a	b	c	d	e	f	g	h	i	j	k	l
x								x	x		x

Pre-Requisites: All Courses till this semester**Course Outcomes:**

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing	: 05 marks
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Final report	: 05 marks
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Presentation before a departmental committee consisting of Head, a Senior Faculty and Supervisor	: 15 marks
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(4ZC02) MANAGEMENT SCIENCE

a	b	c	d	e	f	g	h	i	j	k	l
					x	x	x	x		x	x

Course Objective: The course is aimed at giving the basics of management, its principles, practices and latest concepts for increasing the performance of engineering graduates in their respective fields.

Course Outcomes:

- 1) The Unit – I outlines the significance of management, defines the basic concepts and applicability of management principles in changing paradigms.
- 2) Unit – II demonstrates the procedures of the work study method and work measurement, Project management.
- 3) The Unit – III infers the need to understand the importance of materials management and quality control techniques.
- 4) Unit – IV relates the knowledge of two functional areas of business, human resource management and marketing management.
- 5) The Unit – V explains the different dimensions of behavior, personality, perception, attitudes overall to gain insights into organizational behavior.
- 6) Unit – VI distinguish some aspects related to strategic planning and strategic implementation to gain competitive advantage over competitors

UNIT I

INTRODUCTION TO MANAGEMENT: Management- Definitions, Fayol's principles of Management, Levels of Management, functions of management. Planning: types of planning, planning process; Organizing: Organizational Design and structure, staffing; Directing; Maslow's Motivational theory, Leadership styles, Controlling: Basic control process.

UNIT II

INTRODUCTION TO OPERATIONS MANAGEMENT: Plant Location, plant layout, types of production, Work Study, Method study and Work Measurement, Basic Procedures Project Management: Network Analysis - Programme Evaluation and Review Techniques, Critical Path Method, Crashing of Simple Networks.

UNIT III

MATERIALS MANAGEMENT: Objectives of Materials, Need for Inventory Control, Economic Order Quantity, ABC Analysis, Inventory Control Systems, Just In Time, Introduction to LSCM, Quality Control Techniques– Inspection, ISO standards, Six Sigma.

UNIT IV

(i) Human Resources Management: Objectives of HRM, Challenges of HRM, HR Planning process HR functions and policies – Recruitment, Selection, Training and Development, Performance Appraisal, Balanced Score Card.

(ii) Marketing Management: Concept of Marketing, Functions, Marketing Mix, Product Life Cycle, Marketing Strategies, Channels of Distribution, Differences between products and services.

UNIT V

INTRODUCTION TO ORGANIZATIONAL BEHAVIOR: Definition, Nature and Scope, Perception – Perceptual selectivity and organization, Personality and Attitudes, Determinants of personality Formation of Attitudes-, Perceptual Distortions Attribution analysis Attribution theories, Johari Window and Transactional Analysis.

UNIT VI

STRATEGIC MANAGEMENT: Concepts in Strategic Management, Vision, Mission, Objectives, SWOT Analysis, Concept of Strategic Planning, Competitive Advantage, Concept of Core Competence; An overview, Process and its Implementation, Target Setting, Types of strategies, strategy formulation; Implementation.

Essential Reading:

1. A R Aryasri: Management Science, Tata Mc Graw Hill

Suggested Readings:

1. Dr. Y. Satyanarayana: Management control systems in competitive environment,
2. Koontz & Weihrich: Essentials of Management, 6/e, TMH, 2005
3. Kotler Philip & Keller Kevin Lane: Market Management 12/e, PHI, 2005
4. 5 Strategic Management, Text and Cases, VSP Rao, V Hari Krishna
5. Thomas N Duening & John M. Ivancevich Management – Principles and Guidelines

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(4DC55) INTERNET OF THINGS (PROFESSIONAL ELECTIVE – V)

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x	x	x								x

Course Objectives: *The student will learn about*

1. Terminology, technology and applications of IoT
2. IoT system management using M2M (machine to machine) with necessary protocols
3. Python Scripting Language preferred for many IoT applications
4. Raspberry PI as a hardware platform for IoT sensor interfacing
5. Implementation of web based services for IoT with case studies

Course Outcomes: *After completing this course, student shall be able to*

1. Identify the implementation layers of an IoT application system
2. Describe the management of an IoT system using necessary protocols
3. Design, Develop and Illustrate IoT applications using Raspberry PI platform and Python Scripting
4. Implement web based services on IoT devices

Unit I: Introduction to Internet of Things

Definition and Characteristics of IoT, Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs IoT enabled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates

Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

Unit II: IoT and M2M

Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics; IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

Unit III: Developing IoT

IoT Design Methodology - Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

Unit IV: IoT Physical Devices and Endpoints

Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

Unit V: IoT Physical Servers and Cloud Offerings

Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

Unit VI: Case Studies Illustrating IoT Design

Home Automation – Smart Lighting, Home intrusion detection, **Cities** – Smart parking, **Environment** – Weather monitoring system, Weather reporting bot, Air pollution monitoring, Forest fire detection, **Agriculture** – Smart irrigation, **Productivity applications** – IoT printer

TEXT BOOKS:

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madiseti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

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(4DC56) LOW POWER VLSI DESIGN (PROFESSIONAL ELECTIVE – V)

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x		x								x

Course Objectives: *The Student will learn about the*

1. Sources of power in an IC
2. Power reduction techniques based on technology independent and technology dependent
3. Power dissipation mechanism in various MOS logic style
4. Suitable techniques to reduce the power dissipation

Course Outcomes: *After completing this course, student shall be able to*

1. Identify the factors affecting power consumption of an IC
2. Identify and apply various low power techniques to sub-circuit designs of an IC

UNIT –I: Fundamentals:

Need for Low Power Circuit Design, Sources of Power Dissipation – Switching Power Dissipation, Short Circuit Power Dissipation, Leakage Power Dissipation, Glitching Power Dissipation, Short Channel Effects – Drain Induced Barrier Lowering and Punch Through, Surface Scattering, Velocity Saturation, Impact Ionization, Hot Electron Effect.

UNIT –II: Power Estimation:

Power Estimation techniques – logic power estimation – Simulation power analysis – Probabilistic power analysis.

UNIT –III: Low-Power Design Approaches:

Low-Voltage Low-Power Design Techniques – Trends of Technology and Power Supply Voltage, Low-Voltage Low-Power Logic Styles.

Low-Power Design through Voltage Scaling – VTCMOS circuits, MTCMOS circuits, Architectural Level Approach – Pipelining and Parallel Processing Approaches.

Switched Capacitance Minimization Approaches: System Level Measures, Circuit Level Measures, Mask level Measures.

UNIT –IV: Low-Voltage Low-Power Adders:

Introduction, Standard Adder Cells, CMOS Adder's Architectures – Ripple Carry Adders, Carry LookAhead Adders, Carry Select Adders, Carry Save Adders

UNIT –V: Low-Voltage Low-Power Multipliers:

Introduction, Overview of Multiplication, Types of Multiplier Architectures, Braun Multiplier, Baugh-Wooley Multiplier, Booth Multiplier, Introduction to Wallace Tree Multiplier.

UNIT –VI: Low-Voltage Low-Power Memories:

Basics of ROM, Low-Power ROM Technology, Future Trend and Development of ROMs, Basics of SRAM, Memory Cell, Precharge and Equalization Circuit, Low-Power SRAM Technologies, Basics of DRAM, Self-Refresh Circuit, Future Trend and Development of DRAM.

TEXT BOOKS:

1. CMOS Digital Integrated Circuits – Analysis and Design – Sung-Mo Kang, Yusuf Leblebici, TMH, 2011.
2. Low-Voltage, Low-Power VLSI Subsystems – Kiat-Seng Yeo, Kaushik Roy, TMH Professional Engineering.

REFERENCE BOOKS:

1. Introduction to VLSI Systems: A Logic, Circuit and System Perspective – Ming-BO Lin, CRC Press, 2011
2. Low Power CMOS Design – AnanthaChandrasakan, IEEE Press/Wiley International, 1998.
3. Low Power CMOS VLSI Circuit Design – Kaushik Roy, Sharat C. Prasad, John Wiley & Sons, 2000.
4. Practical Low Power Digital VLSI Design – Gary K. Yeap, Kluwer Academic Press, 2002.
5. Low Power CMOS VLSI Circuit Design – A. Bellamour, M. I. Elamasri, Kluwer Academic Press, 1995.
6. Leakage in Nanometer CMOS Technologies – Siva G. Narendran, AnathaChandrasakan, Springer, 2005.
7. Dimitrios Soudris, Chirstian Pignet, Costas Goutis, “Designing CMOS Circuits for Low Power”, Kluwer, 2002.
8. J.B.Kulo and J.H Lou, “Low voltage CMOS VLSI Circuits”, Wiley 1999.

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(4FC22) BIG DATA ANALYTICS
(PROFESSIONAL ELECTIVE – V)

Course Objective: More and more organizations these days use their data a decision supporting tool and to build data-intensive products and services. This course will cover the basic concepts of big data, methodologies for analyzing structured and unstructured data with emphasis on the relationship between the Data Scientist and the business needs.

Course Outcomes: At the end of the course the student will be able to:

CO1: Understand big data challenges in different domains including social media, transportation, finance, web and medicine

CO2: Analyze scalability and performance of regression model, SVM's, Time series, PCA and Fuzzy Decision Trees.

CO3: Comprehend stream concepts, Architecture, RTAP and Stock Market Predictions.

CO4: Understand the Machine learning concepts, Association techniques like Apriori algorithm, k-means Clustering also Clustering Non-Eucledian Space.

CO5: Understand Map Reduce, HADOOP, capability of No-SQL systems and Visualization Techniques.

CO6: Build Analytics modeling and applications also to understand Industry challenges.

UNIT I

INTRODUCTION TO BIG DATA: Introduction to BigData Platform – Traits of Big data - Challenges of Conventional Systems - Web Data – Evolution Of Analytic Scalability - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools - Statistical Concepts: Sampling Distributions - ReSampling - Statistical Inference - Prediction Error.

UNIT II

DATA ANALYSIS: Regression Modeling - Multivariate Analysis - Bayesian Modeling - Inference and Bayesian Networks - Support Vector and Kernel Methods - Analysis of Time Series: Linear Systems Analysis - Nonlinear Dynamics - Rule Induction - Neural Networks: Learning And Generalization - Competitive Learning - Principal Component Analysis and Neural Networks - Fuzzy Logic: Extracting Fuzzy Models from Data - Fuzzy Decision Trees - Stochastic Search Methods.

UNIT III

MINING DATA STREAMS : Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing - Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT IV

FREQUENT ITEMSETS AND CLUSTERING : Mining Frequent Itemsets - Market Based Model – Apriori Algorithm – Handling Large Data Sets in Main Memory – Limited Pass Algorithm – Counting Frequent Itemsets in a Stream – Clustering Techniques – Hierarchical – K-Means – Clustering High Dimensional Data – CLIQUE And PROCLUS – Frequent Pattern based Clustering Methods – Clustering in NonEuclidean Space – Clustering for Streams and Parallelism.

UNIT V

FRAMEWORKS AND VISUALIZATION : MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed File Systems – Visualizations - Visual Data Analysis Techniques - Interaction Techniques;

UNIT VI:

Systems and Analytics Applications - Analytics using Statistical packages-Approaches to modeling in Analytics – correlation, regression, decision trees, classification, association Intelligence from unstructured information-Text analytics-Understanding of emerging trends and technologies-Industry challenges and application of Analytics

TEXT BOOKS:

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. AnandRajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
3. Bill Franks, “Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics”, John Wiley & sons, 2012.
4. Glenn J. Myatt, “Making Sense of Data”, John Wiley & Sons, 2007
5. Pete Warden, “Big Data Glossary”, O’Reilly, 2011.
6. Jiawei Han, MichelineKamber “Data Mining Concepts and Techniques”, Second Edition, Elsevier, Reprinted 2008.

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IV Year B. Tech. ECM - II Sem

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4	1	-	4

(4EC15) CLOUD COMPUTING
(PROFESSIONAL ELECTIVE – V)

a	b	c	d	e	f	g	h	i	j	k	l	m
	x	x						x			x	x

Prerequisite: Basic Programming ,Computer Networks and Operating Systems.

Course objectives

- ✓ It attempts to present cloud computing in a way that anyone can understand. We do include technical material, but we do so in a way that allows managers and technical people alike to understand what exactly cloud computing is and what it is not.
- ✓ We try to clear up the confusion about current buzzwords such as PaaS, SaaS, etc., and let you all see how and why the technology has evolved to become “the cloud” as we know and use it today.
- ✓ The beauty and advantage of this course is that at the end in the last units students are practically involved in preparing various case studies.

Course Outcomes:

1. Describe the characteristics of cloud
2. Describe the cloud services.
3. Practice hadoop installation, job execution and describe different architectures for cloud applications
4. Creation and running of python programs, running amazon ec2 instance.
5. Discuss mapreduce and image processing app on cloud.
6. Discuss cloud security architecture.

UNIT-1

Introduction to Cloud Computing : Introduction ,characteristics ,Cloud Models and examples, Applications of Cloud Services .Cloud Concepts and Technologies .

UNIT-2

Cloud Services and Platforms : Compute Services,Storage Services,Database Services,Application Services,Content Delivery Services,Analytics Services,Deployment and Management Services,Identity and Access Management Services,Open Source Private cloud Software.

UNIT-3

Introduction to Hadoop and MapReduce: Introduction to Hadoop ,Installing Hadoop, Commands ,HDFS Operations

MapReduce Job Execution, Hadoop Schedulers. Cloud Application Design: Design Considerations for Cloud Application,Reference Architectures for Cloud Applications Cloud Application Design Methodologies , Data Storage Approaches .

UNIT – 4

Python Basics: Introduction, Installing Python ,Data Types ,Data Structures ,Control Flow, Function , Modules, Packages, File Handling, Data and Time Operations, Classes. Python For Cloud: Python for Amazon Web Services, Google, Windows Azure, MapReduce.

UNIT-5

Cloud Application Development in Python: Desing Approaches, Image Processing App, Document Storage App, MapReduce App, Social Media Analytics App.

UNIT-6

CloudSecurity : Introduction ,Cloud Security Architecture (CSA), Authentication, Authorization, Identity Access Management(IAM), Data Security, Key Management, Auditing .Cloud For Industry , Healthcare and Education .

Text Books:

1. Cloud Computing –A Hands on Approach , Arshdeep,Vijay Mediseti,University Press.
2. Cloud Computing: Raj Kumar Buyya,James Broberg,Andrzej GOscinski,Wiley.

References :

1. Cloud Computing : Dr.Kumar Saurab Wiley India 2011 .
2. Code in the cloud computing: K Chandrasekharan CRC Press.
- 3.Cloud Compuitng: John W. Rittinghouse ,James Ransome,CRC press.
- 4.Virtualization Security : Dave Shackleford2013,SYBEX a Willy Brand.
- 5.Cloud Computing and Software Service :Ahson,iiyas.2011.
- 6.Cloud Computing Bible: Sosinsky 2012 Wiley India.

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IV Year B. Tech. ECM - II Sem

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4	1	-	4

(4EC12) SOFTWARE PROJECT MANAGEMENT
(PROFESSIONAL ELECTIVE – V)

a	b	c	d	e	f	g	h	i	j	k	l	m
		x		x		x		x				

Course Objectives :

- Understand project planning and economics.
- Learn software architectures and workflows.
- Understand project organization, Automation and Project Control

Course Outcomes:

- 1.Explain primitives of Project Planning and evolution of software economics.
- 2.Describe software economics; reduce Software product size, improvement in software processes, improving team effectiveness, improving automation, Achieving quality.
- 3.Explain Life cycle phases and Artifacts of the process.
- 4.Describe Model based software architectures and Work Flows.
- 5.Apply Checkpoints for a process such as Major mile stones, Minor Milestones and apply Work breakdown structures for a iterative process within cost and schedule. Describe Project Organizations and Responsibilities.
- 6.Describe Automation and Project Control and Process instrumentation and explain Future Software Project Management such as Modern Project Profiles and Next generation project management.

UNIT I

Conventional Software Management: The waterfall model, conventional software Management performance.

Evolution of Software Economics: Software Economics, pragmatic software cost estimation.

UNIT II

Improving Software Economics: Reducing Software product size, improving software processes, improving team effectiveness, improving automation, Achieving required quality, peer inspections.

The old way and the new: The principles of conventional software Engineering, principles of modern software management, transitioning to an iterative process.

UNIT III

Life cycle phases: Engineering and production stages, inception, Elaboration, construction, transition phases.

Artifacts of the process: The artifact sets, Management artifacts, Engineering artifacts, programmatic artifacts.

UNIT IV

Model based software architectures: A Management perspective and technical perspective.

Work Flows of the process: Software process workflows, Iteration workflows.

Agile development process: Agile Development – Agile manifesto, agility and cost of change, agility principles, myth of planned development, toolset for the agile process .

Extreme Programming – XP values, process, industrial XP SCRUM – process flow, scrum roles, scrum cycle description, product backlog, sprint planning meeting, sprint backlog, sprint execution, daily scrum meeting, maintaining sprint backlog and burn-down chart, sprint review and retrospective

UNIT V

Checkpoints of the process: Major mile stones, Minor Milestones, Periodic status assessments.

Iterative Process Planning: Work breakdown structures, planning guidelines, cost and schedule estimating, Iteration planning process, Pragmatic planning.

Project Organizations and Responsibilities: Line-of-Business Organizations, Project Organizations, evolution of Organizations.

UNIT VI

Process Automation: Automation Building blocks, The Project Environment.

Project Control and Process instrumentation: The seven core Metrics, Management indicators, quality indicators, life cycle expectations,

Future Software Project Management: Modern Project Profiles, Next generation Software economics, modern process transitions.

TEXT BOOKS

a) Software Project Management, Walker Royce: Pearson Education, 2005.

REFERENCES

1. Software Project Management, Bob Hughes and Mike Cotterell: Tata McGraw-Hill Edition.
2. Software Project Management, Joel Henry, Pearson Education.
3. Software Project Management in practice, Pankaj Jalote, Pearson Education.2005.
4. Schwaber, K. and Beedle, M. (2001). Agile Software Development with SCRUM, 1st Ed. New Jersey : Pearson. [ISBN - 9780130676344]
5. Cohn, M. (2010). Succeeding with Agile: Software Development Using Scrum. Pearson Education, ISBN – 9788131

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IMAGE PROCESSING
(PROFESSIONAL ELECTIVE – V)

a	b	c	d	e	f	g	h	i	j	k	l	m
x	x	x	x								x	x

Course Outcomes

- To understand basic algorithms for image processing.
- To understand various filters, Point processing, and Arithmetic operations in image processing.
- To understand different applications of image processing.

UNIT – I

Introduction : Examples of fields that use digital image processing, fundamental steps in digital image processing, components of image processing system.. Digital Image Fundamentals: A simple image formation model, image sampling and quantization, basic relationships between pixels

UNIT – II

Image enhancement in the spatial domain : Basic gray-level transformation, histogram processing, enhancement using arithmetic and logic operators, basic spatial filtering, smoothing and sharpening spatial filters, combining the spatial enhancement methods

UNIT – III

Image restoration : A model of the image degradation/restoration process, noise models, restoration in the presence of noise–only spatial filtering, Weiner filtering, constrained least squares filtering, geometric transforms; Introduction to the Fourier transform and the frequency domain, estimating the degradation function

UNIT – IV

Color Image Processing : Color fundamentals, color models, pseudo color image processing, basics of full–color image processing, color transforms, smoothing and sharpening, color segmentation .

UNIT – V

Image Compression and Morphology : Fundamentals, image compression models, error-free compression, lossypredictive coding, image compression standards, Morphological Image Processing : Preliminaries, dilation, erosion, open and closing, hit or miss transformation

UNIT – VI

Image Segmentation and Recognition : Detection of discontinuous, edge linking and boundary detection, thresholding, region–based segmentation, Patterns and patterns classes, recognition based on decision–theoretic methods, matching, optimum statistical classifiers

TEXT BOOK :

1. Digital Image Processing, Rafeal C.Gonzalez, Richard E.Woods, Third Edition, Pearson Education/PHI.

REFERENCE BOOKS :

1. Image Processing, Analysis, and Machine Vision, Milan Sonka, Vaclav Hlavac and Roger Boyle, Second Edition, Thomson Learning.
2. Introduction to Digital Image Processing with Matlab, Alasdair McAndrew, Thomson Course Technology
3. Computer Vision and Image Processing, Adrian Low, Second Edition, B.S.Publications
4. Digital Image Processing, William K. Prat, Wily Third Edition
5. Digital Image Processing and Analysis, B. Chanda, D. Datta Majumder, Prentice Hall of India, 2003

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(4D880) MAIN PROJECT PHASE - II

a	b	c	d	e	f	g	h	i	j	k	l
x	x	x	x	x	x	x	x	x	x	x	x

Pre-Requisites: All Courses till this semester

Out of total 200 marks for project work (in the final year second semester), 50 marks shall be for Internal Evaluation and 150 marks for the External Evaluation at the end of the Semester.

External Evaluation of the project (viva-voce) shall be conducted by a committee appointed by the Chief Superintendent. The committee consists of an external examiner, HOD, a Senior Faculty Member and Internal Guide.

The pattern of Internal Evaluation is as follows:**Division of marks for internal assessment – 50 marks**

- Progress of Project work and the corresponding interim report as evaluated by internal guides at the end of 5 weeks : 05 Marks
- Seminar at the end of 5 weeks : 05 Marks
- Progress of Project work as evaluated by guides at the end of 10 weeks : 05 Marks
- Seminar at the end of 10 weeks : 05 Marks
- Evaluation by the Guides (at the end of 15 weeks) : 10 Marks
- Project Report : 05 Marks
- Final presentation and defense of the project : 15 Marks

If the project is conducted internally the marks will be given by Internal Guide himself.

Division of Marks for External Evaluation – 150 Marks**Pattern of External Evaluation for Project**

1. Final Project Report : 30 Marks
2. Presentation : 20 Marks
3. Demonstration / Defense of Project :100 Marks

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(4D883) COMPREHENSIVE VIVA-VOCE

a	b	c	d	e	f	g	h	i	j	k	l
x								x	x		x

Pre-Requisites: All Courses till this semester

Course Outcomes:

- Students are assessed in the courses they have undergone till the completion of that academic year.
- They are asked to comprehend the concepts in the core subjects and the elective subjects, to make them ready to face technical interviews which improve their employability skills.

There shall be a Comprehensive Viva-Voce in every II Semester. The Comprehensive Viva-Voce will be conducted by a Committee consisting of an External Examiner, Head of the Department and two Senior Faculty members of the Department.

The Comprehensive Viva-Voce is aimed to assess the students' understanding in various subjects he/she studied during the B.Tech course of study till II-semester. The Comprehensive Viva-Voce is valued for 50 marks by the Committee.

There are no internal marks for the Comprehensive Viva-Voce.

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(4D898) TECHNICAL PAPER WRITING AND SEMINAR - VIII

a	b	c	d	e	f	g	h	i	j	k	l
						x	x	x	x		x

Pre-Requisites: All Courses till this semester**Course Outcomes:**

- Students identify a topic from the current technical topics of their choice in the electronics & computer engineering domain and the allied fields, after surveying in the internet resources, journals and technical magazines in the library.
- Student learnt to arrange the contents of the presentation and scope of the topic, in an effective manner.
- Each student then presents the technical topic they chose in front of the panel and the fellow students, using the oratory skills.
- Students also face the questions posed by the panel and the students and answer them.

There shall be a Technical Paper writing and seminar evaluated for 25 marks in every semester from III-year I-semester. The evaluation is purely internal and will be conducted as follows:

Paper writing	: 05 marks
Final report	: 05 marks
Presentation before a departmental committee consisting of Head, a Senior Faculty and Supervisor	: 15 marks