



B. TECH  
CURRICULUM  
&  
SYLLABUS



**Semester I**

<b>Code</b>	<b>Course Name</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
HSS101	English for Technical Communication I	2	0	0	2
MAT101	Mathematics I	3	0	0	3
PHY101	Physics I	3	0	0	3
CHY104	Chemistry	3	0	0	3
CSE102	Programming Languages	2	0	0	2
EEE101	Basic Electrical and Electronics Engineering	4	0	0	4
PHY181	Physics Laboratory	0	0	3	1
CSE181	Programming Languages Laboratory	0	0	3	1
Total		17	0	6	19

**Semester II**

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
HSS102	English for Technical Communication II	2	0	0	2
MAT102	Mathematics II	3	0	0	3
PHY105	Physics II	3	0	0	3
CIV101	Basic Civil and Mechanical Engineering	4	0	0	4
CHY101	Environmental Sciences	2	0	0	2
MEC101	Engineering Drawing	1	0	3	2
CSE101	Introduction to Computer Science and Engineering	3	0	0	3

MEC181	Workshop	0	0	3	1
CHY181	Chemistry Laboratory	0	0	3	1
Total		18	0	9	21

**Semester III**

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
MAT201	Mathematics III	3	0	0	3
HSS***	Humanities Elective I	3	0	0	3
CSE201	Unix Programming	3	1	0	4
CSE202	Data Structures and Algorithms	3	1	0	4
CSE203	System Software	3	0	0	3
EEE254	Switching Theory and Digital Design	3	0	0	3
EEE294	Digital Logic and Design Laboratory	0	0	3	2
CSE281	Data Structures Lab	0	0	3	2
CSE282	System Software Lab	0	0	3	2
Total		18	2	9	26

**Semester IV**

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
MAT221	Mathematics IV	3	0	0	3
CSE204	Theory of Computation	3	1	0	4
CSE205	Computer Systems Engineering	3	0	0	3
CSE206	Object Oriented Programming	3	1	0	4

CSE207	Operating Systems	3	0	0	3
CSE208	Human Computer Interaction	3	1	0	4
CSE283	Computer Systems Design lab	0	0	3	2
CSE284	Operating Systems Lab	0	0	3	2
CSE285	Object Oriented Programming Lab	0	0	3	2
Total		18	3	9	27

**Semester V**

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE***	Elective I	3	0	0	3
	Minor Elective I	3	0	0	3
CSE301	Computer Architecture and Organisation	3	0	0	3
CSE302	Microprocessors	3	1	0	4
CSE303	Software Engineering	3	1	0	4
CSE304	Compiler Design	3	0	0	3
CSE381	Software Engineering Lab	0	0	3	2
CSE382	Compiler Design Lab	0	0	3	2
CSE383	Microprocessors lab	0	0	3	2
Total		18	2	9	26

**Semester VI**

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
HSS***	Humanities II	3	0	0	3
	Minor Elective II	3	0	0	3
	Free Elective I	3	0	0	3
CSE305	Database Management Systems	3	1	0	3
CSE306	Data Communication and Networks	3	1	0	4
CSE***	Elective II	3	0	0	3
CSE384	Computer Networks Lab	0	0	3	2
CSE385	Database Management Systems Lab	0	0	3	2
CSE386	Advanced Programming Lab	0	0	3	2
	Industrial Training				
Total		18	2	9	25

**Semester VII**

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
HSS***	Humanities III	3	0	0	3
	Minor Elective III	3	0	0	3
CSE401	Object Oriented Software Development	3	1	0	4
CSE***	Elective III	3	0	0	3
CSE***	Elective IV	3	0	0	3
CSE402	Internet Programming	3	1	0	4

CSE481	Internet Programming Lab	0	0	3	2
CSE482	Object Oriented Software Development Lab	0	0	3	2
Total		18	2	6	24

**Semester VIII**

Code No.	Course Title	L	T	P	C
CSE***	Self Study Elective	3	0	0	3
CSE499	Project work	0	0	16	8
Total		3	0	16	11

**MAJOR ELECTIVES**

Code	Course Title	L	T	P	C
CSE307	Artificial Intelligence	3	0	0	3
CSE308	Multimedia Systems	3	0	0	3
CSE309	Computer Graphics	3	0	0	3
CSE311	Embedded Systems	3	0	0	3
CSE312	Real Time Systems	3	0	0	3
CSE313	Natural Language processing	3	0	0	3
CSE314	Digital Image Processing	3	0	0	3
CSE315	Distributed Computing	3	0	0	3
CSE316	Digital Signal Processing	3	0	0	3
CSE403	Soft Computing	3	0	0	3
CSE404	Data mining and Data Ware housing	3	0	0	3
CSE405	Cryptography and Network Security	3	0	0	3
CSE406	Parallel Computing	3	0	0	3
CSE407	Software Quality Management	3	0	0	3
CSE408	Grid Computing	3	0	0	3

CSE409	Bioinformatics	3	0	0	3
CSE410	Network Management	3	0	0	3
CSE411	Fault Tolerant Computer Systems	3	0	0	3
CSE412	Pervasive Computing	3	0	0	3
CSE413	Quantum Computing	3	0	0	3
CSE414	Nano Computing	3	0	0	3
CSE416	DNA computing	3	0	0	3
CSE417	VLSI design and fabrication	3	0	0	3
CSE418	Network System Design with Network Processors	3	0	0	3

### MINOR ELECTIVES

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
CSE311	Embedded Systems	3	0	0	3
CSE312	Real Time Systems	3	0	0	3
CSE314	Digital Image Processing	3	0	0	3
CSE408	Grid Computing	3	0	0	3
CSE409	Bioinformatics	3	0	0	3
CSE412	Pervasive Computing	3	0	0	3
CSE414	Nano Computing	3	0	0	3
CSE417	VLSI design and fabrication	3	0	0	3
ECE318	Information Theory and Coding	3	0	0	3
ECE344	Multimedia Compression Techniques	3	0	0	3
ECE431	Wireless Communication	3	0	0	3
EEE409	Industrial Automation	3	0	0	3
EEE410	Neural Network and Fuzzy Logic	3	0	0	3
INT404	Information System Design	3	0	0	3
INT408	Enterprise Resource Planning	3	0	0	3

**HUMANITIES ELECTIVES**

<b>Code</b>	<b>Course Title</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
HSS001	Total Quality Management	3	0	0	3
HSS002	Engineering Management	3	0	0	3
HSS004	Industrial Psychology	3	0	0	3
HSS006	Professional Ethics	3	0	0	3
HSS014	Introduction to Marketing Management	3	0	0	3
HSS015	Management Concepts and Techniques	3	0	0	3
HSS016	Organizational Psychology	3	0	0	3
HSS017	International Economics	3	0	0	3
HSS018	Communication Skills	3	0	0	3
HSS020	Human Resource Management	3	0	0	3
HSS023	Entrepreneurship Development	3	0	0	3
HSS026	German I	3	0	0	3
HSS027	German II	3	0	0	3
HSS028	French I	3	0	0	3
HSS029	French II	3	0	0	3
HSS036	Technology & Development	3	0	0	3

**SEMESTER I**

<b>HSS101</b>	<b>ENGLISH FOR TECHNICAL COMMUNICATION I</b> (Common to all branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>

**FOCUS ON LANGUAGE**

Parts of speech - Nominal compounds, noun phrases - Relative pronoun - Adjective - numerical, comparison and contrast, collocation and word combinations - Verb - Preposition and relative - Conjunction- connectives, expressions of purpose and function, cause and effect - Articles - adjectives - Sentence pattern - Tenses - Voice - Rewriting the sentences in impersonal/abbreviated passive grammatical structures - Concord - sentence level verb noun agreement - Gerund - rewriting infinitive into gerund - Imperative - rewriting imperative into recommendation using should - Word formation - varied grammatical function of the same word - Affixes - prefix and suffix, number prefix, negative prefix - Reported speech - Editing strategies - Conditional structures - real, unreal, no possibility, zero condition - Writing formal definition - Abbreviation and acronym - Idioms and phrases - Varieties of English - British versus American.

**LISTENING SKILLS**

Comprehension practice - Vocabulary development - Familiarity to varied types of spoken English and accents - Developing ability to understand audio and video media - Aiming at overcoming barriers to listening - Listening to documentaries, radio news broadcasts, TV news telecasts - Active listening in discussions and to lectures - Taking notes while listening - Extracting information from listening.

**SPEAKING SKILLS**

Oral practice - Role play - Interplay - Seminar - Transcoding visual into oral - Participating in short and longer conversation - Voice record, replay, correction of intonation, pronunciation and flow of speech - Phonemes - vowels, consonants, stress, rhythm, intonation -

Group discussion - Participative learning - Acquiring proficiency, fluency, accuracy in oral communication - Speaking practice - Developing confidence - Extempore speech - Learning professional/conversational etiquette.

### **READING SKILLS**

Vocabulary Extension - Improving vocabulary - Intensive reading - Reading Strategies - identifying topic sentence - guessing meaning from content - picking out specific information - professional reading - Reading practice - Predicting the content, critical and analytical reading - Reading articles in English newspapers, sports magazines, encyclopedias - Reading aloud, use of stress and intonation - Reading and comprehending technical materials - Cloze reading.

### **WRITING SKILLS**

Discourse Cohesion - Improving writing skills, avoiding common grammatical errors in academic writing - Extending the hints - Writing shorter sentences - Punctuation - Dialogue writing - Paragraph writing, problems and solutions, achieving coherence, transition words, sequence words - Essays of descriptive and argumentative - Writing instructions, use of imperatives - Jumbled sentences into sequential paragraph using linguistic clues - Report writing - technical reports, industry visit reports, events reports - Writing recommendations - Letter writing - formal and informal letters - job application and resume, permission for in-plant training, business correspondence letters, calling for quotation, placing order, lodging complaint, persuasive letters - Assignment writing - Mini-project - Transcoding - transferring of information from text to pictorial/graphical representation and vice versa.

### **TEXT BOOK**

1. Rizvi M Ashraf, Effective Technical Communication, Tata McGraw-Hill, 2005.

**REFERENCES**

1. Daniel Jones, English Pronouncing Dictionary, Universal Book Stall, New Delhi, 17<sup>th</sup> Edition, 2000.
2. Geoffrey Leech, Fan Svartvik, A Communicative Grammar of English, Pearson Education Asia, 1994.
3. Hornby, AS, Oxford Advanced Learner's Dictionary of Current English, OUP, 7<sup>th</sup> Edition, 2005.
4. Manivannan G, English for Engineers - A Book on Scientific and Technical Writing, Govi Publications, 2005.
5. Martin Cutts, Plain English Guide - How to Write Clearly and Communicate Better, Oxford University Press, 1999.

<b>MAT101</b>	<b>MATHEMATICS I</b> (Common to all branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**MATRICES**

Review of Linear algebra-Matrix operations - Addition, Scalar Multiplication, Multiplication, Transpose, Adjoint and their properties- Special types of matrices - Null, Identity, Diagonal, Triangular, Symmetric, Skew-symmetric, Hermitian, Skew-Hermitian, Orthogonal, Unitary, Normal- Rank- consistency of a system of linear equations- Solution of the matrix Equation  $Ax = b$  - Row-reduced Echelon form.

**EIGEN VALUE PROBLEMS**

Eigen value and eigen vector of real matrix – properties of eigen values and eigen vectors – Cayley- Hamilton theorem – Orthogonal transformation of a real symmetric matrix to diagonal form – reduction of quadratic form to canonical form by orthogonal transformation – index, signature and nature of quadratic form.

**DIFFERENTIAL CALCULUS**

Review of limits - continuity and differentiability - Curvature – Cartesian and Parametric Co-ordinates – Centre and radius of curvature – Circle of curvature-evolutes - involutes - envelopes - partial differentiation –Euler's theorem for homogeneous functions-

total differential – Taylor’s expansion (two variables) - Maxima / Minima for functions of two variables – Method of Lagrangian multiplier – Jacobians.

### **THREE DIMENSIONAL ANALYTICAL GEOMETRY**

Direction cosines and ratios – Angle between two lines – Equations of a plane – Equations of straight line – coplanar lines – shortest distance between two skew lines – sphere – tangent plane – plane section of a sphere – orthogonal spheres.

### **ORDINARY DIFFERENTIAL EQUATIONS**

Solutions of second and higher order linear ODE with constant coefficients – Cauchy’s and Legendre’s linear equations - Simultaneous first order linear equations with constant coefficients - Method of variation of parameters.

### **TEXT BOOKS**

1. Kreyszig E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore , 8<sup>th</sup> Edition., 2001.
2. Arumugam S., Thangapandi Isaac, A., Somasundaram, A., Engineering Mathematics Volume I, Scitech Publications (India) Pvt. Ltd., Chennai, 2<sup>nd</sup> Edition., Reprint 2000, 1999.

### **REFERENCES**

1. Grewal B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 37<sup>th</sup> Edition., 5<sup>th</sup> Reprint 2004, 2003.
2. Venkataraman M. K., Engineering Mathematics First Year, The National Publishing Company, Chennai, 2<sup>nd</sup> Edition., Reprint 2001, 2000.

<b>PHY101</b>	<b>PHYSICS – I</b> (Common to all Branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**ACOUSTICS AND STRUCTURE OF SOLIDS**

Classification of sound – Reverberation - Sabine's formula - Common acoustical defects and remedies - Classification of solids- Crystal structures - X-ray diffraction - crystal growth - Crystal defects.

**LASER AND FIBRE OPTICS**

Interaction of radiation with matter – quantum mechanical view - three and four Level laser system - Engineering and medical applications -Introduction of fibre optics- classification of fibre - Engineering and medical applications

**QUANTUM PHYSICS**

Inadequacy of classical mechanics – Black body radiation - Plancks law - Photoelectric effect - Compton effect - Einstein's photoelectric equation - Schrödinger wave equation - Particle in one - three dimensional box.

**NDT,NEW ENGG.MATERIALS**

Ultrasonics - Ultrasonics flaw detectors - X-ray photography – Fluoroscopy – Thermography - Gamma ray spectroscopy - Characterization technique Nanophase materials – Biomaterials - Non linear materials - Polymer materials.

**DIGITAL ELECTRONICS**

Introduction - Analog to Digital circuits - Conversion of numbers one's complement - 2's complement - Logic gates - Boolean algebra - DeMorgan's theorem - Karnaugh's maps.

**TEXT BOOK**

1. Gaur R. K. and Gupta S. L., Engineering Physics, Dhanpat Rai Publishers, New Delhi, 2001.

**REFERENCES**

1. Murthy V.S.R., Jena AK., Gupta K.P. and Murthy G.S., Structures and Properties of Engineering Materials, Tata McGraw Hill Publishing company Limited, New Delhi, 2003.
2. Ali Omar. M., Elementary Solid State Physics, Pearson Education (Singapore), Indian Branch, New Delhi, First Edition, 2006.
3. William F. Smith., Foundations of materials science and Engineering, McGraw-Hill, New York, 3rd Edition , 2003.
4. Mathews P.M., Venkatesan. K., Text Book of Quantum Mechanics, Tata McGraw Hill company, Delhi, 2003.
5. Gupta S.L., Kumar.V., Hand book of Electronics, Pragati Prakashan, Meerut, 28<sup>th</sup> Edition, 2001.

<b>CHY104</b>	<b>CHEMISTRY</b> (Common to CSE & IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**WATER**

Water Quality Parameter (Industry and Drinking Water) – Hardness, Definition, Classifications, Expressions, Units of Hardness of Water with respect to CaCO<sub>3</sub>, Problems -Estimation of Hardness by EDTA Method (Theory Only) - Definition of Alkalinity (Theory Only) – Boiler feed water - Requirements, Disadvantages of using hard water in boilers, Removal of boiler scales and sludges - Water Softening - Zeolite Process, Demineralization (Ion – Exchange Process), Desalination.

**CORROSION SCIENCE AND CONTROL ENGINEERING**

Corrosion, definitions – Electrode potential - Principles of Dry and Wet Corrosion, Factors Influencing rate of corrosion, Types of Corrosion - Corrosion Control – Impressed Current Cathodic Protection and Sacrificial Anodic Protection Method - Corrosion Inhibitors – Protective Coatings, Surface conversion coatings, organic coatings (paints).

## **POLYMERS**

Introduction, Classification, Difference Between Thermoplastic and Thermosetting Plastics – Properties of Plastic - Degree of Polymerization – Types of Polymerization (Mechanism) - Phenol Formaldehyde Resin, Epoxy Resin, polyurethanes, Teflon -Amino Resins (Urea Formaldehyde, Nylon.11, Nylon.66 & Nylon 6), PET, PVC – Composites - Definition, characteristics, Constituent. Types- Fibre reinforced plastics (FRP), Metal Matrix Composites (MMC), Ceramic Matrix Composites (CMMC), Properties and Applications.

## **INSTRUMENTAL METHODS OF ANALYSIS**

Electro Magnetic Radiation - Absorption of Radiation , Beer - Lambert's Law – UV-VIS. Spectroscopy – IR Spectroscopy - Principle and Instrumentation (Block Diagram Only) Estimation of Iron by Colorimeter – Flame Photometry, Principle and Instrumentation (Block Diagram Only), Estimation of Na by Flame Photometry - Atomic Absorption Spectroscopy, Principle and Instrumentation (Block Diagram Only), Quantitative Estimation of Nickel by Atomic Absorption Spectroscopy.

## **ENERGY AND MEMORY STORAGE DEVICES AND NANOTECHNOLOGY**

Batteries - Introduction, Primary and Secondary Batteries - Dry Cell - Alkaline Batteries, Lead Acid Storage Cell, NICAD Battery, Lithium Batteries – Fuel Cell (Hydrogen - Oxygen Fuel Cell) – Photo Galvanic Cell - Ferrites – Definition, Properties, Manufactures and uses – Ferrite Core – Magnetic Core – Transformer – Ferrite Toroids – Semiconductor storage - Optical disc Storage – Magneto-optical disc storage – Chemical sensors - Nanotechnology – Introduction, Preparation, Characterization and Application.

## **TEXT BOOKS**

1. Jain, P.C and Monika Jain, Engineering Chemistry, Dhanpat Rai Publishing company (P) Ltd., New Delhi, 14<sup>th</sup> Edition 2002.
2. Sharma, B.K., Industrial Chemistry, Goel Publishing House, Meerut, 12<sup>th</sup> edition 2001.

**REFERENCES**

1. Puri B.R. and Sharma L.R. Principles of Physical Chemistry, Shoban Lal Nagin Chand & Co., Jalandhar, 40<sup>th</sup> edition 2003.
2. Vogel A.I., A text book of Quantitative Inorganic Analysis, ELBS, London, 3<sup>rd</sup> edition 2000.
3. Mick Wilson and Kamali Kannangara, Nanotechnology: Basic science and emerging technology, Overseas India Pvt. Ltd. Press, New Delhi, 1<sup>st</sup> edition 2005.
4. Bandyopadhyay, A.K., Nano Materials, New Age International Publishers, New Delhi, 1<sup>st</sup> edition 2007.

<b>CSE102</b>	<b>PROGRAMMING LANGUAGES</b> (Common to all Branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>

**BASIC ELEMENTS OF C & CONTROL STATEMENTS**

Introduction to C- Structure of C language – Lexical elements of C- Operators and Expressions-Operator precedence and associativity of operators -Input and Output Functions-Library Functions –Header Files-Simple Computational problems. Decision Making: if statement - if-else statement - else-if ladder - switch statement – Looping Control Structure - the break statement - ? : operator - Continue statement - goto statement – Problems using Control Structures.

**FUNCTIONS, PROGRAM STRUCTURES & ARRAYS**

Prototypes and Functions – Declaring, defining and accessing Functions- Parameter passing methods-Recursion - Storage Classes - Automatic Variables -External Variables – Static and Register Variables – Programs using functions. Defining and Processing an Array - Passing Arrays to Functions - Multidimensional Arrays - Arrays and Strings - Enumerated data types-Programs using sorting, searching and merging of arrays.

### **POINTERS, STRUCTURES & UNIONS**

Pointer Fundamentals - Pointer Declarations - Passing Pointers to Functions - Arrays and Pointers - Pointers and One-Dimensional Arrays - Pointers and Multidimensional Arrays - Operations on Pointers - Pointers and Structures - Dynamic Memory Allocation – Command Line Arguments – Programs using Pointers with Functions, Arrays and & Structures. Defining a Structure - Processing a Structure - User-Defined Data Types – Union – Nested structure - Structures and Pointers - Passing Structures to Functions - Self Referential Structures.

### **DATA FILES & DATA STRUCTURES**

Opening and Closing a Data File - Creating a Data File - High Level File Operations - Processing and Updation of Data Files - Unformatted Data Files - Low Level Programming – File Handling Programs. Linked List – Creation, Insertion and Deletion of elements - Stack and Queue implementation using Linked List.

### **UNIX BASICS & SHELL PROGRAMMING**

Shell Fundamentals - Shell Commands - Shell Decisions and Repetitions - Command line usage - Wildcard expansion - Redirection of I/O, pipes and filters. Shell Programming - Simple scripts - Specifying the interpreter - Shell variables - The Environment - Control flow; test, if, for, while, case - Command substitution - Signal catching - Shell functions - Aliases - Reading from the Standard I/P - Startup Files - basename and dirname - Expression evaluation.

### **TEXT BOOKS**

1. Byron S. Gottfried, Theory and Problems of Programming with C, Tata McGraw Hill, Second Edition, 1996.
2. Lowell Jay Arthur and Ted Burns, UNIX Shell Programming, John Wiley & Sons Canada, Ltd, Fourth Edition, 1997.
3. Deshpande P.S, Kakde O.G, C & Data Structures , Dreamtech Press, First edition, 2004

**REFERENCES**

1. Brian Kernighan W, Dennis Richie M, The C Programming language, Pearson Education,2005.
2. Johnsonbaugh R.and Kalin M, Applications Programming in ANSI C, Pearson Education, Third Edition ,2003.
3. Behrouz A.Forouzan and Richard Gilberg F, A Structured Programming Approach Using C, Brooks-Cole Thompson Learning Publications, Second Edition, 2001.
4. Bruce Molay, Understanding UNIX/LINUX Programming: A Guide to Theory and Practice, Prentice Hall, First Edition, 2002.
5. Glass, G., Ables, K. UNIX for Programmers and Users, Prentice Hall, 1999.
6. Stephen Kochan and Patrick Wood, UNIX Shell Programming, Pearson Education, Third Edition, 2003.

<b>EEE101</b>	<b>BASIC ELECTRICAL AND ELECTRONICS ENGINEERING</b> (Common to all Branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**ELECTRICAL CIRCUITS**

Introduction to electric circuits – laws of electric circuits– Ohm’s Law, Kirchoff’s Laws– analysis of DC circuits–mesh, nodal – introduction to AC circuits– average Value, RMS value, power and power factor–analysis of 3 phase AC circuits – balanced and unbalanced circuits

**ELECTRICAL MACHINES**

DC Machines –principle of operation–DC generators–emf equation, characteristics, types– DC motors–shunt, series, compound– single phase transformer – principle of operation, emf equation, phasor diagram –induction motors–single phase, three phase–alternators–principle of operation, emf equation , characteristics

### **ELECTRICAL MEASUREMENTS**

Moving coil –ammeter, voltmeter – moving iron instruments – ammeter, voltmeter – dynamometer – wattmeter, energy meter

### **BASIC ELECTRONICS**

Semiconductor devices – introduction, construction, types – pn junction diode –working principle, characteristics– zener diode–working principle, characteristics uni–junction transistor– operation, characteristics –field effect transistor– operation, characteristics– bipolar junction transistor– operation, characteristics–applications– half wave and full wave rectifiers

### **DIGITAL ELECTRONICS**

Introduction to binary number system–logic gates –AND, OR, NOT, NAND, NOR, exclusive OR–boolean algebra– combinational circuits – half adder, full adder, half subtractor, full subtractor

### **INTEGRATED CIRCUITS**

Operational amplifier–introduction, DC characteristics, AC characteristics–types of operational amplifier–inverting, non–inverting– applications– scalar, adder, Subtractor, differentiator, and integrator

### **TEXT BOOKS**

1. Edward Hughes., Electrical &Electronics Technology, Pearson Education ltd, 9<sup>th</sup> edition, 2005.
2. Kothari.D.P.,and.Nagrath.I.J.,Basic Electrical Engineering, Tata McGraw Hill,2<sup>nd</sup> Edition.

### **REFERENCES**

1. Malvino,A P., Electronic Principles, TataMcGraw Hill International, 1998.
2. Vincent Del tora.,Electrical Engineering fundamentals, Prentice hall of India , 2<sup>nd</sup> edition 2003.

3. Muraleedharan.K.A., Muthusubramanian .R., and Salivahanan .S., Basic Electrical and Electronics and Computer Engineering, Tata McGraw Hill, 1997.

<b>PHY 181</b>	<b>PHYSICS LABORATORY</b> (Common to all Branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>

1. To determine the acceleration due to gravity using Compound Pendulum
2. To determine the Rigidity Modulus of wire using Torsional Pendulum
3. To find thickness of the given two glass plates using single optic lever
4. To determine the thermal conductivity of a bad conductor – Lee’s disc method.
5. To determine the refractive index of the material of the prism
6. To find the prominent wave length of mercury spectrum using grating
7. To determine the particle size using Laser
8. To determine the coefficient of viscosity of the liquid by Poiseuille’s method
9. To determine the young’s modulus of given material using Uniform Bending
10. To Determine the thickness of a given material using Air wedge method
11. To determine the focal length of a biconvex lens using Newton’s Rings method
12. To determine the velocity of ultrasonic waves in the liquid using ultrasonic Interferometer

<b>CSE181</b>	<b>PROGRAMMING LANGUAGES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	<b>LABORATORY</b> (Common to all Branches)	<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>

**WORD PROCESSING, SPREADSHEET, POWERPOINT**

1. To create an advertisement in Word.
2. To illustrate the concept of mail merging in word.
3. To create a spread sheet to analyze the marks of the students of a class and also to create appropriate charts.
4. To create the presentation for the department using Power Point.

**C PROGRAMMING**

5. To write a simple menu driven calculator program using switch statement
6. To write a program to print Pascal's triangle.
7. To write a program for electricity bill preparation.
8. To write a program to print the sine and cosine series.
9. To print Fibonacci series up to N numbers.

**ARRAYS AND FUNCTIONS**

10. To write a program to perform Matrix multiplication.
11. To write a program to sort a given set of numbers.
12. To write a program to perform string manipulation manipulations function like string concatenations, comparison, find the length and string copy without using library functions.
13. To write a program to arrange names in alphabetical order.
14. To write a C program to check whether a number is palindrome or not using functions.
15. To write a program to calculate the factorial of the given number using functions.

**POINTERS, STRUCTURES AND FILES**

16. To print the mark sheet of n students using structures.
17. To write a program using pointers to access the elements of an array

- and count the number of occurrences of the given number in the array.
18. To write a program for find the average of numbers using files.
  19. To write a program to merge the given two files arguments using command line arguments.

### UNIX PROGRAMMING

20. Study of Basic UNIX Commands.
21. Implement ls Command.
22. Write a shell script to determine the properties of a given file.
23. Implement grep function.
24. Write a shell script to find the factorial of given number.
25. Write a shell script to evaluate the given expression using switch-case.

<b>SEMESTER II</b>
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<b>HSS102</b>	<b>ENGLISH FOR TECHNICAL COMMUNICATION II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	(Common to all branches)	<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>

### GRAMMAR AND VOCABULARY

Grammar and Vocabulary - Introduction to grammatical models - Proper use of tenses, concord, voice, articles, punctuation, and modal auxiliaries.

### RECEPTION SKILLS

Listening and Language Development - Improving listening skills - comprehension practice - Comprehend classroom lectures, simple technically oriented passages - Listening to news bulletins, pre-recorded talks, different speech styles, comprehending the essential meaning - Physical and psychological barriers to listening - Steps to overcome the barriers - Practice in note-taking while listening.

### SPEAKING TECHNIQUES

Speaking practice - Improving conversing skills - Improving self-expression - Developing confidence and fluency in oral

communication - Physical and psychological barriers to speaking - Steps to overcome the barriers - Formal and public speaking practice - Extemporaneous talk practice - Speech process - fluency and accuracy in speech - Developing persuasive speaking skills - Conversation in a given milieu, social and cultural surroundings - Practice in giving small talks on local topics for a minute or two - Goal oriented group discussion - Participating in seminars - Independent and effective communication.

### **READING STRATEGIES**

Reading comprehension - Vocabulary extension methods - Speed reading practice - technical and non-technical materials - Practice in various reading techniques - skimming, scanning, eye reading - Looking for specific information - Comprehending the given passages, technical information.

### **WRITTEN COMMUNICATION**

Basic grammatical structures - Alphabet of other languages - Paragraph writing - Expressing the idea in writing - Avoiding and correcting common errors - Effective writing techniques - brevity, clarity, objectivity and simplicity - Discourse writing - definition, description, instruction - Note-making - Proof reading - Mechanics of writing - Writing formal, informal letters, Technical reports - Reference skills - using dictionary better.

### **TEXT BOOKS**

1. Rizvi M Ashraf, Effective Technical Communication, Tata McGraw Hill , 2005
2. Rutherford Andrea J, Basic Communication Skills for Technology, Pearson Education, 2002.

### **REFERENCES**

1. Deborah C Andrews, Margaret D Bickle, Technical Writing - Principles and Forms, Macmillan, 1978.
2. Manivannan G, English for Engineers - A Book on Scientific and Technical Writing, Govi Publications, 2005.

3. Sarah Freeman, Written Communication in English, Orient Longman, 2000.
4. Thomson A J & AV Martinet, A Practical English Grammar, OUP, 4<sup>th</sup> Edition, 1986.
5. Tom Hutchinson, Alan Waters, English for Specific Purpose, Cambridge University Press, 1987.

<b>MAT102</b>	<b>MATHEMATICS II</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
	(Common to all branches)	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **SEQUENCES AND SERIES**

Convergence and divergence of infinite series – series of positive terms – comparison, D’Alembert’s ratio, Raabe’s and Cauchy’s root tests – Convergence of alternating series – Leibnitz’s test ( proof of theorems and tests not included) – elementary notions of absolute and conditional convergence - Power series – Taylor’s theorem(one variable).

### **ANALYTIC FUNCTION AND CONFORMAL MAPPING**

Function of a complex variable – Analytic function – Necessary conditions – Cauchy – Riemann equations – Sufficient conditions (excluding proof) – Properties of analytic function – Harmonic conjugate – Construction of Analytic functions - Conformal mapping -  $w = z+a$ ,  $az$ ,  $1/z$ ,  $e^z$ ,  $\sin z$ ,  $\cos z$  and bilinear transformation – fixed points – cross ratio.

### **COMPLEX INTEGRATION**

Statement and application of Cauchy’s integral theorem and integral formula – Taylor and Laurent expansions – Isolated singularities – Residues - Cauchy’s residue theorem - Contour integration over unit circle and semicircular contours (excluding poles on boundaries)- evaluation of real integrals using contour integration.

### **MULTIPLE INTEGRALS**

Review of Riemann integrals - Double integration – Cartesian and polar coordinates – change of order of integration – change of

variable between Cartesian and polar – area as double integral – Triple integration in Cartesian, cylindrical and spherical polar coordinates – volume as triple integral.

### VECTOR CALCULUS

Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stoke’s theorem (excluding proof) – Simple applications

### TEXT BOOKS

1. Kreyszig E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore , 8<sup>th</sup> Edn., 2001.
2. Arumugam S., Thangapandi Isaac, Somasundaram A., Engineering Mathematics Volume II, Scitech Publications (India) Pvt. Ltd., Chennai, 1<sup>st</sup> Edn., Reprint 2000, 1999.

### REFERENCES

1. Grewal B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 37<sup>th</sup> Edn., 5<sup>th</sup> Reprint 2004, 2003.
2. Venkataraman M. K., Engineering Mathematics First Year, The National Publishing Company, Chennai, 2<sup>nd</sup> Edn., Reprint 2001, 2000.
3. Venkataraman M. K., Engineering Mathematics –III A, The National Publishing Company, Chennai, 11<sup>th</sup> Edn., Reprint 2002, 1998.

<b>PHY 105</b>	<b>PHYSICS – II</b> (Common to CSE & IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### VOLTAGE AND CURRENT LAWS

Kirchoff’s current law, Kirchoff’s Voltage law, Single loop circuit, single node-pair circuit, Series and parallel connected independent sources, Resistors in series and parallel, Voltage and current division

**CIRCUIT ANALYSIS TECHNIQUES:**

Linearity and superposition, Sources transformation, Thevenin and Norton equivalent circuits, Maximum power transfer, Delta-Wye conversion, Single Phase and 3 Phase Circuits, Power factor, Power, Concept of Phasor Diagrams.

**SEMICONDUCTOR DEVICES:**

Conductors, Semiconductors, Silicon crystals, ideal diode, diode approximation, zener diode, zener regulator- Bipolar transistors- Basic ideas of junction FET, Depletion mode MOSFET, Enhancement mode MOSFET and Silicon control rectifier

**RECTIFIER, AMPLIFIER AND OSCILLATOR:**

Half wave Rectifier, Full wave Rectifier, Bridge Rectifier, Filter, Choke input filter, Capacitors input filter, Zener Regulator. Un-biased transistor, Biased transistor, transistor currents, JFET Amplifier. Theory of Sinusoidal Oscillation, RC Oscillators, LC Oscillators, 555 Timer, 555 Circuits.

**OPERATIONAL AMPLIFIER**

Introduction of an Inverting Amplifier, Non Inverting Amplifier, Basic Application of operational amplifier: Subtractor, Summing Amplifier, Digital to Analog Converter, Low Pass Filter, First Order Low Pass Filter, First Order High Pass Filter, Integrator, Differentiator, Relaxation Oscillator.

**TEXT BOOK**

1. Albert Paul Malvino, Electronic Principles, Tata McGraw-Hill Publishing Company Limited, Sixth Edition, 1999.

**REFERENCES**

1. William H. Hayt, Jack E. Kemmerly, Steven M. Durbin, Engineering Circuit Analysis, Tata McGraw-Hill Publishing Company, Sixth Edition, 2002.

2. Robert L. Boylestad, Louis Nashelsky, Electronic devices and Circuit Theory, Pearson Education Asia, Eighth Edition, 2002.
3. Floyd, Electronic Devices, , Pearson Education, Sixth-Edition, 2002.
4. David A. Bell, “Electronics Devices and Circuits”, Fourth Edition-Prentice Hall of India, 1999.

<b>CIV101</b>	<b>BASIC CIVIL AND MECHANICAL ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>4</b>	<b>0</b>	<b>0</b>	<b>4</b>

**CIVIL ENGINEERING BUILDINGS**

Characteristics of good building materials such as stones, bricks, plywood and ceramic tiles, timber, cement, aggregates and concrete - Basic functions of buildings – Major components of buildings – Foundations - Purpose of a foundation – Bearing capacity of soils – types of foundations. Proper methods of construction of Brick masonry – Stone masonry – Hollow Block masonry. Beams – Lintels – Columns – Flooring – Damp proof course – surface finishes – Doors and windows – Roofing.

**TRANSPORTATION ENGINEERING**

Principles and Classification of surveying, Chain surveying, Compass surveying and leveling - Importance of roads – Classification of Highways –water bound macadam, bituminous and cement concrete roads –. Railways - Importance of railways – Gauges – Components of a permanent way. Bridges - Components of Culverts – Causeways, Slab Bridge, T-beam and slab bridge, Suspension bridge

**MECHANICAL ENGINEERING**

**BOILERS AND TURBINES**

Boilers - boiler mountings and accessories – Cochran boiler, Locomotive boiler, Babcock and Wilcox boiler, fire and water tube

boilers - Steam turbine - single stage impulse turbine, Parson's reaction turbine, difference between impulse and reaction turbines.

### **POWER PLANTS AND INTERNAL COMBUSTION (IC) ENGINE**

Classification of power plants – steam, nuclear, diesel and hydro power plants - Alternate sources of energy - solar, wind, tidal, geothermal, ocean thermal energy conversion. – IC engine - components, working of four and two stroke petrol and diesel engines.

### **PRODUCTION TECHNOLOGY**

Metal casting and forming process –patterns, moulding, melting of cast iron, casting – forging – rolling – extrusion – drawing - Metal joining process - welding – arc welding, gas welding, brazing and soldering - Metal machining – lathe, drilling machine, milling machine, shaping machine, planing machine, introduction to Computer Numerical Control machining.

### **TEXT BOOK**

1. Shanmugam, G., and Palanichamy, M.S., Basic Civil and Mechanical Engineering, Tata McGraw Hill Publishing Co., New Delhi, 1996.

### **REFERENCES**

1. Khanna, K., Justo C E G, Highway Engineering, Khanna Publishers, Roorkee, 2001
2. Arora S.P. and Bindra S.P., Building Construction, Planning Techniques and Method of Construction, Dhanpat Rai and Sons, New Delhi, 1997.
3. Venugopal K., Basic Mechanical Engineering, Anuradha Publications, Kumbakonam, 2000.
4. Shanmugam G., Basic Mechanical Engineering, Tata McGraw Hill Publishing Co., New Delhi, 2001.

<b>CHY101</b>	<b>ENVIRONMENTAL SCIENCES</b> (Common to all branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>2</b>	<b>0</b>	<b>0</b>	<b>2</b>

**NATURAL RESOURCES**

Definitions – Scope of Environmental Sciences - Forest Resource – Food Resource – Land Resource – Water – Mineral resources - Utilization of Natural Resource, Impact on Environment – Conservation of Natural Resources.

**ECOSYSTEM AND BIODIVERSITY**

Concept – Structure and Function – Energy Flow in Ecosystem – Ecological Succession – Food Chain – Food Web, Ecological Pyramids – Biodiversity, Definition, Values, Threats to Biodiversity, Conservation of Biodiversity.

**ENVIRONMENTAL POLLUTION**

Definition, Causes, Effects and Control Measures of Air, Water and Soil Pollution – Thermal and nuclear Pollution.

**MANAGEMENT OF ENVIRONMENTAL POLLUTION**

Solid Waste Management – Treatment Methods adopted for Municipal Sewage and Industrial Effluent – Hazardous and Biomedical Waste Management.

**TOOLS FOR ENVIRONMENTAL MANAGEMENT**

Environment Impact Assessment – Precautionary and Polluter Pay Principle - Constitutional Provision – (Air, Water and Forest) - Waste Minimization Techniques, Cleaner Technology Options, Bioremediation.

**TEXT BOOK**

1. Dhameja, S.K., Environmental engineering and Management, S. K. Kataria and sons, New Delhi, 1<sup>st</sup> edition 2004.

**REFERENCES**

1. Bharucha Erach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad, 1<sup>st</sup> edition, 2001.
2. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co. USA, 2<sup>nd</sup> edition, 2004.
3. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media., New Delhi, 2<sup>nd</sup> edition, 2004.
4. Masters, G. M., Introduction to Environmental Engineering & Science, Prentice Hall, New Delhi, 2<sup>nd</sup> edition, 1997
5. Henry, J. G. and Heike, G. W. Environmental Science & Engineering, Prentice Hall International Inc., New Jersey, 1<sup>st</sup> edition, 2005.

<b>MEC101</b>	<b>ENGINEERING DRAWING</b> (Common to all branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>1</b>	<b>0</b>	<b>3</b>	<b>2</b>

**INTRODUCTION**

Importance of graphics – use of drafting instruments – BIS conventions and specifications – size, layout and folding of drawing sheets – lettering dimensioning and scales - Orthographic principles - free hand sketching in first angle projection from pictorial views.

**PROJECTION OF POINTS, STRAIGHT LINES AND PLANES**

Projection of points, located in all quadrants - projection of straight lines located in the first quadrant, determination of true lengths and true inclinations, location of traces - projection of polygonal surface and circular lamina located in first quadrant inclined to one or both reference planes.

**PROJECTION AND SECTION OF SOLIDS**

Projection of solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method. Section of above solids in simple vertical position by cutting

planes inclined to any one of the reference planes, obtaining true shape of section.

### **DEVELOPMENT OF SURFACES**

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones - development of lateral surfaces of combined solids – prism and cylinder, cylinder and cylinder with axes at right angles with no offset.

### **ISOMETRIC AND PERSPECTIVE PROJECTION**

Principles of isometric projection – isometric view and projections of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of prisms, pyramids and cylinders by visual ray and vanishing point methods.

### **TEXT BOOK**

1. Bhatt, N.D., Engineering Drawing, Charotar publishing House, New Delhi, 46<sup>th</sup> Edition, 2003.

### **REFERENCES**

1. Natarajan, K.V., A text book of Engineering Graphics, Dhanalakshmi Publishers, Chennai, 2006.
2. Shah, M.B., and Rana, B.C., Engineering Drawing, Pearson Education, New Delhi, 2005.
3. Gopalakrishnana, K.R., Engineering Drawing (Vol. I and II), Subhas Publications, 1998.
4. Luzadder and Duff, Fundamentals of Engineering Drawing, Prentice Hall of India Pvt Ltd, New Delhi, XI Edition, 2001.
5. Venugopal, K., Engineering Graphics, New Age International (P) Limited, 2002.

<b>CSE101</b>	<b>INTRODUCTION TO COMPUTER SCIENCE AND ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION TO COMPUTERS**

Introduction, Characteristics, Generation, Classification and Application Digital Computer Fundamentals: Hardware – Basic Computer Organisation - Input unit, Output Unit, Storage Unit, ALU, Control Unit and CPU.

**PROCESSOR AND MEMORY**

Computer System – Input devices , Output devices , The Central Processing Unit - Instruction Set, Registers, Main Memory Organization, RAM, ROM, and Cache Memory. Software - Software Terminologies - Categories of software - Operating System (Functions and Types), Language Translators, Word Processing, Spreadsheet, PowerPoint and Database Management Systems

**NUMBER SYSTEMS**

Non-positional number systems - Positional Number systems - Conversion from one number system to another - Fractional Numbers - Computer Arithmetic- Binary Arithmetic - Addition, Subtraction, Division and Multiplication Computer Codes BCD code, EBCDIC code and ASCII code, Collating Sequence.

**PROBLEM SOLVING**

Program Solving Methodology, Problem solving Techniques - Algorithm, Flowchart, Control Structure, Pseudo code - Programming- Generation of Programming languages and Types - Machine Language, Assembly Language and High Level Language.

**DATA COMMUNICATION**

Computer Networks – Computer Security, Internet – Internet Services - Information Technology Role of Information Technology - Recent Trends – Multimedia

**TEXT BOOKS**

1. Pradeep K.Sinha and Priti Sinha, Computer Fundamentals: Concepts, Systems and Applications , BPB Publications, 2003. ( Unit III )
2. ITL Education Solution Limited, Introduction to Information Technology, Pearson Education,2005. (Unit I,II,IV,V)

**REFERENCES**

1. Allen B.Tucker et.al, Fundamentals of Computing , TMH New Delhi, 1998.
2. Rajaraman V, Fundamentals of Computers, Prentice-Hall of India, 2002.

<b>MEC181</b>	<b>WORK SHOP</b> (Common to all branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>

**CARPENTRY**

Carpentry tools - practice in marking, sawing, planing and chiseling – making simple joints: lap joint, T-joint, dovetail joint, mortise and tenon joint.

**FITTING**

Fitting tools - practice in marking, filing, punching, hacksawing - fitting to size and drilling - making of simple mating profiles: V, square, dovetail, half round joints.

**SHEET METAL**

Study of press, die and tools - sheet metal layout - development of lateral surfaces -simple exercises: blanking, forming, bending and flanging.

**DRILLING**

Drilling and tapping in drilling machines

**Demonstration on:**

- i) Welding operations like butt joint and lap joints in Arc welding
- ii) Foundry operations like mould preparation for split pattern
- iii) Smithy operations like the production of hexagonal bolt
- iv) Preparation of plumbing line sketches – basic pipe connections involving the fittings like valves, taps, couplings, unions, reducers, elbows and other components used in household fittings.

<b>CHY 181</b>	<b>CHEMISTRY LAB</b> (Common to all branches)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>1</b>

1. Preparation of standard and buffer solutions.
2. Estimation of hardness of water sample by EDTA method
3. Determination of dissolved oxygen in a sample of water.
4. Estimation of chloride and fluoride ion in water sample.
5. Determination of alkalinity of water sample.
6. Estimation of hydrochloric acid by pH titration
7. Estimation of ferrous ion by potentiometric titration
8. Estimation of mixture of acid by conductometric titration
9. Estimation of iron by spectrophotometric method.
10. Flame photometry – Determination of Na & K

**SEMESTER III**

<b>MAT201</b>	<b>MATHEMATICS III</b> (Common to Bio-Technology, Chemical Engineering, Civil Engineering, CSE, EEE, EIE and Mechanical Engineering)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
			<b>3</b>	<b>0</b>	<b>0</b>

**LAPLACE TRANSFORM**

Definition of Laplace Transform - Linearity property - condition for existence of Laplace Transform - First & Second Shifting properties - Laplace Transform of derivatives and integrals - Unit step functions - Dirac delta-function - Differentiation and Integration of transforms - Convolution Theorem - Inversion - Periodic functions - Evaluation of integrals by Laplace Transform - Solution of boundary value problems.

**PARTIAL DIFFERENTIAL EQUATIONS**

Formation of PDE – Solution of std types of first order PDE – Lagrange’s linear equation – Linear PDE of second and higher order with constant coefficients.

**FOURIER SERIES**

Dirichlet’s conditions – General Fourier series – odd and even functions – Half range sine and cosine series – complex form of Fourier series – Parseval’s identity – Harmonic analysis

**Z – TRANSFORM**

Z-transform – elementary properties – Inverse Z-transform – convolution theorem – formation of difference equation – solution of difference equation using Z-transform.

**FOURIER TRANSFORM**

Fourier Integral formula - Fourier Transform - Fourier sine and cosine transforms - Linearity, Scaling, frequency shifting and time

shifting properties - Self reciprocity of Fourier Transform - Convolution theorem -Application to boundary value problems.

**TEXT BOOKS**

1. Kreyszig, E, Advanced Engineering Mathematics, John Wiley and Sons (Asia) Limited, Singapore , 8<sup>th</sup> Edn., 2001.
2. Arumugam, S., Thangapandi Isaac, A., Somasundaram, A., Engineering Mathematics Volume II, Scitech Publications (India) Pvt. Ltd., Chennai, 1<sup>st</sup> Edn., Reprint 2000, 1999.

**REFERENCES**

1. Grewal , B.S., Grewal, J.S., Higher Engineering Mathematics, Khanna Publishers, New Delhi, 37<sup>th</sup> Edn., 5<sup>th</sup> Reprint 2004, 2003.
2. Venkataraman, M. K., Engineering Mathematics –III A, The National Publishing Company, Chennai, 11<sup>th</sup> Edn., Reprint 2002, 1998.
3. Venkataraman, M. K., Engineering Mathematics - III B, The National Publishing Company, Chennai, 13<sup>th</sup> Edn., Reprint 1999, 1998.

<b>CSE201</b>	<b>UNIX PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**INTRODUCTION TO UNIX**

Unix operating system - History - System structure – Users Perspective- OS Services- Hardware - Architecture- System Concepts - Kernel data structures – System Administration – Buffer Cache - Heaters – Structure of the Buffer Pool - Scenarios-Reading and writing Disk Blocks.

**FILE SYSTEMS**

INODES - Structure of a regular file - Directories – Conversion of a path name to an INODE - Super Block- INODE assignment – Disk Blocks- System calls for the file system

### **PROCESSES**

Process States and Transitions – Layout of System Memory – Context of a Process – Manipulation of the process address space – Sleep – Process Control – Creation – Signals – Awaiting process termination – The Shell – System Boot and Init Process – Process Scheduling and Time – System calls for time – Clock.

### **MEMORY MANAGEMENT**

Swapping – Segmentation - Demand Paging – I/O Subsystem - Driver Interfaces – Disk Drivers – Terminal Drivers - Streams.

### **INTERPROCESS COMMUNICATION**

Process Tracing – System V IPC – Network Communications - Sockets – Problem of Multiprocessor Systems – Solution with Master and Slave Processors – Semaphores – Distributed Unix Systems – Satellite Processors – Newcastle connection – Transparent distributed file systems – System Calls.

### **TEXT BOOKS**

1. Bach M.J., The Design of the Unix Operating System, Prentice Hall India, 2001.

### **REFERENCES**

1. Goodheart B., Cox.J., The Magic Garden Explained, Prentice Hall India, 1994.
2. Leffler S.J., Mckusick M.K., Karels M.J and Quarterman J.S., The Design and Implementation of the 4.3 BSD Unix Operating System. Addison Wesley, 1998.

<b>CSE202</b>	<b>DATA STRUCTURES AND ALGORITHMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

### **INTRODUCTION**

The Role of Algorithms in Computing - Algorithms, Algorithms as a technology - analyzing algorithms - designing algorithms -

Structures in C - Implementing structures - Unions in C - Implementation of unions - Structure parameters - Recursive definition and processes: Factorial function - Fibonacci sequence - Recursion in C - Efficiency of recursion

### **STACKS, QUEUES AND HASHING**

Abstract Data Types- Stacks and queues, Linked lists, Implementing pointers and objects, Representing rooted trees. Hash Tables - Direct-address tables, Hash tables, Hash functions - Open addressing - perfect hashing.

### **TREES**

Binary Search Trees- Querying a binary search tree, Insertion and deletion, randomly built binary search trees. Red-Black Trees - Properties of red-black trees, Rotations, Insertion, Deletion –AVL trees-rotations. B-Trees - Definition of B-trees, Basic operations on B-trees, deleting a key from a B-tree.

### **SORTING AND SEARCHING**

Priority Queues (Heaps) – Model – Simple implementations – Binary Heap. Sorting-Bubble sort, insertion sort, selection sort, shell sort, Heap sort, quick sort, Counting sort, Radix sort, Bucket sort. Searching- linear search, Binary search

### **GRAPHS**

Elementary Graph Algorithms - Representations of graphs, Breadth-first search, Depth-first search, Topological sort, strongly connected components. Minimum Spanning Trees- Growing a minimum spanning tree , The algorithms of Kruskal and Prim .shortest paths in directed acyclic graphs, Dijkstra's algorithm ,All Pairs Shortest Paths - Shortest paths and matrix multiplication , The Floyd - Warshall algorithm .

**TEXT BOOK**

1. Cormen T. H., Leiserson C. E., Rivest R. L. and Stein C., Introduction to Algorithms, Prentice Hall India, 2nd Edition, 2002.

**REFERENCES**

1. Aaron Tenenbaum M, Yeedidiah Langsam, Moshe Augenstein J., Data structures using C, Pearson Education, 2004
2. Weiss M. A., Data Structure and Algorithm Analysis in C, Addison Wesley, 1997.
3. Horowitz E., Shan S, Fundamentals of Data Structures, Pittman, 1977.

<b>CSE203</b>	<b>SYSTEM SOFTWARE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**BACKGROUND**

System Software and Machine Architecture – SIC, RISC and CISC Architectures

**ASSEMBLERS**

Machine Dependent and Independent Assembler Features – Assembler Design Options - Implementation Examples

**LOADERS AND LINKERS**

Machine Dependent and Independent Loader Features - Loader Design options -Implementation Examples

**MACROPROCESSORS**

Machine Independent Macro Processor Features - Macro Processor Design Options -Implementation Examples

**OTHER SYSTEM SOFTWARE**

Basic Compiler Functions - DBMS-Text Editors - Interactive Debugging Systems

**TEXT BOOK**

1. Leland L. Beck , System Software: An Introduction to Systems Programming, Addison-Wesley , 3<sup>rd</sup> Edition

**REFERENCES**

1. Dhamdhere D.M, Systems Programming and Operating Systems, Tata McGraw-Hill Publishing Co. Ltd., New Delhi, 2<sup>nd</sup> revised edition, 2003.
2. Godbole, A, Operating Systems & Systems Programming, The McGraw-Hill Education, India, 2003,

<b>EEE254</b>	<b>SWITCHING THEORY AND DIGITAL DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**BOOLEAN ALGEBRA**

Boolean Algebra - Special functions

**DESIGN**

Minimum Cost Two-Level Designs - Minimal Cost Two-Level Designs

**CIRCUITS**

Binary Decision Diagrams - Synchronous Sequential Circuits

**SEQUENTIAL CIRCUITS**

Design of Synchronous Sequential Circuits - Asynchronous Sequential Circuits

**MUTILEVEL CIRCUITS**

Introduction to Design of Multilevel Circuits - Gedanken Experiments

**TEXT BOOK**

1. Gary D. Hachtel and Fabio Somenzi, Logic Synthesis and Verification Algorithms, Kluwer Academic Publishers, 1996

<b>EEE294</b>	<b>DIGITAL LOGIC AND DESIGN LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Combinational Logic Design.
2. Real World Circuit Behavior.
3. Implementing Combinational Circuits.
  - 1 Segment Decoder, Redux.
4. Structural VHDL and Iterative Circuits.
5. Basic logic building blocks, muxes, encoders, decoders,
6. Registers, counters, latches.
7. Synchronous finite state machine design.
8. Memory devices and microprocessor busses
9. Mixed signal design, analog to digital converters.

<b>CSE281</b>	<b>DATA STRUCTURES LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

Simple programs using structure and recursive method

1. Write a program to implement a list using an array .
2. Write a program to create a singly linked list
3. Write a program to implement a stack using an array .
4. Write a program to implement a stack using a linked list .
5. Write a program to check for balanced parentheses of an expression using array implementation of stack.
6. Write a program to check for balanced parentheses of an expression using linked list implementation of stack.
7. Write a program to evaluate a postfix expression using array implementation of stack.

8. Write a program to evaluate a postfix expression using linked list implementation of stack.
9. Write a program to implement a Queue using an array.
10. Write a program to implement a Queue using linked list.
11. Write a program to implement a binary search tree.
12. Write a program to sort a set of elements using bubble sort, insertion sort, selection sort, Shell sort, heap sort, and quick sort
13. Write a C program to search a set of elements using linear search and binary search.
14. Write a C program to implement the Dijkstra's Algorithm
15. Write C program for the implementation of minimum spanning using Kruskal and Prims algorithm.

<b>CSE282</b>	<b>SYSTEM SOFTWARE LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

Using C or C++

1. Implement a symbol table with functions to create, insert, modify, search, and display.
2. Implement pass one of a two pass assembler.
3. Implement pass two of a two pass assembler.
4. Implement a single pass assembler
5. Implement a macro processor.
6. Implement an absolute loader.
7. Implement a relocating loader.
8. Implement a direct-linking loader.
9. Implement a simple text editor with features like insertion / deletion of a character, word, sentence.
10. Debugging the program.

**SEMESTER IV**

<b>MAT221</b>	<b>MATHEMATICS IV</b> (Common to CSE and IT)	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**PROBABILITY , RANDOM VARIABLES AND STANDARD DISTRIBUTIONS**

Axioms of probability - Conditional probability - Total probability - Bayes theorem - Random variable - Probability mass function - Probability density functions - Properties- Mathematical expectation - Moments - Moment generating functions and their properties - Binomial, Poisson, Geometric, Negative Binomial, Uniform, Exponential, Gamma, Weibull and Normal distributions and their properties - Functions of a random variable.

**TWO DIMENSIONAL RANDOM VARIABLES**

Joint distributions - Marginal and conditional distributions – Independent random variables - Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem.

**TESTING OF HYPOTHESIS**

Sampling distributions – Testing of hypothesis for mean, variance, proportions and differences using Normal, t, Chi-square and F distributions - Tests for independence of attributes and Goodness of fit.

**DESIGN OF EXPERIMENTS**

Analysis of variance – One way classification – CRD - Two – way classification – RBD - Latin square.

**GRAPH THEORY**

Introduction of graphs - paths, cycles, and trails - vertex degrees and counting - Directed graphs - trees and distance basic properties - Spanning trees, enumeration, optimization and trees.

**TEXT BOOKS**

1. Gupta, S.C, and Kapur, J.N., Fundamentals of Mathematical Statistics, Sultan Chand, New Delhi, 11<sup>th</sup> Edn., 2006.
2. Ross, S., A first Course in Probability, Pearson Education, Delhi, 5<sup>th</sup> Edn., 2002.
3. Arumugam, S., Ramachandran, S., Invitation to Graph Theory, Scitech Publications (India) Pvt. Ltd., Chennai, 1<sup>st</sup> Edn., Reprint 2006, 2001.

**REFERENCES**

1. Johnson. R. A., Miller & Freund's Probability and Statistics for Engineers, Prentice Hall of India, New Delhi, 7<sup>th</sup> Edition., 2005.
2. Wilson, R.J., Graph Theory, Person Edition, New Delhi, 4<sup>th</sup> Edition., Reprint 2004, 2003.

<b>CSE204</b>	<b>THEORY OF COMPUTATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**AUTOMATA**

Introduction to formal proof – Additional forms of proof – Inductive proofs – Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions.

**REGULAR EXPRESSIONS AND LANGUAGES**

Regular Expression – Regular Grammars– properties of regular languages-pumping Lemma and application

**CONTEXT-FREE GRAMMAR AND LANGUAGES**

Context-Free Grammar (CFG) – Application- Parse Trees – Ambiguity in grammars and languages – Pushdown automata – Languages of a Pushdown Automata – Equivalence of Pushdown automata and CFG - Deterministic Pushdown Automata.

**PROPERTIES OF CONTEXT-FREE LANGUAGES**

Normal forms for CFG – Pumping Lemma for CFL –Applications properties of CFL – Turing Machines – Programming Techniques for TM-Extensions-Restricted TM

**UNDECIDABILITY**

A language that is not Recursively Enumerable (RE) – An undecidable problem that is RE – Undecidable problems about Turing Machine – Post’s Correspondence Problem - The classes P and NP-NP complete-complements of languages in NP

**TEXT BOOK**

1. Hopcroft J.E, Motwani R., and Ullman J.D, Introduction to Automata Theory, Languages and Computations, 3<sup>rd</sup> Edition, 2006.

**REFERENCES**

1. Martin J., Introduction to Languages and the Theory of Computation, TMH, 3<sup>rd</sup> Edition, 2003
2. Lewis H.R. and .Papadimitriou C.H, Elements of The theory of Computation, Pearson Education/PHI, 2<sup>nd</sup> Edition, 2003

<b>CSE205</b>	<b>COMPUTER SYSTEMS ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION TO SYSTEMS**

System Science And Engineering - System Definitions And Elements - A Classification Of Systems, Science And System Science, Technology And Technical Systems, Transition To The Systems Age, Systems Engineering. Bringing Systems Into Being - The Engineered System, System Life-Cycle Engineering, The Systems Engineering Process, System Design Considerations, System Synthesis, Analysis, And Evaluation, Implementing Systems Engineering, A Generic System Example.

### **THE SYSTEM DESIGN PROCESS**

Conceptual System Design - Problem Definition And Need Identification - Advanced System Planning - System Feasibility Analysis - System Operational Requirements, Maintenance And Support Concept - Technical Performance Measures - Functional Analysis And Allocation - System Trade-Off Analyses - System Specification - Conceptual Design Review. Preliminary System Design - Subsystem Design Requirements, Development, Product, Process, And Material Specifications, Functional Analysis And Allocation (Subsystem), Detailed Design Requirements, Engineering Design Tools And Technologies, Trade-Off Studies And Design Definition - Design Review - Evaluation - Feedback.

### **SYSTEMS ANALYSIS AND DESIGN EVALUATION**

Alternatives and Models in Decision Making - Alternatives in Decision Making, Models in Decision Making, Decision Evaluation Theory - Decisions Involving Multiple Criteria - The Decision Evaluation Display - Decisions Under Risk and Uncertainty. Models for Economic Evaluation - Interest And Interest Formulas, Determining Economic Equivalence, Evaluating a Single Alternative - Evaluating Multiple Alternatives - Evaluation Involving Multiple Criteria - Multiple Alternatives With Multiple Futures - Break-Even Economic Evaluations - Break - Even Evaluation Under Risk.

### **DESIGN FOR OPERATIONAL FEASIBILITY**

Definition And Explanation Of Reliability - Measures Of Reliability, reliability in the system life cycle - Reliability Analysis Methods - Reliability Test and Evaluation. Design for Maintainability - Definition and Explanation Of Maintainability, Measures Of Maintainability, Availability And Effectiveness Measures, Maintainability In The System Life Cycle, Maintainability Analysis Methods - Maintainability Demonstration.

### **SYSTEMS ENGINEERING MANAGEMENT**

Systems Engineering Planning And Organization-Systems Engineering Program Planning, - Systems Engineering Management

Plan (Semp), Organization For Systems Engineering, Program Management, Control, And Evaluation-Organizational Goals And Objectives, Outsourcing And The Identification Of Suppliers, Program Leadership And Direction, Program Evaluation And Feedback, Risk Management.

**TEXT BOOK**

1. Blanchard, Benjamin S.; Fabrycky, Wolter J., Systems Engineering and Analysis, 4<sup>th</sup> Edition

<b>CSE206</b>	<b>OBJECT ORIENTED PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**INTRODUCTION**

Introduction to OOP – Basic Concepts of OOP – Applications of OOP- Introduction to C++ - Introduction to C++ stream I/O – declarations in C++ - Creating New data types in C++ - function Prototypes – Inline functions – Reference Parameters – Const Qualifier – Dynamic memory allocation – default arguments – Unary Scope resolution operator – Linkage specifications.

**CLASSES, CONSTRUCTORS AND FRIEND CLASS**

Introduction – Comparing class with Structure – Class Scope – Accessing Members of a class – Constructor – Destructor – Const objects – Const member functions – Friend class – Friend function – This pointer – Data abstraction and Information hiding – container classes and Iterators.

**OVERLOADING & INHERITANCE**

Operator Overloading – Fundamentals – Restrictions – Overloading stream – Insertion and stream extraction operators – Overloading unary & binary operators – Converting between types – Overloading ++ and --. Inheritance – Introduction – Protected members – Casting base \_class pointers to derived \_class pointers – Overloading Base class members in a Derived class – Public, Protocols and Private

inheritance – Direct base classes and Indirect Base Classes – Using Constructors and Destructors in Derived classes – Implicit Derived class object to base class object conversion.

### **VIRTUAL FUNCTIONS, STREAMS AND FILES**

Introduction – Type fields and switch statements – Virtual functions – Abstract base classes and concrete classes – Polymorphism – Dynamic binding – Virtual destructors. C++ Stream I/O: Streams – Stream Input – Stream Output – Unformatted I/O – Stream manipulators – Stream format states – Stream error – States. Files: File Operations, File pointers, Error Handling during file Operations.

### **TEMPLATES & EXCEPTION HANDLING**

Templates – Function templates – Class templates – Overloading template functions – Class template and non type parameters – Templates with Multiple parameters. Exception Handling - When exception handling, Basic of C++ exception, Catching an exception, re throwing an exception, exception specifications.

### **TEXT BOOK**

1. Goran Svenk , Object-Oriented Programming Using C++ for Engineering and Technology, Thomson Delmer Learning, 2003

### **REFERENCES**

1. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley, 2000.
2. John R.Hubbard, Programming with C++, Schaums outline series, TMH 2003.
3. Deitel H.M., and Deitel P.J., How to program C++, PHI 2003.

<b>CSE207</b>	<b>OPERATING SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Computer-System Organization - Computer-System Architecture - Operating-System Structure- User Operating-System Interface - System Calls - Types of System Calls - System Programs - Operating-System Design and Implementation -Operating-System Structure - Operating-System Generation

**PROCESS MANAGEMENT**

Process Concept - Process Scheduling - Operations on Processes - Interprocess Communication - Examples of IPC - Communication in Client-Server Systems - Threads - Overview - Multithreading - CPU Scheduling - Concepts - Scheduling Criteria - Scheduling Algorithms - Multiple-Processor Scheduling - Process Synchronization - The Critical-Section Problem - Synchronization Hardware - Semaphores - Classic problems of Synchronization - Critical regions - Monitors.

**DEADLOCKS**

System Model - Deadlock Characterization - Methods for handling Deadlocks -Deadlock Prevention - Deadlock avoidance - Deadlock detection - Recovery from Deadlocks - Memory Management - Main Memory - Swapping - Contiguous Memory allocation - Paging- Segmentation - Segmentation with Paging.

**STORAGE MANAGEMENT**

Virtual Memory - Demand Paging - Copy-on-Write - Page Replacement - Allocation of frames - Thrashing - Memory Mapped files - Allocating Kernel memory- File Concept - Access Methods - Directory Structure - File System Mounting - File Sharing - Protection - File System Structure - File System Implementation - Directory Implementation - Allocation Methods - Free-space Management

**DISK MANAGEMENT**

Mass Storage Structure - Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management - RAID Structure - Stable-Storage Implementation - Tertiary-Storage Structure – I / O Hardware - Kernel I/O Subsystem – Protection and Security - Case Study: The Linux System, Windows XP – Introduction Real Time and Multimedia Systems

**TEXT BOOK**

1. Abraham Silberschatz , Peter Galvin, Greg Gagne, Operating System Concepts, John Wiley and Sons , 7<sup>th</sup> Edition ,2004

**REFERENCES**

1. Andrew S. Tanenbaum, Albert S Woodhull, Operating Systems Design and Implementation, Prentice Hall, 3<sup>rd</sup> Edition, 2006.
2. William Stallings, Operating Systems, Prentice Hall, 5<sup>th</sup> Edition, 2004.
3. Gary Nutt, Operating Systems: A Modern Perspective, Addison-Wesley, 3<sup>rd</sup> Edition 2004.

<b>CSE208</b>	<b>HUMAN COMPUTER INTERACTION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**FUNDAMENTALS**

Introduction - History of HCI - Aspects of Human Cognition - The Computer - Models of Interaction

**FRAMEWORK**

HCI frameworks & paradigms - Usability principles – Design of everyday things

**HUMAN ABILITIES**

Predictive evaluation – Interpretive evaluation – task analysis -  
Empirical Evaluation –Gathering usability data – usability  
sepecifications

**APPLICATION**

Usability - Design Process - Task Analysis - HCI issues in  
software engineering - UI Agents

**ADVANCED TOPICS**

Organisational Impact - Groupware - Pervasive Computing - Future  
Applications and Conclusions

**TEXT BOOK**

1. John Carroll , Human-Computer Interaction in the New  
Millennium, 2002

**REFERENCE**

1. Dix, Finlay, Abowd, Beale, Human Computer Imteractions, 2<sup>nd</sup>  
Edition, 1998

<b>CSE283</b>	<b>COMPUTER SYSTEMS DESIGN LABORATORY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Software development and debugging on the Micro trainer;  
engineering documentation.
2. Computer bus timing and analysis with oscilloscope and  
logic analyzer
3. Parallel input/output port interfacing and software control.
4. Parallel I/O exercise – keypad interface – hardware/software
5. Interrupt support hardware and software for keypad control.
6. Real-time operation with 8254 programmable interval timer  
and interrupts.
7. PWM waveform generation with the 8253/8254  
programmable interval timer.

8. DC motor speed control with pulse-width modulation and a AC-DC converter.
9. Motor speed sensing: frequency counting (model & implement).
10. Motor characterization (step response).
11. Implementation of a motor PID control algorithm (model & implement).
12. PID controller.

<b>CSE284</b>	<b>OPERATING SYSTEMS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

(Implement the following on UNIX platform. Use C for high level language implementation)

1. Basic Commands in Unix Operating System
2. Working with vi editor and advanced Commands
3. Shell programming – I
  - Simple Programs
4. Shell programming - II
  - using loops, patterns, expansions and substitutions
5. Write programs using the following system calls of UNIX operating system:
  - fork, exec, getpid, exit, wait, close, stat, opendir, readdir
6. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)
7. Simulation of UNIX commands.
8. Implementation of CPU Scheduling Algorithms.
9. Implementation of Page Replacement Algorithms.
10. Implement the Producer – Consumer problem using semaphores.
11. Simulation of Shared Memory Concept in UNIX
12. Implementation of bankers Algorithm.
13. Implementation Disk Scheduling Algorithms

<b>CSE285</b>	<b>OBJECT ORIENTED PROGRAMMING LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Simple C++ programs.
2. Programs using Functions.
3. Function Overloading
4. Operator Overloading
5. Simple & Multiple Inheritance
6. Multilevel & Hybrid Inheritance
7. Virtual Functions
8. Polymorphism
9. File Handling
10. Templates
11. Exception Handling

**SEMESTER-V**

<b>CSE301</b>	<b>COMPUTER ARCHITECTURE AND ORGANISATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**BASIC STRUCTURE OF COMPUTERS**

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

**ARITHMETIC UNIT**

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

**BASIC PROCESSING UNIT**

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

**MEMORY SYSTEM**

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory - Memory Management requirements – Secondary storage.

**I/O ORGANIZATION**

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

**TEXT BOOK**

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, Computer Organization, McGraw-Hill, 2002, 5<sup>th</sup> Edition.

**REFERENCES**

1. William Stallings, Computer Organization and Architecture – Designing for Performance, Pearson Education, 6<sup>th</sup> Edition, 2003.
2. David A.Patterson and John L.Hennessy, Computer Organization and Design: The hardware software interface, Morgan Kaufmann, 2<sup>nd</sup> Edition, , 2002.
3. John P.Hayes, Computer Architecture and Organization, McGraw Hill, 3<sup>rd</sup> Edition, 1998.

<b>CSE302</b>	<b>MICROPROCESSORS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**INTRODUCTION AND ARCHITECTURE**

Intel 8086 Microprocessor – Architecture – Assembly Language Programming .

**8086 SOFTWARE ASPECTS**

Linking and relocation – Stacks – Procedures – Macros - Interrupts and Interrupt Routines – Byte & String Manipulation.

**8086 SYSTEM DESIGN**

Minimum mode and maximum mode configurations – System design using 8086 - Coprocessor, Closely coupled and loosely coupled configurations.

**I/O INTERFACES**

Parallel communication interface – Programmable Timer – Keyboard and Display controller – DMA controller – Interrupt controller

**ARCHITECTURE AND SALIENT FEATURES OF ADVANCED PROCESSORS:**

Intel’s family of processors – 80286, 80386, 80486 and the Pentium and Pentium pro microprocessors.

**TEXT BOOKS**

1. Yu-cheng Liu and Glenn A.Gibson, Microcomputer Systems: The 8086/8088 Family Architecture, Programming & Design, Prentice Hall of India Pvt. Ltd, 2<sup>nd</sup> Edition, 2004.
2. Barry B.Brey, The Intel Microprocessors – 8086/8088, 80186, 286, 386, 486, Pentium and Pentium Pro processor, Prentice Hall of India Pvt. Ltd., 2004.

**REFERENCES**

1. Douglas V. Hall, Microprocessors and Interfacing, Tata McGraw Hill, 2004.
2. Peter Abel, IBM PC Assembly Language and Programming, Prentice Hall of India Private Limited, 2005.

<b>CSE303</b>	<b>SOFTWARE ENGINEERING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**SOFTWARE ENGINEERING CONCEPTS**

Software and Software Engineering- project management concepts  
 Software engineering paradigms - water fall life cycle model - prototype model - RAD model - spiral model - incremental model - 4<sup>th</sup> generation techniques - Planning and Scheduling – Cost Estimation – Risk Analysis and management– Requirements and specification.

**MEASURE, METRICS AND QUALITY**

Measures – metrics – Indicators - Metrics in process and project domains - Software measurement - Metrics for software Quality - Integrating metrics in a software engineering process - Software quality assurance – Reliability standards

**DESIGN CONCEPTS**

Design Process - Design Principles - Design Concepts - Effective modular design - Design Notations - Software architecture - Mapping - user interface design

**SOFTWARE TESTING AND DEBUGGING**

Testing Fundamentals and strategies - White-box and Black box testing - Basis path testing - data flow testing - testing for special environments - Unit testing, - Integration testing - validation testing - system testing – debugging - software maintenance - software configuration management

**ADVANCED TOPICS**

Computer Aided Software Engineering - Clean room software engineering – Reengineering - Reverse Engineering

**TEXTBOOK**

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Mc-Graw Hill, 6<sup>th</sup> Edition, 2004.

**REFERENCES**

1. Steve McConnell, Code Complete, Second Edition, Microsoft Press.
2. Ian Somerville, Software Engineering,, Addison-Wesley, 8<sup>th</sup> edition, 2006.
3. Richard E. Fairley, Software Engineering Concepts, McGraw-Hill, 1985.

<b>CSE305</b>	<b>COMPILER DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION TO COMPILING**

Introduction to Compiler - Analysis of the Source Program - The Phases of a Compiler – Cousins of the Compiler - The Grouping of Phases - Compiler-Construction Tools - One-Pass Compiler.

### **LEXICAL ANALYSIS**

The Role of the Lexical Analyzer - Input Buffering - Specification of Tokens - Recognition of Tokens - A Language for Specifying Lexical Analyzers - Finite Automata - From a Regular Expression to an NFA - Design of a Lexical Analyzer Generator - Optimization of DFA

### **SYNTAX ANALYSIS**

The Role of the Parser - Context-Free Grammars - Writing a Grammar - Top-Down Parsing - Recursive Descent Parsing - Predictive Parsing - Bottom-Up Parsing - Shift Reduce Parsing - Operator-Precedence Parsing - LR Parsers - SLR Parser - Canonical LR Parser - LALR Parser - Using Ambiguous Grammars - Parser Generators

### **CODE GENERATION**

Intermediate Languages - Declarations - Assignment Statements - Boolean Expressions - Case Statements - Back patching - Procedure Calls - Issues in the Design of a Code Generator - The Target Machine - Run-Time Storage Management - Basic Blocks and Flow Graphs - Next-Use Information - A Simple Code Generator - DAG Representation of Basic Blocks

### **CODE OPTIMIZATION AND RUN TIME ENVIRONMENTS**

Introduction - The Principal Sources of Optimization - Peephole Optimization - Optimization of Basic Blocks - Loops in Flow Graphs - Introduction to Global Data-Flow Analysis - Code-Improving Transformations - Dealing with Aliases - Data-Flow Analysis of Structured Flow Graphs - Estimation of Types - Symbolic Debugging of optimized Code.

### **TEXT BOOK**

1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman, Monica S. Lam, Compilers: Principles, Techniques, and Tools, Pearson Education, 2006.

**REFERENCES**

1. Allen I. Holub, Compiler Design in C, Prentice Hall of India, 2003
2. Bennet J.P., Introduction to Compiler Techniques, Tata McGraw-Hill, 2<sup>nd</sup> Edition, 2003
3. Henk Alblas and Albert Nymeyer,, Practice and Principles of Compiler Building with C, PHI, 2001.

<b>CSE381</b>	<b>SOFTWARE ENGINEERING LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Selection of a project for each organized team.
2. Preparation of System Requirement Specification (SRS) and related analysis documents as per the guidelines in ANSI/IEEE Std 830-1984.
3. Estimation using COCOMO and Functions point model for the project chosen.
4. Developing Schedules and Tracking the progress
5. Decomposing systems into modules.
6. Design documents representing the complete design of the software system as well as the design diagrams for each module.
7. Analysis and design for the same problem in O-O approach.
8. Test documents as per ANSI/IEEE Std. 829/1983 and prepare Software Test Documentation.
9. Implementation

10. Testing the developed software– preparation of test cases,  
Execution of test cases.

11. Debugging

12. Maintenance using SCM tools

<b>CSE385</b>	<b>COMPILER DESIGN LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Write a Program to design Token Separator for the given Expression
2. Implement a lexical analyzer part of a ‘C’ Compiler
3. Constructing NFA from a regular Expression
4. Constructing DFA from a regular Expression
5. Find leading and Trailing of the given Grammar
6. Constructing Top down parsing table
7. Implementation of Shift reduce parsing Algorithm
8. Implementation of Operator precedence Parsing Algorithm
9. Constructing LR Parsing table
10. Generation of DAG for the given expression
11. Simulation of Symbol Table Management
12. Generation of a code for a given intermediate code

13. Use LEX tool to implement a lexical analyzer
14. Use LEX and YACC to implement a parser
15. Use LEX and YACC to Implement DESK Calculator

<b>CSE383</b>	<b>MICROPROCESSORS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Assembly language programming in 8086**

1. Write a program for 16 bit addition and 16 bit subtraction.
2. Write a program to find a length of the given string.
3. Write a program to store numbers from 00 to FF in consecutive memory locations.
4. Write a program to find the sum of the numbers in a word array.
5. Write a DAC program for generation of sawtooth and triangular wave generation.
6. Write a ADC program to convert the analog voltage to the corresponding digital value.
7. Write an interrupt controller program to check the enable status of the interrupts.
8. Write a program to check the status of the peripheral IC8255 ports.
9. Write a program to generate a square wave using parallel peripheral interface chip.

10. Write a program to check the triggering of the clock pulse of the timer.
11. Write a program using 8279 to display the word CSE DEPT in seven segment display.
12. Write a program to run a stepper motor at different speeds.
13. MINI projects using 8086/8051 regarding controller experiments.

<b>SEMESTER VI</b>
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<b>CSE304</b>	<b>DATABASE MANAGEMENT SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>3</b>

**INTRODUCTION TO RELATIONAL MODEL**

Database-System Applications - Purpose of Database Systems - View of Data - Database Languages - Relational Databases - Database Design - Structure of Relational Databases - Fundamental Relational-Algebra -operations – Additional & Extended Relational-Algebra operations - Null Values - Modification of the Database - Relational Languages -Tuple Relational Calculus - Domain Relational Calculus.

**SQL**

SQL - Data Definition - Structure of SQL Queries - Set Operations - Aggregate Functions - Nested Sub queries - Complex Queries - Views – Data base Modification - Joined Relations - SQL Data Types and Schemas - Integrity Constraints - Authorization - Embedded SQL - Dynamic SQL - Functions and Procedural Constructs - Recursive Queries - Advanced SQL Features

**DATABASE DESIGN**

Overview of the Design Process - ER Model - Constraints - ER-Diagrams - Design Issues - Weak Entity Sets - Extended E-R Features - Reduction to Relational Schemas - UML - Relational Database Design - Features of Good Relational Designs - Normalization and its Types - Functional-Dependency Theory - Decomposition Using Functional Dependencies - Decomposition Using Multivalued Dependencies.

**DATA STORAGE AND QUERY PROCESSING**

Introduction to Storage and File Structure - Indexing - Basic Concepts - types - Comparison - B-Tree Index Files - Bitmap Indices

– B+ Trees - Multiple-Key Access - Static Hashing - Dynamic Hashing - Query Processing - Overview - Measures of Query Cost - selection Operation -sorting -join Operation -Evaluation of Expressions - Query optimization – Data Analysis and Mining – Information Retrieval

**TRANSACTION MANAGEMENT**

Transaction Concept - Transaction State - Implementation - Concurrent Executions Serializability - Testing for Serializability - concurrency Control - Lock-Based Protocols - Timestamp-Based Protocols - Validation-Based Protocols - Deadlock Handling - Weak Levels of Consistency -Recovery System - Failure Classification - Storage Structure - Recovery and Atomicity - Log-Based Recovery - Recovery with Concurrent Transactions - Buffer Management - Failure with Loss of Nonvolatile - Storage - Advanced Recovery Techniques - Remote Backup Systems

**TEXT BOOK**

1. Abraham Silberschatz, Henry F. Korth and Sudarshan S., Database System Concepts, McGraw-Hill , 5<sup>th</sup> Edition, 2005.

**REFERENCES**

1. Ramez Elmasri and Shamkant B. Navathe, Fundamental Database Systems, Addison-Wesley, 5<sup>th</sup> Edition, 2005.
2. Raghu Ramakrishnan, Database Management System, Tata McGraw-Hill, 3<sup>rd</sup> Edition, 2006
3. Hector Garcia-Molina, Jeff Ullman, and Jennifer Widom, Database Systems: The Complete Book, Prentice Hall, 2003.

<b>CSE306</b>	<b>DATA COMMUNICATION AND NETWORKS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**DATA COMMUNICATION OVERVIEW**

Data Communications, - Data Networking - the Internet - Protocol Architecture - TCP/IP - Internet based Application

### **DATA COMMUNICATION**

Data Transmission - Guided and Wireless Transmission - Digital Data Communication Techniques - Data Link Control - Multiplexing

### **WIDE AREA NETWORKS**

Circuit Switching - Packet Switching - Routing in Switched Networks - Congestion Control in Switched Data Networks - Cellular Wireless Networks

### **LOCAL AREA NETWORKS AND TRANSPORT PROTOCOLS**

Local Area Network Overview - High-Speed LANs - Wireless LANs - Internetwork Protocols - Internetwork Operation - Transport Protocols

### **INTERNETWORK APPLICATIONS**

Internet Applications - Electronic Mail and Network Management - Internet Applications - Internet Directory Service and World Wide Web - Voice over IP - Session Initiation Protocol - Real Time Transport Protocol.

### **TEXT BOOK :**

1. William Stallings, Data And Computer Communication, 8<sup>th</sup> Edition, 2005

### **REFERENCES**

1. Tanenbaum A. S., Computer Networks, Prentice Hall, 4<sup>th</sup> Edition, 2003.
2. Leon-Garcia A., and Widjaja I., Communication Networks: Fundamental Concepts and Key Architectures, McGraw-Hill, 2<sup>nd</sup> Edition, 2004.

<b>CSE384</b>	<b>COMPUTER NETWORKS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Basic Unix Commands
2. Introduction to socket programming
3. Write an application for client-server environment (TCP, UDP)
4. Multicast Server/Client application
5. Data Link Layer Operations
6. Domain name service
7. Getting the MAC Address
8. HTTP Download
9. Cryptography
10. Remote Command Execution
11. Remote Method Invocation

<b>CSE382</b>	<b>DATABASE MANAGEMENT SYSTEMS LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**MS-ACCESS**

1. Creating Tables and Queries using Access
2. Creating Forms and Reports using Access

**SQL**

1. Implementation of DDL commands in RDBMS.
2. Implementation of DML and DCL commands in RDBMS.
3. Implementation of Date and Built in Functions of SQL.

**PL/SQL**

1. Implementation of Simple Programs.
2. Implementation of High-level language extension with Cursors.
3. Implementation of High level language extension with Triggers
4. Implementation of stored Procedures and Functions.

5. Embedded SQL.
6. Database design using E-R model and Normalization.
7. Database Connectivity using ADO
8. Database Connectivity using ODBC
9. Database Connectivity using JDBC

<b>CSE386</b>	<b>ADVANCED PROGRAMMING LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Linked List Implementation of Stack & Queue
2. Implementation Sorting Algorithms
3. Implementation Searching Algorithms
4. Find the strongly connected components in a directed graph.
5. Find the articulation points and biconnected components in an undirected graph.
6. Find minimum spanning tree of a given graph
7. Binary tree Construction and Traversal
8. Implementation of AVL Tree and its operations
9. Implementation of Hash table and its operations
10. Implementation of n queen problem using backtracking

**SEMESTER- VII**

<b>CSE401</b>	<b>OBJECT ORIENTED SOFTWARE DEVELOPMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**INTRODUCTION AND USE CASE MODEL**

Object oriented concepts-Object Oriented systems analysis and design-Concept of a software development lifecycle-Unified Process-Iterative process - Definition of the Inception phase - FURPS+ model. Use Case Model: Goals and scope of a Use Case-Actors - Finding Primary Actors, Goals, and Use Cases-Identifying and writing Use Cases-Use Case types and formats

**ELABORATION PHASE AND INTERACTION DIAGRAM**

Definition of the Elaboration phase -Estimate the overall schedule and resources- System behavior: Identify system events and system operations - Creating a System Sequence Diagram. Interaction diagrams: Importance of interaction diagrams-Sequence diagrams and collaboration diagrams-Creating a collaboration diagram-Collaboration diagram notation

**DOMAIN AND DESIGN MODELS**

Visualizing and identifying concepts-Using noun phrase identification-Domain or Conceptual Models - Creating a domain model - Associations. Responsibilities-Pre-conditions-Post-conditions-Exceptions Design Model: Visibility; identifying four kinds -Visibility in UML notation-Fundamental object design-Design patterns-UML notation for interaction diagrams

**DESIGNING CLASS DIAGRAMS**

Identify classes, methods and associations -DCDs and the UP-Domain Model and Design Model Classes-Steps for creating DCDs - DCDs and CASE tools-Generalization- specialization- aggregation. State diagrams : Events, states and transitions-Use Case State

diagram-State independent and State dependent Classes or Types-  
External and internal events

**IMPLEMENTATION MODEL**

Define patterns-Applying patterns and assigning responsibilities-  
Coupling and Cohesion Applying patterns to assign responsibilities  
to classes-Define frameworks-Persistence Mapping design artifacts  
to code in an OO language-Mapping designs to code-Creating class  
definitions from DCDs - Creating methods from interaction diagrams  
UML and CASE tools : Fitting UML into Unified Process- CASE  
tools

**TEXT BOOK**

1. Larman, C., Applying UML and Patterns. An introduction to  
Object-Oriented Analysis and Design, Prentice-Hall , 3<sup>rd</sup> Edition,  
2005

**REFERENCES**

1. Bjarne Stroustrup , The C++ Programming Language, 3<sup>rd</sup>  
edition, 2000
2. Grady Booch, James Rumbaugh, Ivar Jacobson, UML User  
Guide, Addison Wesley, 2000.
3. Tom Pender , UML 2.0 Bible, Wiley Publishing, Inc, 2003

<b>CSE402</b>	<b>INTERNET PROGRAMMING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**BASIC NETWORK AND WEB CONCEPTS**

Internet standards – TCP and UDP protocols – URLs – MIME – CGI  
– Introduction to SGML.

**JAVA PROGRAMMING**

Java basics – I/O streaming – files – Looking up Internet Address -  
Socket programming – client/server programs – E-mail client –  
SMTP - POP3 programs – web page retrieval – protocol handlers –

content handlers - applets – image handling - Remote Method Invocation.

### **SCRIPTING LANGUAGES**

HTML – forms – frames – tables – web page design - JavaScript introduction – control structures – functions – arrays – objects – simple web applications

### **DYNAMIC HTML**

Dynamic HTML – introduction – cascading style sheets – object model and collections – event model – filters and transition – data binding – data control – ActiveX control – handling of multimedia data

### **SERVER SIDE PROGRAMMING**

Servlets – deployment of simple servlets – web server (Java web server / Tomcat / Web logic) – HTTP GET and POST requests – session tracking – cookies – JDBC – simple web applications – multi-tier applications

### **TEXT BOOKS**

1. Deitel, Deitel and Nieto, Internet and World Wide Web – How to program, Pearson Education Publishers, 2000.
2. Elliotte Rusty Harold, Java Network Programming, O’Reilly Publishers, 2002

### **REFERENCES**

1. Krishnamoorthy R and Prabhu S., Internet and Java Programming, New Age International Publishers, 2004.
2. Thomno A. Powell, The Complete Reference HTML and XHTML , Tata McGraw Hill, 5<sup>th</sup> edition, 2003.
3. Naughton, The Complete Reference – Java2, Tata McGraw-Hill, 3<sup>rd</sup> Edition, 1999.

<b>CSE481</b>	<b>INTERNET PROGRAMMING LAB</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

1. Write programs in Java to demonstrate the use of following components Text fields, buttons, Scrollbar, Choice, List and Check box
2. Write Java programs to demonstrate the use of various Layouts like Flow Layout, Border Layout, Grid layout, Grid bag layout and card layout
3. Write programs in Java to create applets incorporating the following features:
  - a) Create a color palette with matrix of buttons
  - b) Set background and foreground of the control text area by selecting a color from color palette.
  - c) In order to select Foreground or background use check box control as radio buttons
  - d) To set background images
4. Write programs in Java to do the following.
  - a) Set the URL of another server.
  - b) Download the homepage of the server.
  - c) Display the contents of home page with date, content type, and Expiration date. Last modified and length of the home page.
5. Write programs in Java using sockets to implement the following:
  1. HTTP request
  2. FTP
  3. SMTP
  4. POP3
6. Write a program in Java for creating simple chat application with datagram sockets and datagram packets.
7. Write programs in Java using Servlets:
  1. To invoke servlets from HTML forms
  2. To invoke servlets from Applets
8. Write programs in Java to create three-tier applications using servlets
  - a) or conducting on-line examination.
  - b) for displaying student mark list. Assume that student

information is available in a database which has been stored in a database server.

9. Create a web page with the following using HTML
  - a) To embed a map in a Web page
  - b) To fix the hot spots in the map
  - c) Show all the related information when the hot spots are clicked.
10. Create a web page with the following
  - a) Cascading style sheets.
  - b) Embedded style sheets.
  - c) Inline style sheets.
  - d) Use our college information for the web pages.

**For an assigned problem apply the following Software Engineering Techniques:**

1. Read and refine an Analysis Document for design.
2. Create and document a logical design.
3. Create and document a physical design.
4. Create and document an application database.
5. Use a CASE tool for systems design. (Be familiar with modern object-oriented systems including CASE tools and libraries)
6. Use an Application Framework in the design of an information system.
7. Create commonly expected deliverables of systems design: Design Documentation, UML System Design (including UML database design) & System prototypes
8. Perform Software Testing using a suitable testing technique with testing data
9. Perform Software Debugging
10. Document the refined designs and coding

**MAJOR ELECTIVES**

<b>CSE307</b>	<b>ARTIFICIAL INTELLIGENCE</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION AND INTELLIGENT AGENTS**

Introduction to Artificial Intelligence: What is AI ? Intelligent Agents: Rationality – Nature of the Environments – Structure of Agents – Problem Solving Agents – Example Problems – Searching for Solutions - Uniformed search strategies – Avoiding repeated search

**SEARCHING TECHNIQUES**

Informed search strategies – Heuristic Functions – Local Search Algorithms and Optimization problems : Hill Climbing, Simulated Annealing, Local Beam searches and Genetic Algorithm – Constraint Satisfaction Problems (CSP) : Backtracking – Local Search for CSPs – Adversarial Search : Games – Alpha-Beta Pruning

**KNOWLEDGE REPRESENTATION AND REASONING**

Logical Agents: Knowledge Based Agents – The Wumpus World – Propositional Logic - First Order Logic: Representation revisited – Syntax and Semantics – Using First Order Logic- Inference in First Order Logic: Propositional Vs FOL – Forward and Backward Chaining - Knowledge Representation: Ontological Engineering – Actions, Situations and Events

**PLANNING AND LEARNING**

Planning: The Planning Problem –Planning as search, partial order planning, construction and use of planning graphs – Conditional Planning - Learning: Forms of learning – Inductive Learning – Learning Decision Trees – Ensemble Learning – Statistical Learning Methods

**COMMUNICATION, PERCEPTION AND ACTION**

Communication: Communication as action – A Formal Grammar for a Fragment of English – Syntactic Analysis – Augmented Grammars – Semantic Representation – Ambiguity and Disambiguation – Perception: Introduction – Image formation – Extracting Three-Dimensional Information – Object Recognition – Robotics: Hardware – Perception – Planning – Moving – Software Architectures

**TEXT BOOK**

1. Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Pearson Education / Prentice Hall of India , 2<sup>nd</sup> Edition, 2005

**REFERENCES**

1. Nils J. Nilsson, Artificial Intelligence: A new Synthesis, Harcourt Asia Pvt. Ltd., 2000.
2. Elaine Rich and Kevin Knight, Artificial Intelligence, Tata McGraw-Hill, 2<sup>nd</sup> Edition, 2003
3. George F. Luger, Artificial Intelligence-Structures And Strategies For Complex Problem Solving, Pearson Education / PHI, 2002

<b>CSE308</b>	<b>MULTIMEDIA SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION AND QOS**

Introduction - QOS Requirements and Constraints - Concepts-Resources - Establishment Phase – Run Time Phase - Management Architectures.

## **OPERATING SYSTEMS**

Real-Time Processing – Scheduling – Interprocess Communication -  
Memory and Management - Server Architecture - Disk Management.

## **FILE SYSTEMS AND NETWORKS**

Traditional and Multimedia File Systems - Caching Policy –  
Batching - Piggy backing –Ethernet - Gigabit Ethernet - Token Ring  
- 100VG AnyLAN - Fiber Distributed Data Interface (FDDI) - ATM  
Networks-MAN-WAN.

## **COMMUNICATION**

Transport Subsystem - Protocol Support for QOS - Transport of  
Multimedia - Computer Supported Cooperative Work-Architecture -  
Session Management - MBone Applications.

## **SYNCHRONIZATION**

Synchronization in Multimedia Systems – Presentation -  
Synchronization Types -Multimedia Synchronization Methods -  
Case Studies-MHEG-MODE-ACME.

## **TEXT BOOK**

1. Ralf Steinmetz and Klara Nahrstedt, Multimedia Systems,  
Springer, 1<sup>st</sup> Edition 2004.

## **REFERENCE BOOKS**

1. Vaughan T, Multimedia, Tata McGraw Hill, 1999.
2. Rao K. R., Zoran S. Bojkovic, Dragorad A. Milovacovic, D. A.  
Milovacovic , Multimedia Communication Systems: Techniques,  
Standards, and Networks, Prentice Hall, 1<sup>st</sup> Edition, 2002

<b>CSE309</b>	<b>COMPUTER GRAPHICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Overview of graphics systems - Display Devices - Raster Scan and Random Scan Systems - Graphics hardware and software - Overview of OpenGL - Line Drawing algorithms – DDA, Bresenham - Circle, Ellipse Drawing algorithm - Area fills algorithms - Attributes of output primitives

**TWO-DIMENSIONAL CONCEPTS**

Two-dimensional geometric transformation -Translation, rotation, scaling, shearing, reflection - Two-dimensional Viewing - window to viewport mapping, Clipping- point clipping, line clipping- Cohen-Sutherland, Nicholl-Lee-Nicholl Line clipping algorithms, Polygon Clipping-Sutherland-Hodgeman polygon clipping, Curve clipping, Text clipping, Exterior Clipping

**THREE-DIMENSIONAL CONCEPTS**

Three-dimensional display methods, Three-dimensional object representations – polygon surfaces - Curve surfaces - quadratic surfaces - spine representations, Bezier curves and surfaces, B-spline curves and surfaces, Beta splines, Rational spline. Three-dimensional geometric and modeling transformations Three dimensional viewing and clipping

**SURFACE METHODS AND ILLUMINATION MODELS**

Visible surface detection methods-Back face Detection - Depth buffer method - scan line method - area subdivision method - ray-casting method - curved surfaces - wireframe methods - Basic illumination models - displaying light intensities - Halftone patterns and Dithering - polygon-rendering methods - Ray-tracing methods - Radiosity lighting model - Adding surface detail.

**ANIMATION**

Color models and color applications - Computer Animation - Real time application of computer graphics - Morphing

**TEXT BOOK**

1. Donald Hearn, Pauline Baker M., Computer Graphics with OpenGL, Prentice Hall, 3<sup>rd</sup> Edition, 2003.

**REFERENCES**

1. Angel, Edward, Interactive Computer Graphics, Addison-Wesley Longman”, 4<sup>th</sup> Edition, 2006.
2. Woo, Jackie Neider, Tom Davis, and Dave Shreiner, OpenGL Programming Guide, Addison Wesley, 2003.
3. Foley, Van Dam, Feiner, Hughes, Computer Graphics: Principles and Practice, Addison Wesley.

<b>CSE313</b>	<b>NATURAL LANGUAGE PROCESSING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Introduction: Knowledge in speech and language processing – Ambiguity – Models and Algorithms – Language, Thought and Understanding. Regular Expressions and automata: Regular expressions – Finite-State automata. Morphology and Finite-State Transducers: Survey of English morphology – Finite-State Morphological parsing – Combining FST lexicon and rules – Lexicon-Free FSTs: The porter stammer – Human morphological processing

**SYNTAX**

Constituency – Context-Free rules and trees – Sentence-level constructions – The noun phrase – Coordination – Agreement – The verb phrase and sub categorization – Auxiliaries – Spoken language syntax – Grammars equivalence and normal form – Finite-State and

Context-Free grammars – Grammars and human processing. Parsing with Context-Free Grammars - Parsing as search – A basic Top-Down parser – Problems with the basic Top-Down parser – The early algorithm – Finite-State parsing methods

### **SEMANTIC**

Syntax-Driven semantic analysis – Attachments for a fragment of English – Integrating semantic analysis into the early parser – Idioms and compositionality – Robust semantic analysis. Lexical semantics: relational among lexemes and their senses – WordNet: A database of lexical relations – The Internal structure of words – Creativity and the lexicon.

### **NATURAL LANGUAGE GENERATION**

Introduction to language generation – Architecture for generation – Surface realization – Discourse planning – Other issues

### **MACHINE TRANSLATION**

Language similarities and differences – The transfer metaphor – The interlingua idea: Using meaning – Direct translation – Using statistical techniques – Usability and system development.

### **TEXT BOOK**

1. Daniel Jurafsky and James Martin H., Speech and Language Processing, Pearson Education, Singapore Pvt. Ltd., 2003.

### **REFERENCES**

1. James Allen, Natural Language Understanding, Pearson Education, 2003.

<b>CSE315</b>	<b>DISTRIBUTED COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Characterization of Distributed Systems: Resource sharing and the Web-System models:-Architectural models-Fundamental Models, Interprocess Communication:-The API for the Internet protocols, External data representation and marshalling, Client Server communication, Group communication.

**DISTRIBUTED OBJECT AND REMOTE INVOCATION**

Distributed objects and Remote Invocation: Communication between distributed objects, Remote Procedure call, Events and notifications. Operating System Support - The operating system layer- Protection-Processes and threads-Communication and invocation-Operating system architecture.

**OPERATING SYSTEM ISSUES**

Distributed File Systems:- File service architecture-Sun Network File System-The Andrew File System. Time and Global States:- clocks, events and process states Synchronizing physical clocks-Logical time and logical clocks-Global states. Coordination and Agreement:- Distributed mutual exclusion- Elections- Multicast communication.

**DISTRIBUTED TRANSACTION PROCESS**

Transactions and Concurrency Control:- Transactions, Nested transactions, Locks, Optimistic concurrency control, Timestamp ordering. Distributed Transactions:- Flat and nested distributed transactions..., Atomic commit protocols, concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery.

**DISTRIBUTED MULTIMEDIA SYSTEMS**

Distributed Multimedia Systems:- Characteristics of multimedia data, Quality of service management, Resource management, Stream

adaptation. Distributed Shared Memory: Design and implementation issues, Sequential consistency and Ivy, Release consistency and Munin. Corba Case Study

**TEXT BOOK**

1. George Coulouris, Jean Dollimore, Tim Kindberg, Distributed Systems Concepts and Design, AWL, 3<sup>rd</sup> Edition, 2004.

**REFERENCES**

1. Andrew S Tanenbaum, Maarten van Steen, Distributed Systems – Principles and Paradigms, Pearson Education, 2002
2. Mughesh Singhal, Niranjana G Shivaratri, Advanced Concepts in Operating systems, Tata McGraw Hill Edition, 2001
3. Pradeep K. Sinha., Distributed Operating Systems: Concepts and Design Wiley-IEEE Press

<b>CSE316</b>	<b>DIGITAL SIGNAL PROCESSING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**SIGNALS AND SYSTEMS**

Basic elements of digital signal Processing –Concept of frequency in continuous time and discrete time signals –Sampling theorem – Discrete time signals. Discrete time systems –Analysis of Linear time invariant systems –Z transform –Convolution and correlation.

**FAST FOURIER TRANSFORMS**

Introduction to DFT – Efficient computation of DFT Properties of DFT – FFT algorithms – Radix-2 and Radix-4 FFT algorithms – Decimation in Time – Decimation in Frequency algorithms – Use of FFT algorithms in Linear Filtering and correlation.

**IIR FILTER DESIGN**

Structure of IIR – System Design of Discrete time IIR filter from continuous time filter – IIR filter design by Impulse Invariance - Bilinear transformation – Approximation derivatives – Design of IIR

filter in the Frequency domain

### **FIR FILTER DESIGN**

Symmetric - Antisymmetric FIR filters – Linear phase filter – Windowing technique – Rectangular, Kaiser windows – Frequency sampling techniques – Structure for FIR systems.

### **FINITE WORD LENGTH EFFECTS**

Quantization noise – derivation for quantization noise power – Fixed point and binary floating point number representation – comparison – over flow error – truncation error – co-efficient quantization error - limit cycle oscillation – signal scaling – analytical model of sample and hold operations – Application of DSP – Model of Speech Wave Form – Vocoder.

### **TEXT BOOK**

1. John G Proakis and Dimtris G Manolakis, Digital Signal Processing Principles, Algorithms and Application, PHI/Pearson Education, 3<sup>rd</sup> Edition, 2000.

### **REFERENCES**

1. Alan V Oppenheim, Ronald W Schafer and John R Buck, Discrete Time Signal Processing, PHI/Pearson Education, 2<sup>nd</sup> Edition, 2000.
2. Johny R.Johnson, Introduction to Digital Signal Processing, Prentice Hall of India/Pearson Education, 2002.
3. Sanjit K.Mitra, Digital Signal Processing: A Computer – Based Approach, Tata McGraw-Hill, Second Edition, 2001.

<b>CSE403</b>	<b>SOFT COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**AIMS OF SOFT COMPUTING**

Aims of Soft Computing-Foundations of Fuzzy Sets Theory-Basic Concepts And Properties Of Fuzzy Sets- Elements Of Fuzzy Mathematics-Fuzzy Relations-Fuzzy Logic

**APPLICATION OF FUZZY SETS**

Application of Fuzzy Sets-Fuzzy Modeling – Fuzzy Decision Making-Pattern Analysis And Classification-Fuzzy Control Systems-Fuzzy Information Processing-Fuzzy Robotics.

**ARTIFICIAL NEURAL NETWORKS**

Artificial Neural Networks-Models Of Neuron-Feed Forward Neural Networks-Recurrent Neural Networks-Time Delay Neural Networks-Radial Basis Function Neural Networks-Cerebellar Model Articulation Controller-Adaptive Resonance Theory (ART) NN-Associative Neural Memory Models-Supervised Learning Of Neural Networks -Unsupervised Learning-Reinforcement Learning-Application Of ANN- Probabilistic Reasoning

**GENETIC ALGORITHM**

Genetic Algorithm Main Operators- Genetic Algorithm Based Optimization-Genetic Algorithm With Group Principle-Group Genetic Algorithm With Directed Mutation-Comparison Of Conventional And Genetic Search Algorithms-Applications-Elements Of Chaos System-Basic Concepts-Identification Of Chaotic Movement System-Bifurcation And Handling Of Development Of Chaos-Empirical Chaos

**NEURO-FUZZY TECHNOLOGY**

Fuzzy Neural Networks And Their Learning-Architecture Of Neuro-Fuzzy Systems-Generation Of Fuzzy Rules And Membership Functions - Fuzzification And Defuzzification In Neuro-Fuzzy

Systems- Neuro - Fuzzy Identification - Neuro Fuzzy Control- Neuro Fuzzy Navigation System For Intelligent Robot-Combination Of Genetic Algorithm With Neural Networks-Combination Of Genetic Algorithms And Fuzzy Logic-Neuro-Fuzzy-Genetic Approach.

**TEXT BOOK**

1. Aliev,R.A, Aliev,R.R., Soft Computing and its Application, World Scientific Publishing Co. Pvt. Ltd., 2001.

**REFERENCE BOOKS**

1. Cordón O., Herrera F., Hoffman F., Magdalena L, Genetic Fuzzy systems, World Scientific Publishing Co. Pvt. Ltd., 2001.
2. Mehrotra K., Mohan C., K., Ranka S., Elements of Artificial Neural Networks, The MIT Press, 1997.
3. Zaknih A., Neural Networks for Intelligent Signal Processing, World Scientific Publishing Pvt. Ltd., 2003.

<b>CSE404</b>	<b>DATA MINING AND DATA WAREHOUSING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Relation To Statistics, Databases- Data Mining Functionalities-Steps In Data Mining Process-Architecture Of A Typical Data Mining Systems- Classification Of Data Mining Systems - Overview Of Data Mining Techniques.

**DATA PREPROCESSING AND ASSOCIATION RULES**

Data Preprocessing-Data Cleaning, Integration, Transformation, Reduction, Discretization Concept Hierarchies-Concept Description: Data Generalization And Summarization Based Characterization-Mining Association Rules In Large Databases.

**PREDICTIVE MODELING**

Classification And Prediction: Issues Regarding Classification And Prediction-Classification By Decision Tree Induction-Bayesian

Classification-Other Classification Methods-Prediction-Clusters Analysis: Types Of Data In Cluster Analysis- Categorization Of Major Clustering Methods: Partitioning Methods –Hierarchical Methods

### **DATA WAREHOUSING**

Data Warehousing Components -Multi Dimensional Data Model-Data Warehouse Architecture-Data Warehouse Implementation- - Mapping The Data Warehouse To Multiprocessor Architecture-OLAP.-Need- Categorization Of OLAP Tools.

### **APPLICATIONS**

Applications of Data Mining-Social Impacts Of Data Mining-Tools-An Introduction To DB Miner-Case Studies-Mining WWW-Mining Text Database-Mining Spatial Databases.

### **TEXT BOOK**

1. Jiawei Han, Micheline Kamber, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers, 2002.

### **REFERENCEKS**

1. Alex Berson,Stephen J. Smith, Data Warehousing, Data Mining,& OLAP, Tata Mcgraw- Hill, 2004.
2. Ralph Kimball, The Data Warehouse Life Cycle Toolkit, John Wiley & Sons Inc., 1998.

<b>CSE405</b>	<b>CRYPTOGRAPHY AND NETWORK SECURITY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **INTRODUCTION**

Need for Security – Attacks, Services and Mechanisms – Conventional Encryption: Classical Techniques - Modern Techniques – Algorithms - Confidentiality Using Conventional Encryption.

### **SYMMETRIC ENCRYPTION**

Conventional Symmetric Encryption: Theory of Block Cipher Design -Feistel Cipher - DES and Triple DES-Modes of Operation (ECB,CBC, OFB,CFB)-Strength (or Not) of DES- Modern Symmetric Encryption: IDEA, CAST, Blowfish, Twofish - RC2, RC5, Rijndael (AES) -Key Distribution

### **PUBLIC-KEY ENCRYPTION AND HASH FUNCTIONS**

Prime Numbers and Testing for Primality-Factoring Large Numbers-RSA, Diffie-Hellman, ElGamal - Key Exchange Algorithms -Public-Key Cryptography Standards-Hashes and Message Digests-Message Authentication:MD5, SHA, RIPEMD, HMAC

### **AUTHENTICATION**

Digital Signatures, Certificates, User Authentication: Digital Signature Standard (DSS and DSA)-Elliptic Curve Cryptosystems-Authentication of Systems : Kerberos V4 & V5

### **SECURITY SERVICES**

E-mail Security: PGP, S/MIME – IP and Web Security: IPSec and Virtual Private Networks, Secure Socket Layer (SSL) – E-Commerce Security: Electronic Payment Systems – Secure Electronic Transaction (SET) - CyberCash, iKey Protocols, Ecash (DigiCash)

### **TEXT BOOK**

1. William Stallings, Cryptography and Network Security: Principles and Practices, Prentice Hall, , 4<sup>th</sup> Edition, 2006

### **REFERENCES**

1. Wenbo Mao, Modern Cryptography: Theory and Practice, Prentice Hall, 2004
2. Richard A. Mollin, An Introduction to Cryptography, Chapman and Hall/CRC, 2001.
3. B. Schneier, Applied Cryptography, John Wiley and Sons, NY, 1996.

<b>CSE406</b>	<b>PARALLEL COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Introduction-Parallel processing terminology-The sieve of Erasthenes - PRAM Algorithms - Model for parallel computation-PRAM Algorithms-reducing the number of processors

**MULTIPROCESSOR AND MULTICOMPUTER**

Processor array, Multiprocessors, and Multicomputer-Processor organizations-Processor arrays-Multiprocessor-Multicomputers-Flynn's Taxonomy-Speedup, scaled speedup and parallelizability-Parallel programming languages-programming parallel processes-Sequent C-n Cube C-C-LINDA.-A notation for expressing parallel algorithms.

**MAPPING AND SCHEDULING**

Mapping and scheduling-Mapping data to processors on processor arrays and multi computers - Dynamic load balancing on multicomputers - static scheduling on UMA multiprocessors - Deadlock-Elementary Parallel algorithms - classifying MIMD algorithms Reduction – Broadcast - Prefix sums

**SORTING TECHNIQUES**

Matrix multiplication-sequential algorithms - Algorithm for processor array - algorithms for multicomputer for multiprocessor – Sorting - Enumeration sort-Odd-even Transposition sort - Bitonic merge-Quick sort-based algorithms - Random read and Random write.

**PARALLEL ALGORITHMS**

Dictionary operations - Complexity of parallel search-Searching on Multiprocessors - Combinatorial Search - Divide and conquer - TSP-Parallel Branch and Bound algorithms - Alpha beta search - Parallel Alpha beta search

**TEXT BOOK**

1. Michael J.Quinn, Parallel Computing, Theory and Practice, Tata Mc Graw Hill Publishing Company Limited, New Delhi, 2<sup>nd</sup> Edition, 2004

**REFERENCNS**

1. Michael J. Quinn, Parallel Programming in C with MPI and OpenMP, McGraw Hill, 2004.
2. Barry Wilkinson and Michael Allen, Parallel Programming: Techniques and Applications Using Networked Workstations and Parallel Computers, PTR Prentice-Hall, 2<sup>nd</sup> Edition, 2004.
3. David Culler, J.P.Singh, and Anoop Gupta, Parallel Computer Architecture: A Hardware/Software Approach, Morgan Kaufmann Publishers Inc. 1998,

<b>CSE407</b>	<b>SOFTWARE QUALITY MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Definition - The Elements of complete Software Quality System – Additional Issues – Standards – Areas of Standardization – sources of standards – selection of Standards – promulgation of Standards – Nonstandard standards.

**REVIEWS AND DEFECT ANALYSIS**

Reviews – types of reviews – review subjects – documentation reviews – Testing – types of testing – Test Planning and conduct – Defect Analysis – analysis concepts – locating data – defect repair and closure – selecting metrics – collecting measurements – Quality tools – implementing defect analysis.

### **CONFIGURATION MANAGEMENT**

CM components – configuration identification – configuration control – configuration counting – Associated Quality concerns – security – education – vendor management – maintenance – Software safety – aspects of software safety – safety issues – safety requirements – safety management

### **RISK MANAGEMENT**

Types of risk – risk management process – software Documentation – development documents – test documentation – user documentation – training documentation – documentation standards – Quality System implementation – planning – quality charter – changing the organizational culture – organizational considerations – implementation strategies – SQS improvement

### **QUALITY ASSURANCE METRICS**

Software Quality Assurance Case Tools – Introduction - Environment for CASE - The Case for CASE - Applicability of Tools - Where to Find Tools - Software Quality Assurance Metrics – Introduction - Software Quality Metrics Methodology - Omnibus Software Quality Metrics - Software Quality Indicators - Practical Implementations.

### **TEXT BOOK**

1. John W. Horch, Practical Guide to Software Quality Management, ArtechHouse, 2<sup>nd</sup> Edition, 2003.

### **REFERENCES**

1. Schulmeyer G. G. and McManus J. I., Handbook of Software Quality Assurance, Prentice Hall, 3<sup>rd</sup> Edition, 1999.
2. Daniel Galin, Software Quality Assurance, Addison Wesley, 2003
3. Brian Marick, The craft of software testing, Prentice Hall, 1995

<b>CSE410</b>	<b>NETWORK MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **TECHNOLOGY SERVICES AND COMPUTER NETWORK TECHNOLOGY**

Introduction to Network Management-IT Services, Challenges, and Opportunities -Economics of IT Services-Network Management Systems and Organization-Network Components – Topologies - Internet Architecture -Bridged and Router Networks-Ring Networks, Virtual LANs, and Broadband Services

### **NETWORK MANAGEMENT**

Network Management Basics-Network Management Architectures & Applications Management Standards and Models - Network Management Functions-Configuration Management & Auto-discovery-Configuration Database & Reports-Abstract Syntax Notation One (ASN.1)

### **SNMP PROTOCOL**

SNMP v1: Structure of Management Information-Std. Management Information Base (MIBs), Network Management Functions: Fault Management-Fault Identification and Isolation-Event Correlation Techniques. SNMP v2: Version 2 Protocol Specification-Version 2 MIB Enhancements-MIB-II, Case Diagrams - Security Management - Protecting Sensitive Information - Host and User Authentication-Key Management. SNMP v3: Version 3 Protocol & MIB - SNMP v3 User Based Security Model - View Based Access Model - Network Management Functions: Accounting Management - Performance Management- Network Usage, Metrics and Quotas

### **REMOTE NETWORK MONITORING RMON**

RMON1: Statistics Collection- Alarms and Filters-Remote Network Monitoring RMON 2-Monitoring Network Protocol Traffic-Application-Layer Visibility-Management Tools, Systems and

Applications-Test and Monitoring Tools-Integrating Tools-Development Tools- Web-based Enterprise Management-Enterprise Network Management: Network Management System Requirements- Network Management Applications and Systems

**TELECOMMUNICATIONS MANAGEMENT FOR SERVICE PROVIDERS**

Telecommunications Network Management-ATM Management-Management of broadband Networks- Real-time OSs for Next-Generation Service Management-The Operations Systems Implications of Managing Next-Generation Networks Managing a Portfolio of Broadband Access Technologies-Next-Generation Network Design-Experiences in Establishing a Nationwide Broadband Network -Quality of Service in Heterogeneous Networks-Customer-Empowered Networking

**TEXT BOOK**

1. Subramanian, M., Network Management: Principles and Practice, Addison-Wesley, 2000

**REFERENCES**

1. Mauro, D.R. and Schmidt K.J., Essential SNMP, O’Reilly & Associates, Sabastopol, CA. 2001.
2. Peterson L. and Davie B, Computer Networks: A Systems Approach, Morgan Kaufmann Publishers Inc., 3<sup>rd</sup> edition, 2003.
3. Mahbub Hassan and Raj Jain, High Performance TCP/IP Networking, Prentice Hall, 1<sup>st</sup> Edition, 2004.

<b>CSE411</b>	<b>FAULT TOLERANT COMPUTER SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**ARCHITECTURE**

Introduction – Hardware pieces – A Quad – Processor Architecture – Language and Tools – Semaphores – Monitors – Resources – Communication Sequential Processes – Networks – Layered

Architecture – Service Definition and protocol specification – Layer functions – Protocol Specification – OSI Reference Model – IEEE 802 standard – Network Concepts and Characteristics for Embedded Systems – Concurrency, Commitment and Recovery.

### **DISTRIBUTION**

Concepts and measures –Terminology, Definitions, and Conventions – Distributed system model – Distribution Measures – Mutual Exclusion – Problem Definition – Token Ring Algorithm – Time Ordering Algorithm – Path Reversal based – Election Algorithms – Problem Definition – Election in Ring Architecture – Broadcast Elections – Deadlock and Termination – Deadlock Problem – Deadlock Prevention in Multiple Resource Allocation – Deadlock and Termination Detection – Agreement Protocols – commit – Weighted Voting – Consensus – Approximate Agreement – Byzantine agreement.

### **FAULT TOLERANCE AND RECOVERY MECHANISMS**

Tolerating Faults – Fault Tolerant Concepts – Recovery in Time and Space – Fault Detection Techniques – Per formability Measures – Modeling Fault Tolerant systems – Roll – back Mechanisms – Roll-back Mechanisms – Check pointing – N-Version Modular Redundancy – SIFT – Replicas – Alternatives – Dynamics of Replicas and Alternatives

### **FAULT TOLERANT ALGORITHMS**

Handling Exceptions – Interrupts – Reaction to Exceptions – Exception Handling Model – Concurrency – Concurrency Control – Atomicity and Transactions – Partitioning – Broadcasting Solutions – Safe Systems – Safety Measures – Safety aspects in Resiliency – Fault Tolerant Allocation – Problem Definition – Definitions and Formulation – Allocation Algorithms.

### **FAULT TOLERANT IN REAL TIME SYSTEMS**

Allocation in Real Time Systems – Protocols for Real Time Communication –Protocols with Contention – Synchronous

Protocols – Bounded Semantic Links – Fault Tolerant Real-Time Communication – Fault Tolerant Time Services- Local Resynchronization – Byzantine Clock Broadcast – Complete Time Service.

**TEXT BOOK**

1. Shem-Tov Levi, Ashok K. Agrawala, Fault Tolerant System Design, McGraw-Hill International Editions, 1994.

<b>CSE413</b>	<b>QUANTUM COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Quantum bits – Quantum Computation – Quantum Algorithms – The Postulates of quantum mechanics

**QUANTUM CIRCUITS**

Quantum algorithms – Single Qubit Operations – Controlled Operations – Measurement – Universal quantum gates – Summary of the quantum circuit model of Computation – Simulation of quantum systems.

**QUANTUM FOURIER TRANSFORM**

Quantum Fourier Transform – Phase estimation – order finding and factoring – General applications of the quantum fourier transform.

**QUANTUM SEARCH ALGORITHMS**

Quantum Search Algorithm – Quantum search as quantum simulation – Quantum counting – Speeding up the solution of NP complete problems – Quantum search of an structured database – Optimality of the search algorithm – Black box algorithm limits.

**PHYSICAL REALIZATION**

Guiding principles – Conditions for Quantum Computation – Harmonic Oscillator Quantum Computer – Optical Photon Quantum

Computer – Optical Cavity Quantum electrodynamics – Ion Traps – Nuclear magnetic resonance – Other implementation schemes.

**TEXTBOOK**

1. Michael A Nielsoen and Isaac L Chuang, Quantum Computation and Quantum Information, Cambridge University Press, UK, (Indian Reprint), 2002.

<b>CSE416</b>	<b>DNA COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**DNA: ITS STRUCTURE AND PROCESSING:**

The structure of DNA, Operations on DNA Molecules, Reading out the Sequence, beginning of molecular computing: Adleman’s Experiment, Solve the satisfiability Problem, Paradigm of Computing, Hopes and Warnings

**INTRODUCTION TO FORMAL LANGUAGE THEORY:**

Basic Notions, Grammars, Automata, Grammer systems, Characterizations of recursively Enumerable Languages, Universal Turing machines and Type – 0 Grammars. sticker systems: The operations of Sticking, Sticker Systems; Classifications, Generative Capacity of Sticker Systems, Representations of Regular and Linear Languages, Regular sticker systems.

**WATSON- CRICK AUTOMATA:**

Watson-Crick Finite Automata, Relationship Between the WK Families, Characterizations of Finite Transducers, Further variants of Watson-Crick finite Automata, Watson-Crick Automata, Watson-Crick Automata with a Watson-Crick memory, Universability results for Watson-Crick Automata.

**INSERTION-DELETION SYSTEMS:**

Insertion-Deleting in the DNA Framework - Characterizations of Recursively Enumerable languages, - one symbol insertion - deletion

systems - splicing systems - DNA Recombination to the Splicing Operations, on-Iterated Splicing as an Operation with languages, Iterated Splicing as an operation with languages, Extended H Systems; Generative Power, Simple H Systems.

**UNIVERSABILITY BY FINITE H SYSTEMS:**

Using 2-Splicing instead of 1-Splicing, permitting and Forbidding Contexts, Target languages, Programmed and evolving systems Systems based on Double Splicing, Multisets, and Universability Results. Splicing circular strings - Variants of the Splicing Operation for Circular strings, Variant and its power

**TEXT BOOK**

1. Gheorghe Paun, Grzegorz Rozenberg, Arto salomaa, DNA Computing, Springer; 1<sup>st</sup> edition , 2006

<b>CSE418</b>	<b>NETWORK SYSTEM DESIGN WITH NETWORK PROCESSORS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Introduction and overview-Basic Terminology and Example Systems  
- Review of Protocols and Packet Formats

**TRADITIONAL PROTOCOL PROCESSING SYSTEMS**

Conventional computer hardware and its use in low-end network systems- Algorithms for protocol processing-packet processing functionality-Software architectures for protocol processing on conventional hardware-advanced hardware architectures

**NETWORK PROCESSOR TECHNOLOGY**

Motivation for network processors-Complexity of network processor design-network processor architectures-Scaling a network processor-a review of commercial network processor architectures-languages

### **NETWORK PROCESSORS AND PROGRAMMING**

Discussion of Intel® IXP2XXX network processor-Intel®: reference platform; embedded RISC processor-Intel®: programmable packet processor hardware and programming-Intel®: more on programming the packet processors- a programming example-Programming example; switching fabrics

### **ALTERNATIVE ARCHITECTURES**

Network processor design tradeoffs-Active and programmable networks-Active network applications-Commercial network processors-Benchmarks for Network Processors

### **TEXT BOOK**

Comer D., “Network Systems Design Using Network Processors”,  
Prentice Hall, 2003.

**MINOR ELECTIVES**

<b>CSE311</b>	<b>EMBEDDED SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION TO EMBEDDED SYSTEM AND HARDWARE FUNDAMENTALS**

Examples of Embedded Systems-Typical Hardware- Terminology- Gates-A Few Other Basic Considerations-Timing Diagrams-Memory- Interrupts: Microprocessor Architecture-Interrupt Basics-The Shared-Data Problem-Interrupt Latency.

**SOFTWARE ARCHITECTURES FOR EMBEDDED SYSTEMS**

Round-Robin-Round-Robin with Interrupts-Function-Queue-Scheduling Architecture-Real-Time Operating System Architecture-Selecting an Architecture Forth/Open Firmware: Introducing Forth-String Words-Stack Manipulation- Creating New Words-Comments- if ... else- Loops-. Data Structures-Interacting with Hardware and Memory- Forth Programming Guidelines

**INTRODUCTION TO REAL-TIME OPERATING SYSTEMS.**

Tasks and Task States-Tasks and Data-Semaphores and Shared Data -Operating System Services - Message Queues, Mailboxes, and Pipes-Timer Functions-Events - Memory Management - Interrupt Routines in an RTOS Environment.

**BASIC DESIGN USING A REAL-TIME OPERATING SYSTEM.**

Overview – Principles - An Example - Encapsulating Semaphores and Queues - Hard Real-Time Scheduling Considerations - Saving Memory Space - Saving Power - Embedded Software Development Tools - Host and Target Machines - Linker/Locators for Embedded Software - Getting Embedded Software into the Target System

**DEBUGGING TECHNIQUES AND AN EXAMPLE SYSTEM:**

Testing on Your Host Machine-Instruction Set Simulators - The assert Macro - Using Laboratory Tools - An Example System - What the Program Does - Environment in Which the Program Operates - A Guide to the Source Code - Source Code.

**TEXT BOOKS**

1. David Simon , An Embedded Software Primer, Addison Wesley.
2. John Catsoulis, Designing Embedded Hardware, O'Reilly Publication, 2005

**REFERENCES**

1. Raj Kamal, Embedded Systems: Architecture and Programming, Mc Graw Hill publications, 1<sup>st</sup> Edition, 2003.

<b>CSE312</b>	<b>REAL TIME SYSTEMS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Architecture of Real time Systems / Embedded Systems – Operating Systems issues – Performance Measures – Estimating Program runtimes.

**TASK ASSIGNMENT AND SCHEDULING**

Uniprocessor Scheduling – IRIS Tasks – Tasks Assignment Mode changes – Fault tolerant scheduling.

**PROGRAMMING LANGUAGES AND TOOLS**

Desired characteristics based on ADA – Data typing – Control Structures – Packages – Exception Handling – Overloading – Multitasking – Timing specification – Task Scheduling – Just-in-time Compilation – Runtime support.

**REAL TIME DATABASES**

Basic networking principles – Real time databases – Transaction processing – Concurrency control – Disk scheduling algorithms – Serialization and Consistency.

**FAULT TOLERANCE, RELIABILITY AND SYNCHRONIZATION**

Fault types – Fault detection and containment – Redundancy – Data diversity – Reversal checks – Obtaining parameter values – Reliability models for hardware redundancy – Software error models – Clocks – Fault tolerant synchronization – Synchronization in software.

**TEXT BOOK**

1. Krishna C.M., Kang G.Shin, Real Time Systems, McGraw-Hill, 1997.

**REFERENCES**

1. Raymond J.A. Buhr, Donald L. Bailey, An Introduction To Real Time Systems, Prentice Hall International, 1999.
2. Raymond J.A. Buhr, An Introduction to Real Time System from Design to Networking C and C++, Prentice Hall, 1999.

<b>CSE314</b>	<b>DIGITAL IMAGE PROCESSING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**REVIEW OF IMAGE FUNDAMENTALS**

The fast Fourier transform - other separable image transforms. Image Enhancement: Background - Enhancement by point processing - spatial filtering - Enhancement in the frequency Domain - generation of spatial masks from frequency domain specifications - color image processing.

### **IMAGE RESTORATION**

Degradation model - Diagonalisation of circulant and Block Circulant Matrices - Algebraic approach to Restoration - Inverse filtering Least mean square filter - Constrained Least Squares Restoration - Interactive Restoration - Restoration in the spatial domain - Geometric Transformation.

### **IMAGE COMPRESSION**

Fundamentals - Image Compression Models - Elements of Information theory - Error Free Compression - Lossy Compression - Compression Standards.

### **IMAGE SEGMENTATION**

Detection of Discontinuities - Edge linking and Boundary Detection - Threshold - Region Oriented segmentation - The use of motion in segmentation.

### **IMAGE REPRESENTATION AND DESCRIPTION REPRESENTATION SCHEMES**

Boundary Descriptors - Regional Descriptors - Morphology - Relational Descriptors Recognition and Interpretation - Elements of Image Analysis - Patterns and Pattern Classes - Decision - Theoretic Methods - Structural Methods - Interpretation.

### **TEXT BOOK**

1. Rafael C., Gonzalez and Richard. E., Woods, Digital Image Processing, Addison Wesley, 1992.

### **REFERENCNS**

1. Pratt, Digital Image Processing, Tata McGraw Hill, 1991.
2. Anil K. Jain, Fundamentals of Digital Image processing, Prentice Hall of India, 1<sup>st</sup> Edition, 1998.

<b>CSE408</b>	<b>GRID COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COMPUTING TECHNOLOGY**

Cluster Computing – Peer to Peer Computing – Grid Computing – Grid Protocols – Types of Grids – Desktop Grids

**TYPES OF GRIDS**

Cluster Grids – Data Grids – Data Grid Architecture – Open Grid Services Architecture – Implementing OGSA based Grids

**GRID SERVICES**

Creating and Managing Grid Services – Service discovery – Operational requirements – Tools and Toolkits – Grid Enabling software applications

**GRID MANAGEMENT**

Managing Grid Environments – Managing Grids – Management reporting – Monitoring – Service level Monitoring – Data catalogs and Replica management – Portals – Grid Enabling Network Services

**RESOURCE MANAGEMENT IN GRID**

Resource and Service Management – Resource Management on the Grid – Requirement – Resource Management Framework – Grid Resource Management System – Service negotiation and acquisition protocols – Building reliable Clients and Services – Layers of Grid Computing

**TEXT BOOK**

1. Ahmar Abbas, Grid Computing: A Practical Guide to technology and Applications, Charles River media, 2003

**REFERENCES**

1. Joshy Joseph and Craig Fellenstein, Grid Computing, PHI, PTR-2003
2. Ian Foster, Carl Kesselman, The Grid: Blueprint for a New Computing Infrastructure, Morgan Kaufmann, 2<sup>nd</sup> Edition, 2004
3. Daniel Minoli, A Networking Approach to Grid Computing, Wiley-Inter science, 2004

<b>CSE409</b>	<b>BIO INFORMATICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

The Central Dogma – Killer Application – Parallel Universes – Watson’s Definition – Top Down Vs Bottom Up Approach – Information Flow – Conversance – Communications.

**DATABASE AND NETWORKS**

Definition – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks: Communication Models – Transmission Technology – Protocols – Bandwidth – Topology – Contents – Security – Ownership – Implementation.

**SEARCH ENGINES AND DATA VISUALIZATION**

Search Process – Technologies – Searching And Information Theory – Computational Methods – Knowledge Management – Sequence Visualizations – Structure Visualizations – User Interfaces – Animation Vs Simulation

**STATISTICS, DATA MINING AND PATTERN MATCHING**

Statistical Concepts – Micro Arrays – Imperfect Data – Basics – Quantifying – Randomness – Data Analysis – Tools Selection – Alignment – Clustering – Classification – Data Mining Methods – Technology – Infrastructure Pattern Recognition – Discovery – Machine Learning – Text Mining – Pattern Matching Fundamentals

– Dot Matrix Analysis – Substitution Matrix – Dynamic Programming – Word Method – Bayesian Method – Multiple Sequence Alignment Tools.

### **MODELING SIMULATION AND COLLABORATION**

Drug Discovery Fundamentals – Protein Structure – System Biology Tools – Collaboration And Communication – Standards – Issues – Case Study.

### **TEXT BOOK**

1. Bryan Bergeron, Bio Informatics Computing, Prentice Hall, 2003.

### **REFERENCES**

1. Affward T.K., Parry Smith D.J., Introduction to Bio Informatics, Pearson Education, 2001.
2. Pierre Baldi, Soren Brunak, Bio Informatics – The Machine Learning Approach, First East West Press, 2<sup>nd</sup> Edition, 2003

<b>CSE412</b>	<b>PERVASIVE COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **INTRODUCTION**

Introductory concepts, Pervasive Computing, market, m-Business Application examples, devices and interfaces, human machine interfaces, Biometrics, operating systems issues, Java in Pervasive Computing,

### **DEVICE TECHNOLOGY**

Device Technology, Connectivity Issues and Protocols, Management Issues and Mechanisms, Web-based Applications, Protocols, Trans coding, Authentication of Clients over Web,

## **PERVASIVE DEVICES**

WAP, WML, Voice Standards, Speech Applications and Security, PDA

## **WEB APPLICAION**

Operating Systems, Software Components, Standards, Applications, Emerging Trends, Pervasive Web Application Architectures-Issues and Choices

## **ACCESS TECHNOLOGIES (WAP, PDA, VOICE)**

User Interface, Implementation of User Interface - Architectures, Smart Card-based Authentication Mechanisms over the Internet, Applications, and Wearable Computing Architectures.

## **TEXT BOOK**

1. Jochen Burkhardt, Horst Henn, Stefan Hepper, Thomas Schae & Klaus Rindtorff Pervasive Computing: Technology and Architecture of Mobile Internet Applications, Addison Wesley, Reading, 2002.

## **REFERENCS**

1. Uwe Hansman, Lothar Merk, Martin S. Nicklous & Thomas Stober, Principles of Mobile Computing, Springer-Verlag, New Delhi, Second Edition, , 2003.
2. Rahul Banerjee, Internetworking Technologies: An Engineering Perspective, Prentice-Hall of India, New Delhi, 2003.
3. Yi-Bing Lin & Imrich Chlamtac, Wireless and Mobile Network Architectures, John Wiley and Sons, New Delhi, 2004.

<b>CSE414</b>	<b>NANO COMPUTING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
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**DEVICES**

Overview of current research in nano-scale electronics and devices, Semiconductor and Device 1(Materials and building blocks),Semiconductor and Device 2(Photonic Device and Materials),CMOS Device ,Limit of CMOS technology-Scaling Theory

**QUANTUM CONCEPTS**

Nano-Physics-Quantum Mechanics, Quantum Device 1-Length Scales/Transport, Quantum Device 2-Ballistic Electron Transport, Coulomb Blockade, RTD, Electron-Wave Coupling Devices

**FUNDAMENTALS OF CHEMISTRY**

Fundamental of chemistry, Organic Chemistry, Molecular Electronics I,(Molecular Semiconductors and Metals),Molecular Electronics II(Logic Gates),Carbon Nano tube and Its Application, Spintronics I, Spintronics II

**QUANTUM COMPUTATION**

Quantum Computation I,Quantum Computation II,DNA Computation, Nano-Fabrication 1,-photolithography, Nano-Fabrication 2,; e-beam lithography,; Advanced Nano-lithography

**NANO CONCEPTS**

Nano-Fabrication 3,; Thin Film Technology:-- MBE, CVD, PECVD, - LB and Self Assembly, Spun-Coating - Nano-Characterization 1 - Scanning Probe Microscopy - Electron Microscopy (TEM, SEM),Nano-Characterization 2 - Photon Spectroscopy - Electron Spectroscopy - Nanomanipulator

**TEXT BOOK**

1. Rainer Waser , Nanoelectronics and Information Technology: Advanced Electronic Materials and Novel Devices, Wiley-VCH, April 2003.

**REFERENCES**

1. Sandeep Shukla and R. Iris Bahar, et al, Nano, Quantum and Molecular Computing, Kluwer Academic Publishers, 2004.
2. Poole Jr C.P., Owens F.J. , Introduction to Nanotechnology, Wiley, 2003.
3. Petty M.C., Bryce , and D. Bloor ,Introduction to Molecular Electronics, Edward Arnold , 1995.

<b>CSE417</b>	<b>VLSI DESIGN AND FABRICATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**OVERVIEW OF VLSI DESIGN METHODOLOGY**

VLSI Design Process – Architectural Design – Logical Design – Physical Design – Layout Styles – Full Custom Semi Custom approaches – Overview of wafer fabrication – Wafer processing – Silicon gate NMOS process – CMOS process – N well – P well – Twin Tub – Silicon On Insulator

**BASIC ELECTRICAL PROPERTIES OF MOS AND CMOS CIRCUITS**

NMOS and PMOS enhancement transistors – Threshold voltage – MOS device equations – Basic DC equations – Second order effect – Small signal AC characteristics – NMOS and CMOS inverter – Inverter delay – Pass Transistor – Transmission gate

**LAYOUT DESIGN RULES**

Need for design rules – Mead Conway design rules for the Silicon gate NMOS process- CMOS N well / P well design rules – Sheet resistance – Area Capacitance – Wiring Capacitance

**LOGIC DESIGN**

Switch logic- Gate Logic – Inverter – Two input NAND and NOR gate- Other forms of CMOS logic – Dynamic CMOS logic – Clocked CMOS logic – Precharged domino CMOS logic – Structure Design – Simple combinational logic design examples – Parity generator – Multiplexer – Clocked sequential circuits – 2 Phase clocking – Charge storage – Dynamic Register Element – NMOS and CMOS dynamic shift register

**SUB SYSTEM DESIGN PROCESS**

Design of a 4 bit shifter – 4 bit arithmetic processor – ALU Subsystem – Implementing ALU functions with an Adder – Carry look ahead adders – Multipliers – Serial/ Parallel Multipliers – Pipelined multiplier array – Modified booths algorithm – high density memory – FSM – PLA Control Implementation

**TEXT BOOK**

1. Douglas A Pucknell and Kamran Eshranghian, Basic VLSI Design, PHI, 3<sup>rd</sup> Edition, 2004

**REFERENCE BOOKS**

1. Neil H E West and Kamran Eshranghian, Principles of CMOS VLSI Design : A System Perspective, Addison Wesley, 2<sup>nd</sup> Edition, 2002
2. Wayne Wolf, Modern VLSI Design, Pearson Education Inc., 1997

<b>ECE318</b>	<b>INFORMATION THEORY AND CODING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

**ALGEBRA**

Groups – fields – binary field arithmetic – construction of Galois field – basic properties – computations, vector spaces, matrices

### **INFORMATION THEORY**

Information and entropy – properties of entropy of a binary memoryless source – extension of a binary memoryless source – source coding theorem – Shannon fano coding - Huffman coding

### **SHANNON'S THEOREM AND MUTUAL INFORMATION**

Binary symmetric channel – mutual information – properties – channel capacity – Hartley, Shannon Law – channel coding theorem - Lempel-Ziv coding

### **LINEAR AND CYCLIC CODES**

Linear block codes – generator matrices – parity check matrices – encoder – syndrome and error correction – minimum distance – error correction and error detection capabilities – cyclic codes – coding and decoding

### **OTHER CODING TECHNIQUES**

Convolutional codes – encoder – generator matrix – state diagram – distance properties - maximum likelihood decoding – viterbi decoding – sequential decoding – Hadamard matrices and Hadamard codes – BCH codes – description, decoding – Reed Solomon codes

### **TEXT BOOKS**

1. Norman Abramson, Information Theory, John Wiley, 2002.
2. Shu Lin, Costello D.J., Error Control Coding - Fundamentals and Applications, PHI, 2000.

### **REFERENCES**

1. Simon Haykin, Digital Communications, John Wiley, 2001.
2. Taub & Schilling, Principles of Communication System, TMH, 1998.
3. Tomasi, Electronic Communication, Fundamentals Through Advanced, Pearson Education, 2001.
4. Sklar, Digital Communication, Pearson Education, 1999.
5. Cover T., and Thomas, Elements of Information Theory, John Wiley & Sons 1991.

<b>ECE344</b>	<b>MULTIMEDIA COMPRESSION TECHNIQUES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Overview of information theory – redundancy – need for compression – evolution of data compression - applications – Taxonomy of compression techniques – overview of source coding, source models – coding – uniquely decodable codes – prefix codes- Kraft McMillan Inequality.

**QUANTIZATION THEORY**

Scalar quantization theory – overview, uniform, adaptive, nonuniform, Entropy coded Quantization – Vector quantization theory – overview, LBG algorithm –Tree structured vector, structured vector quantizers – rate distribution theory – Evaluation techniques –error analysis and methodologies.

**TEXT COMPRESSION**

Compaction techniques – Huffmann coding – Adaptive Huffmann Coding – Arithmetic coding – Shannon - Fano coding – dictionary techniques – LZW family algorithms.

**AUDIO COMPRESSION**

Audio signal representation – compression techniques Frequency domain and filtering – Basic sub-band coding – G.722– MPEG audio – progressive encoding for audio – Silence compression – speech compression techniques –Vocoders.

**IMAGE COMPRESSION**

Predictive techniques – DM, PCM, DPCM – optimal predictors and optimal quantization – contour based compression, Quad trees – transform coding – JPEG Standard – Sub-band coding algorithms – Design of Filter banks – Wavelet based compression –EPIC, SPIHT coders – JPEG 2000 standards.

**TEXT BOOK**

1. Khalid Sayood, Introduction to Data Compression, Morgan Kauffman Harcourt India, 2<sup>nd</sup> Edition, 2000.

**REFERENCES**

1. David Salomon, Data Compression – The Complete Reference, Springer Verlag New York Inc., 2<sup>nd</sup> Edition, 2001.
2. Yun Q.Shi, Huifang Sun, Image and Video Compression for Multimedia Engineering - Fundamentals, Algorithms & Standards, CRC press, 2003.
3. Peter Symes, Digital Video Compression, McGraw Hill Pub., 2004.
4. Mark Nelson, Data compression, BPB Publishers, New Delhi, 1998.
5. Mark S.Drew, Ze-Nian Li, Fundamentals of Multimedia, PHI, 1<sup>st</sup> Edition, 2003.

<b>ECE431</b>	<b>WIRELESS COMMUNICATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**CELLULAR CONCEPT**

Frequency reuse – channel assignment strategies – hand off strategies – interference and system capacity – Trunking and grade of Service – improving coverage and capacity in cellular systems.

**RADIO PROPAGATION**

Free Space Propagation Model – propagation Mechanisms – reflection, diffraction and scattering – models for path loss – small scale, multipath propagation - parameters of mobile multipath channels – small scale fading types.

**MULTIPLE ACCESS TECHNIQUES**

FDMA – TDMA – CDMA – spread spectrum multiple access – multiplexing and OFDM – Packet Radio protocols – capture effect – capacity of cellular systems.

**EQUALIZATION, DIVERSITY AND CODING**

Linear and nonlinear equalization – adaptive equalization – diversity techniques – RAKE Receiver – fundamentals of channel coding – Block codes and finite fields – convolutional codes – coding gain – Trellis coded Modulation – Turbo Codes.

**WIRELESS STANDARDS**

GSM – IS-95 –UMTS – IMT-2000 – signaling – call control – mobility management and location tracing.

**TEXT BOOK**

1. T.S.Rappaport, Wireless Communications: Principles and Practice, 2<sup>nd</sup> Edition, Pearson Education, 2003.

**REFERENCES**

1. W.C.Y.Lee, Mobile Communications Engineering: Theory and applications, 2<sup>nd</sup> Edition, McGraw-Hill International, 1998.
2. R. Blake, Wireless Communication Technology, Thomson Delmar, 2003.

<b>EEE409</b>	<b>INDUSTRIAL AUTOMATION</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

Definition of Supervisory Control And Data Acquisition (SCADA) – applicable processes – elements of SCADA systems – SCADA Architecture – operation and control using SCADA – development from telemetry – dependence on communications and computers

**COMPONENTS OF AUTOMATED SYSTEMS**

Sensors, transducers and actuators – forgotten cost – special considerations – standardization and maintenance – remote terminal

unit – communication interface – protocol detailed – discrete control – analog control – pulse control , serial control – monitor discrete and analog signals – monitor pulse count and serial signals – master terminal unit – communication interface – configuring a picture of the process – data storage – applications

### **COMMUNICATIONS**

Analog to digital conversion – communication models and types – communication standards – communications system components – protocol – modems – field buses – synchronous or asynchronous – telephone cable or radio

### **PROGRAMMABLE LOGIC CONTROLLERS**

Structure of PLC – control program – programming – simple relay layouts and schematics – PLC connections – ladder logic inputs – ladder logic outputs – tutorial problems – case studies

### **SUBSTATIONS AND DISTRIBUTION AUTOMATION**

Substation automation – structure of subsystem automation – substation communications – substation functions through SCADA – distribution automation– functions of distribution automation – distribution automation for improved energy management – relative rating of communication media for DA – automation in process industries – SCADA systems in industries – requirements of industrial automation system – SCADA system in sugar industries– purification systems – evaporation – crystallization – centrifugation and sugar handling

### **TEXT BOOK**

1. Stuart A. Boyer., SCADA: Supervisory Control and Data Acquisition, 3<sup>rd</sup> Edition, ISA–The instrumentation systems and Automation Society

**REFERENCE**

1. ISA's Practical Guide Series, Analytical Instrumentation (1996).
2. Maintenance of Instrumentation and systems – 2<sup>nd</sup> Edition (2005)
3. Fundamentals of Industrial Control – 2<sup>nd</sup> Edition (2006).

<b>EEE410</b>	<b>NEURAL NETWORK AND FUZZY LOGIC</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**NEURAL NETWORKS**

Overview of biological neuro-system – mathematical models of neurons – learning rules – learning paradigms – supervised – unsupervised and reinforcement learning

**FEEDFORWARD AND FEEDBACK NETWORKS**

Perceptron networks – training rules – multilayer perceptron – back propagation algorithm – associative memories – Hopfield networks – Boltzman machine – self organizing map

**FUZZY LOGIC**

Overview of classical sets – introduction to fuzzy logic – membership function – fuzzy rule generation – operations on fuzzy sets – compliment – intersections – unions – combinations of operations – fuzzy if-then rule – fuzzy inferencing –Mamdani, TSK – defuzzification

**NEURO FUZZY SYSTEM**

Adaptive neuro fuzzy inference systems (ANFIS) – architecture – hybrid learning algorithm – parameter identification – rule base structure identification – input selection – input space partitioning – neuro-fuzzy control

### **APPLICATIONS OF NEURAL NETWORK AND FUZZY LOGIC**

Applications of neural network – pattern recognition – fuzzy logic control – inverted pendulum – image processing – home heating system – biomedical applications – applications of neuro fuzzy system – character recognition – channel equalization – noise cancellation

### **TEXT BOOKS**

1. Jang, J.S.R., Sun, C.T., E. Mizutani., Neuro-Fuzzy and Soft Computing, Prentice Hall of India (P) Ltd, New Delhi, 2005
2. Timothy J. Ross., Fuzzy Logic with Engineering Applications, Tata McGraw Hill, 1997.

### **REFERENCES**

1. Laurance Fausett, Englewood cliffs, N.J., Fundamentals of Neural Networks, Pearson Education, 1992.
2. Zimmermann, H.J., Fuzzy Set Theory & its Applications, Allied Publication Ltd., 1996.
3. John Yen & Reza Langari., Fuzzy Logic – Intelligence Control & Information, Pearson Education, New Delhi, 2003.

<b>INT404</b>	<b>INFORMATION SYSTEMS DESIGN</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **MANAGING THE DIGITAL FIRM**

Why information systems – contemporary approaches to information systems – new role of information systems- major types of systems in organizations – systems from a functional perspective – enterprise applications – organizations and information systems – managers decision making and information systems – information systems and business strategy.

## **DESIGNING INFORMATION SYSTEMS**

Systems as planned organizational change – business process re-engineering and process improvement – overview of systems development – alternate system – Building approaches – Understanding the business value of Information Systems - The importance of change management in information system success and failure – Managing Implementation.

## **DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS**

Systems analysis and design – System development life cycle – Limitation – End User Development – Managing End Users – off-the shelf software packages – Outsourcing – Comparison of different methodologies.

## **KNOWLEDGE MANAGEMENT, ETHICS AND SECURITY**

Knowledge Management in the organization – Information and Knowledge base systems – Decision -support systems – Understanding ethical and Social issues packed to systems – Ethics in an Information society – The moral dimensions of Information Systems – System vulnerability and abuse – Creating a control environment – Ensuring System Quality.

## **INFORMATION ARCHITECTURE**

Defining Information Architecture – why Information Architecture matters – Practicing Information Architecture in the Real world – Information Ecologies – User needs and Behavior – The anatomy of Information Architecture – Organizing Systems – Search Systems.

## **TEXT BOOKS**

1. Lauaon Kenneth & Landon Jane, Management Information Systems: Managing the Digital firm , Eighth edition, PHI, 2004.

2. Uma G. Gupta, Management Information Systems – A Management Perspective, Galgotia publications Pvt., Ltd., 1998.
3. Louis Rosenfel and Peter Morville, Information Architecture for the World wide Web, O'Reilly Associates, 2002.

### REFERENCES

1. Steven Alter, Information Systems – A Management Perspective, Pearson Education, 2001.
2. Uma Gupta, Information Systems – Success in 21<sup>st</sup> Century, Prentice Hall of India, 2000.
3. Robert G. Murdick, Joel E. Ross and James R. Claggett, Information Systems for Modern Management, PHI, 1994.

<b>INT408</b>	<b>ENTERPRISE RESOURCE PLANNING</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### INTRODUCTION

ERP: An Overview, Enterprise – An Overview, Benefits of ERP- ERP and Related Technologies- Business Process Reengineering (BPR)- Data Warehousing- Data Mining - OLAP - SCM

### ERP IMPLEMENTATION

ERP Implementation Lifecycle - Implementation Methodology - Hidden Costs - Organizing the Implementation – Vendors - Consultants and Users - Contracts with Vendors - Consultants and Employees - Project Management and Monitoring

### THE BUSINESS MODULES

Business modules in an ERP Package - Finance – Manufacturing - Human Resources - Plant Maintenance - Materials Management - Quality Management - Sales and Distribution

### **THE ERP MARKET**

ERP Market Place - SAP AG - People soft – Baan - JD Edwards-  
Oracle – QAD - SSA

### **ERP – PRESENT AND FUTURE**

Turbo Charge the ERP System – EIA - ERP and e-Commerce - ERP  
and Internet - Future Directions

### **TEXT BOOK**

1. Alexis Leon,ERP Demystified, Tata McGraw Hill, New Delhi,  
2003

### **REFERENCES**

1. Joseph A Brady, Ellen F Monk, Bret Wagner,Concepts in  
Enterprise Resource Planning, Thompson Course Technology, USA,  
2001.
2. Vinod Kumar Garg and Venkitakrishnan N K, Enterprise  
Resource Planning – Concepts and Practice, PHI, New Delhi, 2003

**HUMANTIES ELECTIVES**

<b>HSS001</b>	<b>TOTAL QUALITY MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION TO QUALITY MANAGEMENT**

Definitions – TOM framework, benefits, awareness and obstacles - Quality – vision, mission and policy statements - Customer Focus – customer perception of quality, Translating needs into requirements, customer retention. Dimensions of product and service quality. Cost of quality.

**PRINCIPLES AND PHILOSOPHIES OF QUALITY MANAGEMENT**

Overview of the contributions of Deming, Juran Crosby, Masaaki Imai, Feigenbaum, Ishikawa, Taguchi, Shingeo and Walter Shewhart - Concepts of Quality circle, Japanese 5S principles and 8D methodology.

**STATISTICAL PROCESS CONTROL AND PROCESS CAPABILITY**

Meaning and significance of statistical process control (SPC) – construction of control charts for variables and attributed - Process capability – meaning, significance and measurement – Six sigma concepts of process capability - Reliability concepts – definitions, reliability in series and parallel, product life characteristics curve - Business process re-engineering (BPR) – principles, applications, reengineering process, benefits and limitations.

**TOOLS AND TECHNIQUES FOR QUALITY MANAGEMENT**

Quality functions development (QFD) – Benefits, Voice of customer, information organization, House of quality (HOQ), building a HOQ, QFD process. Failure mode effect analysis (FMEA) – requirements

of reliability, failure rate, FMEA stages, design, process and documentation.

### **TAGUCHI TECHNIQUES**

Taguchi techniques – introduction, loss function, parameter and tolerance design, signal to noise ratio - Seven old (statistical) tools - Seven new management tools - Bench marking and POKA YOKE.

### **REFERENCES**

1. Dale H.Besterfield et al, Total Quality Management, Perarson Education, Thrid edition, (First Indian Reprints 2004).
2. Shridhara Bhat K, Total Quality Management – Text and Cases, Himalaya Publishing House, First Edition, 2002.
3. William J.Kolarii, Creating quality, Mcgraw Hill, 1995
4. Poornima M.Charantimath., Total quality management, Pearson Education, First Indian Reprint, 2003.

<b>HSS002</b>	<b>ENGINEERING MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **INTRODUCTION**

Demand and Revenue Analysis - Demand Forecasting - Production Analysis - Cost and Supply Analysis, Price and output Determination - Investment Analysis - Plant Location - Economic Optimization.

### **FORMS OF BUSINESS AND FUNCTIONS**

Types of Business Organisation, Forms - Planning - Organizing - Designing effective organisations - Coordination

### **HUMAN RESOURCE DEVELOPMENT**

Motivating individuals and workgroups - Leadership for Managerial Effectiveness - Team working and Creativity - Managerial Communication - Personal Management – Time Management - Stores Management - Career Planning.

**FINANCIAL MANAGEMENT**

Product development - Management techniques in product development - Nature of controlling - Operations Management - Just-in-Time.

**GLOBAL ENVIRONMENT**

Managing World Economic Change - The global environment - Multinational Strategies - Economic Cycles and Director Investment - Change and Organisation Development - Managerial Ethics and Social responsibilities.

**REFERENCES**

Harold Koontz& Heinz Wehrich, Essentials of Management, Tata McGraw Hill publishing company Ltd.  
Koontz, Wehrich& Aryasri, Principles of Management, Tata McGraw Hill publishing company Ltd.  
Tripathi, Reddy, Principles of Management, Tata McGraw Hill publishing company Ltd.  
Hampton, Management, Tata McGraw Hill publishing company Ltd.  
L.M.Prasad, Principles of Management.

<b>HSS004</b>	<b>INDUSTRIAL PSYCHOLOGY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

The role of the psychologist in industry, the field of occupational Psychology - Study of behavior in work situation and applications of Psychological principles to problems of selection, Placement, Counseling and training

**DESIGN OF WORK ENVIRONMENTS**

Human engineering and physical environment techniques of job analysis, Social environment- Group dynamics in Industry Personal psychology - Selection, training, placement, promotion, counseling,

job motivations, job satisfaction .Special Study of problem of fatigue, boredom and accidents,

### **UNDERSTANDING CONSUMER BEHAVIOUR**

Consumer behaviour; study of consumer preference, effects of advertising, Industrial morale - the nature and scope of engineering psychology, its application to industry

### **WORK METHODS**

Efficiency at work, the concept of efficiency, the work curve, its characteristics - The work methods; hours of work, nature of work, fatigue and boredom, rest pauses. The personal factors; age abilities, interest, job satisfaction The working environment - noise, illumination, atmospheric conditions - Increasing efficiency at work; improving the work methods, Time and motion study, its contribution and failure resistance to time and motion studies, need for allowances in time and motion study.

### **WORK AND EQUIPMENT DESIGN**

Criteria in evaluation of job-related factor, job design, human factors, Engineering information, input processes, mediation processes, action processes, methods design, work space and its arrangement, human factors in job design. Accident and Safety - The human and economic costs of accidents, accident record and statistics, the causes of accidents situational and individual factors related to accident reduction

### **REFERENCES**

1. Tiffin,J and McCormic E.J., Industrial Psychology, Prentice Hall, 6th Edn., 1975.
2. McCormic E.J., Human Factors engineering and design, McGraw Hill, 4th Edn.,1976. Mair, N.R.F., Principles of Human relations
3. Gilmer, Industrial Psychology
4. Ghiselli & Brown, Personnel and Industrial Psychology.
5. Myer, Industrial Psychology.

6. Dunnet, M.D., Handbook of Industrial and Organizational Psychology.
7. Blum & Taylor, Industrial Psychology.

<b>HSS006</b>	<b>PROFESSIONAL ETHICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**ENGINEERING ETHICS**

Functions of Being a Manager – Stock holder and stakeholder management - Ethical treatment of employees - ethical treatment of customers- supply chain management and other issues.

**ENGINEERING AS SOCIAL EXPERIMENTATION**

Senses of Ethics – Variety of moral issues – Types of inquiry – Moral dilemmas - Moral Autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Professions and Professionalism – Professional ideals and virtues – Theories about right action – Self-interest – Customs and religion – Use of Ethical Theories.

**ENGINEER RESPONSIBILITY FOR SAFETY**

Corporate social responsibility - Collegiality and loyalty – Respect for Authority – Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Rights – Employee Rights – Discrimination.

**RESPONSIBILITY AND RIGHTS**

Moral imagination, stake holder theory and systems thinking - One approach to management Decision – making Leadership.

**GLOBAL ISSUES**

Multinational Corporations – Environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineers – Engineers as Expert Witnesses and Advisors – Moral Leadership – Sample code of conduct.

**REFERENCES**

1. Mike Martin and Roland Schinzinger, Ethics in Engineering, McGraw Hill, New York, 1996.
2. Charles D Fledderman, Engineering Ethics, Prentice Hall, New Mexico, 1999.
3. Laura Schlesinger, How Could You Do That: The Abdication of Character, Courage, and Conscience, Harper Collins, New York, 1996.
4. Stephen Carter, Integrity, Basic Books, New York, 1996.
5. Tom Rusk, The Power of Ethical Persuasion: From Conflict to Partnership at Work and in Private Life, Viking, New York, 1993.

<b>HSS014</b>	<b>MARKETING MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**MARKETING**

Meaning - concept - functions - marketing Planning & implementation marketing Programmes - Marketing environment – Market Segmentation and consumer behaviour – Influencing factors, Decision process – Marketing mix – Marketing department.

**PRODUCT**

Meaning - Product planning - policies - positioning - New product development Product life cycle – BCG Matrix-branding. Packing, labeling.

**PRICING**

Pricing objectives – Setting and modifying the price – Different pricing method Product line pricing and new product pricing

**DISTRIBUTION**

Nature of Marketing channels - Types of Channel flows - Channel functions - Channel co-operation, conflict and competition - Direct Marketing Telemarketing, Internet shopping.

**PROMOTION**

Promotion Mix - Advertisement - Message - copy writing – Advertisement budgeting - Measuring advertisement effectiveness - Media strategy - sales promotion - Personal selling, publicity and direct marketing

**REFERENCES**

1. Philip Kotler, Marketing Management- Analysis Planning and Control, Prentice Hall of India, New Delhi.
2. Cundiff, Still & Govoni, Fundamentals of Modern Marketing, Prentice Hall of India, New Delhi.
3. Ramaswamy. V S & Namakumari. S, Marketing Management-Planning Implementation and Control, Macmillan Business Books, 2002.
4. Jobber, Principles and Practice of Marketing, McGraw-Hill.

<b>HSS015</b>	<b>MANAGEMENT CONCEPTS AND TECHNIQUES</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**DEVELOPMENT OF MANAGEMENT THOUGHT**

Scientific Management Movement, Administrative Movement, Human- Relations Movement, Decision-Science Movement, Behavioral Movement, Systems Movement, Contingency Movement

**ESSENTIALS OF PLANNING**

Objectives, goals, Programmed Decisions and Un programmed Decisions; Decision-Making, Creativity in Decision-Making, Forecasting and Strategy to Formulation.

**EFFECTIVE ORGANIZING**

Span of Control, Departmentation, Authority; Responsibility, Bureaucracy and Adhocracy; Group Dynamics

**REALITIES OF ORGANIZATIONAL LIFE**

Organizational Politics, Organizational Power, Organizational Conflict

**COMMUNICATION & CONTROL**

Communication Process Evaluation, Control Process, Qualities of a Good Control System, Management Audit, Human – Offset Accounting, Cost Benefit Analysis.

**REFERENCES**

1. Harold Koontz & Heinz Weihrich, Essentials of Management, Tata McGraw Hill publishing company Ltd.
2. Koontz, Weihrich & Aryasri, Principles of Management, Tata McGraw Hill publishing company Ltd.
3. Tripathi & Reddy, Principles of Management, Tata McGraw Hill publishing company Ltd.
4. Hampton, Management, Tata McGraw Hill publishing company Ltd.
5. L.M.Prasad, Principles of Management.

<b>HSS016</b>	<b>ORGANIZATIONAL PSYCHOLOGY</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**FOCUS AND PURPOSE**

Definition, need and importance of organizational Behaviour – nature and scope – frame work.

**INDIVIDUAL BEHAVIOUR**

Personality – types – factors influencing personality – theories – learning – types of learners – learning theories – organizational Behaviour modification. Attitudes – characteristics – components – formation – measurement. Perceptions – importance – factors influencing perception – interpersonal perception.

**GROUP BEHAVIOUR**

Organization structure – formation – groups in organizations – influence – group dynamics – emergence of informal leaders and

working norms – group decision making techniques – interpersonal relations – communication – control.

### **POWER**

Leadership styles – theories – leaders Vs managers – sources of power – power centers – power and politics.

### **DYNAMICS OF ORGANIZATIONAL BEHAVIOURS**

Organizational climate – factors affecting organizational climate – importance. Job satisfaction – determinants – measurements – influence on behavior. Organizational change – importance – stability Vs change – proactive Vs reaction change – the change process – resistance to change – managing change. Organizational development – characteristics – objectives – team building. Organizational effectiveness – perspective – effectiveness Vs efficiency – approaches – the time dimension – achieving organizational effectiveness.

### **REFERENCES**

1. Stephen P. Robins, Organisational Behavior, Prentice Hall of India, 9th edition, 2001.
2. Hellriegel, Slocum and Woodman, Organisational Behavior, South-Western, Thomson Learning, 9th edition, 2001.
3. Schermerhorn, hunt and Osborn, Organisational behavior, John Wiley, 7th edition, 2001.
4. Jit S. Chand, Organisational Behavior, Vikas publishing House Pvt. Ltd. 2nd edition, 2001.
5. Fred Luthans, Organisational Behavior, McGraw Hill Book Co., 1998.
6. New Strom & Davis, Organisational behaviour, McGraw Hill, 2001.
7. Jaffa Harris and Sandra Hartman, Organisational Behaviour, Jaico, 2002.
- 8.

<b>HSS017</b>	<b>INTERNATIONAL ECONOMICS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**INTRODUCTION**

The Traditional Theory of International Trade, The Basic Trade Model, Heckscher-Ohlin-Samuelson Model, Effects of Tariffs & Quotas, Theory of Factor Movements - New Theories of International Trade and Industrial Policies.

**EXCHANGE RATE & BALANCE OF PAYMENT**

The Balance of Payments and National Accounts, Determinants of Exchange Rates The Exchange-Rate Regime Choice and a Common Currency Area, International Debt and Currency Crises.

**INTERNATIONAL REGULATORY AUTHORITY**

Political Economy of Trade Disputes, the FTA and the WTO - The role of the IMF and other International Financial Organizations.

Reasons for Protection World Trade, International Movements of Capital - The Balance of Trade and Other Measures of International Transactions. Export and import policies.

**INTERNATIONAL MACROECONOMICS**

European Monetary Unification and the Euro - Preferential Trading Arrangements and the NAFTA International Policies for Economic Development, Trade Outsourcing and Off shoring

**REFERENCES**

1. N. Bhagwati, A. Panagariya and T. N. Srinivasan, Lectures on International Trade, MIT Press, 2<sup>nd</sup> edition, 1998.
2. M. Obstfeld and K. Rogoff, Foundation of International Macroeconomics, McGraw-Hill, 1996.
3. Romer, D., Advanced Macroeconomics, McGraw Hill, 1996.

<b>HSS018</b>	<b>COMMUNICATION SKILLS</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

**COMMUNICATION IN BUSINESS**

Systems approach, forms of business communication, management and communication, factors facilitating communication.

**COMMUNICATION PROCESS**

Interpersonal perception, selective attention, feedback, variables, listening barriers to listening, persuasion, attending and conducting interviews, participating in discussions, debates and conferences, presentation skills, paralinguistic features, oral fluency development.

**BUSINESS CORRESPONDENCE**

Business letter. Memos, minutes, agendas, enquiries, orders, sales letters, notice, tenders, letters of application, letter of complaints.

**TECHNICAL REPORTS**

Format, Choice of vocabulary, coherence and cohesion, paragraph writing, organization.

**PROJECT REPORTS**

Project proposal, project reports, and appraisal reports.

**REFERENCES**

1. Sharan J.Genrson and Steven M.Gerson, Technical Writing - Process and Product, Pearson Education, 2000.
2. Raymond V.Lesikar, John D. Pettit and Mary E.Flatley, Lesikass Basic Communication, Tata McGraw Will, 8th Edition, 1999.
3. Stevel. E. Pauley, Daniel G.Riordan, Technical Report Writing Today, AITBS Publishing & Distributors, India 5th edition, 2000.
4. Robert L.Shurter, Effective letters in business, Third Ed., 1983.

5. McGraith, Basic Managerial Skills for all Prentice Hall of India, 6th Edition, 2002.
6. Halliday, M.A.Ky R.Hasan, Cohesion in English, Longman, London, 1976.

<b>HSS020</b>	<b>HUMAN RESOURCE MANAGEMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **INTRODUCTION**

Functions of a human resources manager - recruitment and selection processes interview methods.

### **HR- EVALUATION AND DEVELOPMENT**

Performance appraisal, Training and development, disciplinary procedures, collective bargaining and employee welfare.

### **TRENDS IN HRM**

The recent methods and trends in HRM with a few case studies in the context of globalization.

### **STRATEGIC      ROLE      OF      HUMAN      RESOURCE MANAGEMENT**

Job analysis Personnel planning and recruiting Employee testing and selection, interviewing candidates, Appraising performance.

### **CAREER AND COMPENSATION**

Managing careers Compensation Benefits and services Labor relations and collective bargaining Employee safety and health

### **REFERENCES**

1. Decenzo and Robbins, Human Resource Management, Wiley, 6<sup>th</sup> edition, 2001.
2. Biswajeet Pattanayak, Human Resource Management, Prentice Hall of India, 2001.
3. Eugene McKenna and Nic Beach, Human Resource Management, Pearson Education.

4. Dessler, Human Resource Management, Pearson Education Limited, 2002.
5. Mamoria C.B and Mamoria S., Personnel Management, Himalaya Publishing.
6. Wayne Cascio, Managing Human Resources, McGraw-Hill, 1998.
7. Ivancevich, Human Resource Management, McGraw-Hill, 2002.

<b>HSS023</b>	<b>ENTREPRENEURSHIP DEVELOPMENT</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>

### **ENTREPRENEURIAL COMPETENCE**

Entrepreneurship concept – Entrepreneurship as a Career – Entrepreneur – Personality Characteristics of Successful Entrepreneur – Knowledge and Skills Required for an Entrepreneur.

### **ENTREPRENEURIAL ENVIRONMENT**

Business Environment - Role of Family and Society - Entrepreneurship Development Training and Other Support Organisational Services - Central and State Government Industrial Policies and Regulations - International Business.

### **BUSINESS PLAN PREPARATION**

Sources of Product for Business – Pre-feasibility Study - Criteria for Selection of Product - Ownership - Capital - Budgeting Project Profile Preparation - Matching Entrepreneur with the Project - Feasibility Report Preparation and Evaluation Criteria.

### **LAUNCHING OF SMALL BUSINESS**

Finance and Human Resource Mobilization Operations Planning - Market and Channel Selection - Growth Strategies - Product Launching.

**MANAGEMENT OF SMALL BUSINESS**

Monitoring and Evaluation of Business - Preventing Sickness and Rehabilitation of Business Units - Effective Management of small Business.

**REFERENCES**

1. Hisrich, Entrepreneurship, Tata McGraw Hill, New Delhi, 2001.
2. P. Saravanavel, Entrepreneurial Development, Ess Pee kay Publishing House, Chennai, 1997.
3. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi, 2001.
4. Prasama Chandra, Projects – Planning, Analysis, Selection, Implementation and Reviews, Tata McGraw-Hill Publishing Company Limited, 1996.
5. P.C.Jain (ed.), Handbook for New Entrepreneurs, EDII, Oxford University Press, New Delhi, 1999.
6. Staff College for Technical Education, Manila and Centre for Research and Industrial Staff Performance, Bhopal, Entrepreneurship Development, Tata McGraw-Hill Publishing Company Ltd., New Delhi, 1998.

<b>HSS026</b>	<b>GERMAN I</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
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German for science and technology, based on the book ‘German for science and Technology’ by stecker/Davids, for beginners grammar, noun group; verb, prepositions, pronouns, modal verbs, compound verbs, reading and translating practice. Simple colloquial German.

<b>HSS027</b>	<b>GERMAN II</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
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German for Science and Technology, based on the book ‘German for science and Technology by Stoecker/Davids, continuation of

GERMAN-I; grammar; subordinate clauses, compound senses, passive voice, infinitive and participle constructions subjunctive. Further reading and translating proactive of technical texts. Continuation of colloquial German.

<b>HSS028</b>	<b>FRENCH I</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
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Definite and indefinite articles – Adjectives – agreement with their nouns – Conjugation of verbs; to have, to be affirmative, negative and interrogative forms – Possessive adjectives. Contraction of ‘of the’ ‘to the’ (Singular and Plural) – demonstrative adjectives – The three groups of verbs – present perfect tense with ‘to have’ and ‘to be’ – The partitive article – Future tense – immediate future recent past – Reflexive verbs – Present perfect of reflexive verbs.

<b>HSS029</b>	<b>FRENCH II</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
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The imperative mood – Comparison of adjectives – Gender of adjectives – Subject and direct object – Possessive pronouns – Subject direct object – Conjugation of verbs – peculiarities of certain verbs – Imperfect tense – Adverbs – Relative pronouns – Demonstrative pronouns – interrogative adjectives and pronouns – Agreement of the participle – Grammatical analysis – Future perfect – past perfect – present participle – Conditional present.

<b>HSS036</b>	<b>TECHNOLOGY AND DEVELOPMENT</b>	<b>3</b>	<b>0</b>	<b>0</b>	<b>3</b>
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Development of Scientific thought from Aristotle, Francis Bacon to Modern Times. Significant developments in Technology and their impact on society from prehistoric times to present day. The present technological situation in India. The problems of Rural Development, urban Proliferation and of Technology gap. The course will be given from readings from various renowned authors

and will be in the form of an introduction of the ideas and discussion on the same.