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* Common to all B.E. / B.Tech. Programmes

+ Offering English Language Laboratory as an additional subject (with no marks) during 2nd semester may be decided by the respective Colleges affiliated to Anna University Chennai.

A. CIRCUIT BRANCHES

I Faculty of Electrical Engineering
1. B.E. Electrical and Electronics Engineering
2. B.E. Electronics and Instrumentation Engineering
3. B.E. Instrumentation and Control Engineering

II Faculty of Information and Communication Engineering
1. B.E. Computer Science and Engineering
2. B.E. Electronics and Communication Engineering
3. B.E. Bio Medical Engineering
4. B.Tech. Information Technology

B. NON – CIRCUIT BRANCHES

I Faculty of Civil Engineering
1. B.E. Civil Engineering

II Faculty of Mechanical Engineering
1. B.E. Aeronautical Engineering
2. B.E. Automobile Engineering
3. B.E. Marine Engineering
4. B.E. Mechanical Engineering
5. B.E. Production Engineering

III Faculty of Technology
1. B.Tech. Chemical Engineering
2. B.Tech. Biotechnology
3. B.Tech. Polymer Technology
4. B.Tech. Textile Technology
5. B.Tech. Textile Technology (Fashion Technology)
7. B.Tech. Plastics Technology
### SEMESTER III
(Applicable to the students admitted from the Academic year 2008–2009 onwards)

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**SEMESTER VII – Elective III**

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**SEMESTER VIII – Elective IV**

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**SEMESTER VIII – Elective V**

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AIM:
To encourage students to actively involve in participative learning of English and to help them acquire Communication Skills.

OBJECTIVES:
1. To help students develop listening skills for academic and professional purposes.
2. To help students acquire the ability to speak effectively in English in real-life situations.
3. To inculcate reading habit and to develop effective reading skills.
4. To help students improve their active and passive vocabulary.
5. To familiarize students with different rhetorical functions of scientific English.
6. To enable students write letters and reports effectively in formal and business situations.

UNIT I
Technical Vocabulary - meanings in context, sequencing words, Articles- Prepositions, intensive reading& predicting content, Reading and interpretation, extended definitions, Process description

SUGGESTED ACTIVITIES:
1. Exercises on word formation using the prefix ‘self’ - Gap filling with preposition.
2. Exercises - Using sequence words.
3. Reading comprehension exercise with questions based on inference – Reading headings
4. and predicting the content – Reading advertisements and interpretation.
5. Writing extended definitions – Writing descriptions of processes – Writing paragraphs based on discussions – Writing paragraphs describing the future.

UNIT II

SUGGESTED ACTIVITIES:
1. Reading comprehension exercises with questions on overall content – Discussions analyzing stylistic features (creative and factual description) - Reading comprehension exercises with texts including graphic communication - Exercises in interpreting non-verbal communication.
2. Listening comprehension exercises to categorise data in tables.
3. Writing formal letters, quotations, clarification, complaint – Letter seeking permission for Industrial visits – Writing analytical paragraphs on different debatable issues.

UNIT III
Cause and effect expressions – Different grammatical forms of the same word - Speaking – stress and intonation, Group Discussions - Reading – Critical reading - Listening, - Writing – using connectives, report writing – types, structure, data collection, content, form, recommendations.
SUGGESTED ACTIVITIES:
1. Exercises combining sentences using cause and effect expressions – Gap filling exercises using the appropriate tense forms – Making sentences using different grammatical forms of the same word. (Eg: object – verb / object – noun)
2. Speaking exercises involving the use of stress and intonation – Group discussions – analysis of problems and offering solutions.
3. Reading comprehension exercises with critical questions, Multiple choice question.

UNIT IV
12
Numerical adjectives – Oral instructions – Descriptive writing – Argumentative paragraphs – Letter of application - content, format (CV / Bio-data) - Instructions, imperative forms - Checklists, Yes/No question form – E-mail communication.

SUGGESTED ACTIVITIES:
1. Rewriting exercises using numerical adjectives.
2. Reading comprehension exercises with analytical questions on content – Evaluation of content.
3. Listening comprehension – entering information in tabular form, intensive listening exercise and completing the steps of a process.
4. Speaking - Role play – group discussions – Activities giving oral instructions.

UNIT V
9
Speaking - Discussion of Problems and solutions - Creative and critical thinking – Writing an essay, Writing a proposal.

SUGGESTED ACTIVITIES:
1. Case Studies on problems and solutions
2. Brain storming and discussion
3. Writing Critical essays
4. Writing short proposals of 2 pages for starting a project, solving problems, etc.
5. Writing advertisements.

TOTAL: 60 PERIODS

TEXT BOOK:

REFERENCES:
**EXTENSIVE READING:**

**NOTE:**
The book listed under Extensive Reading is meant for inculcating the reading habit of the students. They need not be used for testing purposes.

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**MA2161**

**MATHEMATICS – II**

**L T P C**

3 1 0 4

**UNIT I**

**ORDINARY DIFFERENTIAL EQUATIONS**

Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

**UNIT II**

**VECTOR CALCULUS**


**UNIT III**

**ANALYTIC FUNCTIONS**

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy – Riemann equation and Sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping : w= z+c, cz, 1/z, and bilinear transformation.

**UNIT IV**

**COMPLEX INTEGRATION**


**UNIT V**

**LAPLACE TRANSFORM**


Definition of Inverse Laplace transform as contour integral – Convolution theorem (excluding proof) – Initial and Final value theorems – Solution of linear ODE of second order with constant coefficients using Laplace transformation techniques.

**TOTAL : 60 PERIODS**

**TEXT BOOK**

REFERENCES:

PH2161
ENGINEERING PHYSICS – II
L T P C
3 0 0 3

UNIT I
CONDUCTING MATERIALS

UNIT II
SEMICONDUCTING MATERIALS

UNIT III
MAGNETIC AND SUPERCONDUCTING MATERIALS

UNIT IV
DIELECTRIC MATERIALS
UNIT V MODERN ENGINEERING MATERIALS

Metallic glasses: preparation, properties and applications.
Shape memory alloys (SMA): Characteristics, properties of NiTi alloy, application, advantages and disadvantages of SMA.

TEXT BOOKS:
2. Charles P. Poole and Frank J.Ownen, ‘Introduction to Nanotechnology’, Wiley India(2007) (for Unit V)

REFERENCES:

CY2161 ENGINEERING CHEMISTRY – II

AIM
To impart a sound knowledge on the principles of chemistry involving the different application oriented topics required for all engineering branches.

OBJECTIVES
• The student should be conversant with the principles electrochemistry, electrochemical cells, emf and applications of emf measurements.
• Principles of corrosion control
• Chemistry of Fuels and combustion
• Industrial importance of Phase rule and alloys
• Analytical techniques and their importance.

UNIT I ELECTROCHEMISTRY
Electrochemical cells – reversible and irreversible cells – EMF – measurement of emf – Single electrode potential – Nernst equation (problem) – reference electrodes – Standard Hydrogen electrode – Calomel electrode – Ion selective electrode – glass electrode and measurement of pH – electrochemical series – significance – potentiometer titrations (redox - Fe²⁺ vs dichromate and precipitation – Ag⁺ vs CI titrations) and conduct metric titrations (acid-base – HCl vs, NaOH) titrations,
UNIT II  CORROSION AND CORROSION CONTROL  9
Chemical corrosion – Pilling – Bedworth rule – electrochemical corrosion – different
types – galvanic corrosion – differential aeration corrosion – factors influencing corrosion
– corrosion control – sacrificial anode and impressed cathodic current methods –
corrosion inhibitors – protective coatings – paints – constituents and functions – metallic
coatings – electroplating (Au) and electroless (Ni) plating.

UNIT III  FUELS AND COMBUSTION  9
Calorific value – classification – Coal – proximate and ultimate analysis metallurgical
coke – manufacture by Otto-Hoffmann method – Petroleum processing and fractions –
cracking – catalytic cracking and methods-knocking – octane number and cetane
number – synthetic petrol – Fischer Tropsch and Bergius processes – Gaseous fuels-
water gas, producer gas, CNG and LPG, Flue gas analysis – Orsat apparatus –
theoretical air for combustion.

UNIT IV  PHASE RULE AND ALLOYS  9
Statement and explanation of terms involved – one component system – water system –
condensed phase rule – construction of phase diagram by thermal analysis – simple
eutectic systems (lead-silver system only) – alloys – importance, ferrous alloys –
nichrome and stainless steel – heat treatment of steel, non-ferrous alloys – brass and
bronze.

UNIT V  ANALYTICAL TECHNIQUES  9
Beer-Lambert’s law (problem) – UV-visible spectroscopy and IR spectroscopy –
principles – instrumentation (problem) (block diagram only) – estimation of iron by
colorimetry – flame photometry – principle – instrumentation (block diagram only) –
estimation of sodium by flame photometry – atomic absorption spectroscopy – principles
– instrumentation (block diagram only) – estimation of nickel by atomic absorption
spectroscopy.

TOTAL: 45 PERIODS

TEXT BOOKS
Delhi (2002).

REFERENCES
(2008).
OBJECTIVE:
At the end of this course the student should be able to understand the vectorial and scalar representation of forces and moments, static equilibrium of particles and rigid bodies both in two dimensions and also in three dimensions. Further, he should understand the principle of work and energy. He should be able to comprehend the effect of friction on equilibrium. He should be able to understand the laws of motion, the kinematics of motion and the interrelationship. He should also be able to write the dynamic equilibrium equation. All these should be achieved both conceptually and through solved examples.

UNIT I  BASICS & STATICS OF PARTICLES  12

UNIT II  EQUILIBRIUM OF RIGID BODIES  12

UNIT III  PROPERTIES OF SURFACES AND SOLIDS  12

UNIT IV  DYNAMICS OF PARTICLES  12

UNIT V  FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS  12

TOTAL: 60 PERIODS
TEXT BOOK

REFERENCES

EE2151 CIRCUIT THEORY L T P C
(Common to EEE, EIE and ICE Branches) 3 1 0 4

UNIT I BASIC CIRCUITS ANALYSIS 12

UNIT II NETWORK REDUCTION AND NETWORK THEOREMS FOR DC AND AC CIRCUITS: 12
Network reduction: voltage and current division, source transformation – star delta conversion.
Thevenins and Novton & Theorem – Superposition Theorem – Maximum power transfer theorem – Reciprocity Theorem.

UNIT III RESONANCE AND COUPLED CIRCUITS 12

UNIT IV TRANSIENT RESPONSE FOR DC CIRCUITS 12
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. with sinusoidal input.

UNIT V ANALYSING THREE PHASE CIRCUITS 12
Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wire circuits with star and delta connected loads, balanced & un balanced – phasor diagram of voltages and currents – power and power factor measurements in three phase circuits.

TOTAL: 60 PERIODS
TEXT BOOKS:

REFERENCES:

EC2151 ELECTRIC CIRCUITS AND ELECTRON DEVICES L T P C
(For ECE, CSE, IT and Biomedical Engg. Branches) 3 1 0 4

UNIT I CIRCUIT ANALYSIS TECHNIQUES 12

UNIT II TRANSIENT RESONANCE IN RLC CIRCUITS 12

UNIT III SEMICONDUCTOR DIODES 12

UNIT IV TRANSISTORS 12
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and comparison of their characteristics – Breakdown in transistors – operation and comparison of N-Channel and P-Channel JFET – drain current equation – MOSFET – Enhancement and depletion types – structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

UNIT V SPECIAL SEMICONDUCTOR DEVICES
(Qualitative Treatment only) 12

TOTAL : 60 PERIODS
TEXT BOOKS:

REFERENCES:

GE2151 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING L T P C
(Common to branches under Civil, Mechanical and Technology faculty) 3 0 0 3

UNIT I ELECTRICAL CIRCUITS & MEASURMENTS 12

Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters.

UNIT II ELECTRICAL MECHANICS 12

UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS 12


UNIT IV DIGITAL ELECTRONICS 12
Binary Number System – Logic Gates – Boolean Algebra – Half and Full Adders – Flip-Flops – Registers and Counters – A/D and D/A Conversion (single concepts)

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 12

Communication Systems: Radio, TV, Fax, Microwave, Satellite and Optical Fibre (Block Diagram Approach only).

TOTAL: 60 PERIODS
TEXT BOOKS:

REFERENCES:

GE2152 BASIC CIVIL & MECHANICAL ENGINEERING  L T P C
(Common to branches under Electrical and I & C Faculty)  4 0 0 4

A – CIVIL ENGINEERING

UNIT I SURVEYING AND CIVIL ENGINEERING MATERIALS  15


UNIT II BUILDING COMPONENTS AND STRUCTURES  15
FOUNDATIONS: Types, Bearing capacity – Requirement of good foundations.


TOTAL : 30 PERIODS

B – MECHANICAL ENGINEERING

UNIT III POWER PLANT ENGINEERING  10
UNIT IV  I C ENGINES  10
Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.

UNIT V  REFRIGERATION AND AIR CONDITIONING SYSTEM  10

TOTAL: 30 PERIODS

REFERENCES

GE2155  COMPUTER PRACTICE LABORATORY – II  L T P C
0 1 2 2

LIST OF EXPERIMENTS

1. UNIX COMMANDS  15
Study of Unix OS - Basic Shell Commands - Unix Editor

2. SHELL PROGRAMMING  15
Simple Shell program - Conditional Statements - Testing and Loops

3. C PROGRAMMING ON UNIX  15
Dynamic Storage Allocation-Pointers-Functions-File Handling

TOTAL : 45 PERIODS

HARDWARE / SOFTWARE REQUIREMENTS FOR A BATCH OF 30 STUDENTS

Hardware
- 1 UNIX Clone Server
- 33 Nodes (thin client or PCs)
- Printer – 3 Nos.

Software
- OS – UNIX Clone (33 user license or License free Linux)
- Compiler - C
LIST OF EXPERIMENTS

1. Determination of Young’s modulus of the material – non uniform bending.
2. Determination of Band Gap of a semiconductor material.
3. Determination of specific resistance of a given coil of wire – Carey Foster Bridge.
5. Spectrometer dispersive power of a prism.
6. Determination of Young’s modulus of the material – uniform bending.

• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.
• The lab examinations will be held only in the second semester.

LIST OF EXPERIMENTS

1. Conduct metric titration (Simple acid base)
2. Conduct metric titration (Mixture of weak and strong acids)
3. Conduct metric titration using \( \text{BaCl}_2 \) vs \( \text{Na}_2 \text{SO}_4 \)
4. Potentiometric Titration (\( \text{Fe}^{2+} / \text{KMnO}_4 \) or \( \text{K}_2 \text{Cr}_2 \text{O}_7 \))
5. PH titration (acid & base)
6. Determination of water of crystallization of a crystalline salt (Copper sulphate)
7. Estimation of Ferric iron by spectrophotometry.

• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.
• The lab examinations will be held only in the second semester.
List of Exercises using software capable of Drafting and Modeling

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.

2. Drawing of a Title Block with necessary text and projection symbol.

3. Drawing of curves like parabola, spiral, involute using Bspline or cubic spline.

4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.

5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).

6. Drawing of a plan of residential building (Two bed rooms, kitchen, hall, etc.)

7. Drawing of a simple steel truss.

8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,


10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

Note: Plotting of drawings must be made for each exercise and attached to the records written by students.

List of Equipments for a batch of 30 students:

1. Pentium IV computer or better hardware, with suitable graphics facility -30 No.
2. Licensed software for Drafting and Modeling. – 30 Licenses
3. Laser Printer or Plotter to print / plot drawings – 2 No.

EE2155 ELECTRICAL CIRCUIT LABORATORY (Common to EEE, EIE and ICE) 0 0 3 2

LIST OF EXPERIMENTS

1. Verification of ohm’s laws and kirchoff’s laws.

2. Verification of Thevemin’s and Norton’s Theorem

3. Verification of superposition Theorem

4. Verification of maximum power transfer theorem.

5. Verification of reciprocity theorem

6. Measurement of self inductance of a coil

7. Verification of mesh and nodal analysis.

8. Transient response of RL and RC circuits for DC input.


10. Frequency response of single tuned coupled circuits.

TOTAL: 45 PERIODS
1. Verification of KVL and KCL
2. Verification of Thevenin and Norton Theorems.
3. Verification of superposition Theorem.
4. Verification of Maximum power transfer and reciprocity theorems.
5. Frequency response of series and parallel resonance circuits.
6. Characteristics of PN and Zener diode
7. Characteristics of CE configuration
8. Characteristics of CB configuration
9. Characteristics of UJT and SCR
10. Characteristics of JFET and MOSFET

TOTAL : 45 PERIODS

ENGLISH LANGUAGE LABORATORY (Optional)  
1. LISTENING:  
Listening & answering questions – gap filling – Listening and Note taking– Listening to telephone conversations

2. SPEAKING:  
Pronouncing words & sentences correctly – word stress – Conversation practice.

CLASSROOM SESSION
Group Discussions etc
2. Goal setting – interviews – stress time management – situational reasons

Evaluation

(1) Lab Session – 40 marks
  Listening – 10 marks
  Speaking – 10 marks
  Reading – 10 marks
  Writing – 10 marks

(2) Classroom Session – 60 marks
  Role play activities giving real life context – 30 marks
  Presentation – 30 marks

Note on Evaluation
1. Examples for role play situations:
   a. Marketing engineer convincing a customer to buy his product.
   b. Telephone conversation – Fixing an official appointment / Enquiry on availability of flight or train tickets / placing an order. etc.
2. Presentations could be just a Minute (JAM activity) or an Extempore on simple topics or visuals could be provided and students could be asked to talk about it.

REFERENCES

LAB REQUIREMENTS
1. Teacher – Console and systems for students
2. English Language Lab Software
3. Tape Recorders.

MA 2211 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS

(Common to all branches)

OBJECTIVES
The course objective is to develop the skills of the students in the areas of Transforms and Partial Differential Equations. This will be necessary for their effective studies in a large number of engineering subjects like heat conduction, communication systems, electro-optics and electromagnetic theory. The course will also serve as a prerequisite for post graduate and specialized studies and research.

UNIT I FOURIER SERIES 9 + 3

UNIT II FOURIER TRANSFORMS 9 + 3

UNIT III PARTIAL DIFFERENTIAL EQUATIONS 9 + 3
Formation of partial differential equations – Lagrange’s linear equation – Solutions of standard types of first order partial differential equations - Linear partial differential equations of second and higher order with constant coefficients.

UNIT IV APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS 9 + 3
Solutions of one dimensional wave equation – One dimensional equation of heat conduction – Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in cartesian coordinates.
UNIT V  
Z-TRANSFORMS AND DIFFERENCE EQUATIONS  
9 + 3


LECTURES : 45 TUTORIALS : 15 TOTAL : 60 PERIODS

TEXT BOOK:

REFERENCES:

CS2203  
OBJECT ORIENTED PROGRAMMING  
(1MT TOTAL: 0 PERIODS)

AIM
To understand the concepts of object-oriented programming and master OOP using C++.

UNIT I

UNIT II

UNIT III
Function and class templates - Exception handling – try-catch-throw paradigm – exception specification – terminate and Unexpected functions – Uncaught exception.

UNIT IV
UNIT V

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

CS 2202 DIGITAL PRINCIPLES AND SYSTEM DESIGN L T P C
(Common to CSE & IT) 3 1 0 4

AIM
To provide an in-depth knowledge of the design of digital circuits and the use of Hardware Description Language in digital system design.

OBJECTIVES
• To understand different methods used for the simplification of Boolean functions
• To design and implement combinational circuits
• To design and implement synchronous sequential circuits
• To design and implement asynchronous sequential circuits
• To study the fundamentals of VHDL / Verilog HDL

UNIT I BOOLEAN ALGEBRA AND LOGIC GATES 8
Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Logic gates

UNIT II COMBINATIONAL LOGIC 9
Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL)

UNIT III DESIGN WITH MSI DEVICES 8
Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 10
Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters – HDL for Sequential Circuits.
UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards. ASM Chart

TUTORIAL: 15 TOTAL : 60 PERIODS

TEXT BOOK:

REFERENCES:

IT 2201 DATA STRUCTURES AND ALGORITHMS

L T P C
3 0 0 3

AIM
To master the design and applications of linear, tree, and graph structures. To understand various algorithm design and analysis techniques.

UNIT I LINEAR STRUCTURES
Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists – Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and queues

UNIT II TREE STRUCTURES
Tree ADT – tree traversals – left child right sibling data structures for general trees – Binary Tree ADT – expression trees – applications of trees – binary search tree ADT – AVL trees – binary heaps

UNIT III HASHING AND SETS

UNIT IV GRAPHS

UNIT V ALGORITHM DESIGN AND ANALYSIS
Introduction to algorithm design techniques: Greedy algorithms, Divide and conquer, Dynamic programming, backtracking, branch and bound, Randomized algorithms – Introduction to algorithm analysis: asymptotic notations, recurrences – Introduction to NP-complete problems

TOTAL: 45 PERIODS
TEXT BOOK:

REFERENCES:

IT 2202 PRINCIPLES OF COMMUNICATION

UNIT I FUNDAMENTALS OF ANALOG COMMUNICATION 9
Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

UNIT II DIGITAL COMMUNICATION 9
Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying – binary phase shift keying – QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery – squaring loop, Costas loop, DPSK.

UNIT III DIGITAL TRANSMISSION 9

UNIT IV SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES 9
Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.
UNIT V  SATELLITE AND OPTICAL COMMUNICATION


TUTORIAL: 15 TOTAL: 45 +15=60 PERIODS

TEXT BOOKS:

REFERENCES:

GE 2021 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
3 0 0 3

AIM:
• The aim of this course is to create awareness in every engineering graduate about the importance of environment, the effect of technology on the environment and ecological balance and make them sensitive to the environment problems in every professional Endeavour that they participates.

OBJECTIVE:
• At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity. The role of government and non-government organization in environment managements.

UNIT I  ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity –
biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10
Forest resources: Use and over-exploitation, deforestation, case studies- timber extraction, mining, dams and their effects on forests and tribal people – Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES BOOKS:

CS 2207 DIGITAL LABORATORY L T P C
(Common to CSE & IT) 0 0 3 2

LIST OF EXPERIMENTS

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
4. Design and implementation of parity generator / checker using basic gates and MSI devices
5. Design and implementation of magnitude comparator
6. Design and implementation of application using multiplexers/Demultiplexers
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Simulation of combinational circuits using Hardware Description Language (VHDL/ Verilog HDL software required)
10. Simulation of sequential circuits using HDL (VHDL/ Verilog HDL software required)

List of equipments and components for a batch of 30 students (2 per batch)

<table>
<thead>
<tr>
<th>S.NO</th>
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<th>Quantity Reqd</th>
<th>Remarks</th>
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<td>10 bit</td>
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<td>3</td>
<td>Bread Boards</td>
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**IT 2205**  
**DATA STRUCTURES AND ALGORITHMS LAB**  
**L T P C**  
**0 0 3 2**

**AIM**
To develop programming skills in design and implementation of data structures and their applications.

1. Implement singly and doubly linked lists.
2. Represent a polynomial as a linked list and write functions for polynomial addition.
3. Implement stack and use it to convert infix to postfix expression.
4. Implement array-based circular queue and use it to simulate a producer-consumer problem.
5. Implement an expression tree. Produce its pre-order, in-order, and post-order traversals.
6. Implement binary search tree.
7. Implement priority queue using heaps
8. Implement hashing techniques.
9. Implement Dijkstra's algorithm using priority queues
10. Implement a backtracking algorithm for Knapsack problem

TOTAL: 45 PERIODS

List of Equipments and components for A Batch of 30 students (1 per batch)

1. SOFTWARE REQUIRED – TURBOC version 3 or GCC version UNIT
   III UNIT III4.
2. OPERATING SYSTEM – WINDOWS 2000 / XP / NT OR LINUX
3. COMPUTERS REQUIRED – 30 Nos. (Minimum Requirement : Pentium III or
   Pentium IV with 256 RAM and 40 GB harddisk)

CS 2209 OBJECT-ORIENTED PROGRAMMING LAB (Common to CSE & IT) L T P C
0 0 3 2

1. Design C++ classes with static members, methods with default arguments, friend
   functions. (For example, design matrix and vector classes with static allocation, and
   a friend function to do matrix-vector multiplication)
2. Implement complex number class with necessary operator overloading and type
   conversions such as integer to complex, double to complex, complex to double etc.
3. Implement Matrix class with dynamic memory allocation and necessary methods.
   Give proper constructor, destructor, copy constructor, and overloading of
   assignment operator.
4. Overload the new and delete operators to provide custom dynamic allocation of
   memory.
5. Develop a template of linked-list class and its methods.
6. Develop templates of standard sorting algorithms such as bubble sort, insertion
   sort, merge sort, and quick sort.
7. Design stack and queue classes with necessary exception handling.
8. Define Point class and an Arc class. Define a Graph class which represents graph
   as a collection of Point objects and Arc objects. Write a method to find a minimum
   cost spanning tree in a graph.
9. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square,
   Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to
   demonstrate dynamic polymorphism and RTTI.
10. Write a C++ program that randomly generates complex numbers (use previously
    designed Complex class) and writes them two per line in a file along with an
    operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write
    another program to read one line at a time from this file, perform the corresponding
    operation on the two complex numbers read, and write the result to another file (one
    per line).
List of Equipments and software for a batch of 30 students

1. PC – 30 nos.
   - Processor – 2.0 GHz or higher
   - RAM – 256 MB or higher
   - Hard disk – 20 GB or higher
   - OS- Windows 2000/ Windows XP/ NT

2. Software – Turbo C (freeware) – to be installed in all PC’s.

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**MA2262 PROBABILITY AND QUEUEING THEORY**

(Common to CSE & IT)

**AIM**

The probabilistic models are employed in countless applications in all areas of science and engineering. Queueing theory provides models for a number of situations that arise in real life. The course aims at providing necessary mathematical support and confidence to tackle real life problems.

**OBJECTIVES**

At the end of the course, the students would

- Have a well–founded knowledge of standard distributions which can describe real life phenomena.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
- Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

**UNIT I RANDOM VARIABLES**

9+3

Discrete and continuous random variables - Moments - Moment generating functions and their properties. Binomial, Poisson, Geometric, Negative binomial, Uniform, Exponential, Gamma, and Weibull distributions.

**UNIT II TWO DIMENSIONAL RANDOM VARIABLES**

9+3

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

**UNIT III MARKOV PROCESSES AND MARKOV CHAINS**

9+3

Classification - Stationary process - Markov process - Markov chains - Transition probabilities - Limiting distributions-Poisson process.
UNIT IV  QUEUEING THEORY  9+3
Markovian models – Birth and Death Queuing models- Steady state results: Single and multiple server queuing models- queues with finite waiting rooms- Finite source models- Little’s Formula

UNIT V  NON-MARKOVIAN QUEUES AND QUEUE NETWORKS  9+3
M/G/1 queue- Pollaczek- Khintchine formula, series queues- open and closed networks

TUTORIAL  15 TOTAL : 60 PERIODS

TEXT BOOKS:
1. O.C. Ibe, “Fundamentals of Applied Probability and Random Processes”, Elsevier, 1st Indian Reprint, 2007 (For units 1, 2 and 3).

REFERENCES:
UNIT IV  TRANSACTIONS  9

UNIT V  IMPLEMENTATION TECHNIQUES  9

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS 2252  MICROPROCESSORS AND MICROCONTROLLERS  L T P C
(Common to CSE & IT)  3 0 0 3

UNIT I  THE 8085 AND 8086 MICROPROCESSORS  9
8085 Microprocessor architecture-Addressing modes- Instruction set-Programming the 8085

UNIT II  SOFTWARE ASPECTS  9

UNIT III  MULTIPROCESSOR CONFIGURATIONS  9
Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration –8087 Numeric Data Processor – Data Types – Architecture –8089 I/O Processor –Architecture –Communication between CPU and IOP.
UNIT IV  I/O INTERFACING

UNIT V  MICROCONTROLLERS

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS 2253  COMPUTER ORGANIZATION AND ARCHITECTURE  L T P C
(Common Common to CSE & IT)  3 0 0 3

UNIT I  BASIC STRUCTURE OF COMPUTERS

UNIT II  BASIC PROCESSING UNIT

UNIT III  PIPELINING
Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.
UNIT IV  MEMORY SYSTEM  9
Basic concepts – Semiconductor RAM – ROM – Speed – Size and cost – Cache
memories – Improving cache performance – Virtual memory – Memory management
requirements – Associative memories – Secondary storage devices.

UNIT V  I/O ORGANIZATION  9
Accessing I/O devices – Programmed Input/Output -Interrupts – Direct Memory Access
– Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB), I/O devices and
processors.

TOTAL:45 PERIODS

TEXT BOOK:

REFERENCES:

CS 2254  OPERATING SYSTEMS  L T P C
(Common to CSE & IT)  3 0 0 3

AIM
To learn the various aspects of operating systems such as process management,
memory management, and I/O management

UNIT I  PROCESSES AND THREADS  9
Introduction to operating systems – review of computer organization – operating system
Cooperating processes – Interprocess communication – Communication in client-server
Case Study: Pthreads library

UNIT II  PROCESS SCHEDULING AND SYNCHRONIZATION  10
CPU Scheduling: Scheduling criteria – Scheduling algorithms – Multiple-processor
scheduling – Real time scheduling – Algorithm Evaluation. Case study: Process
scheduling in Linux. Process Synchronization: The critical-section problem –
Synchronization hardware – Semaphores – Classic problems of synchronization –
Methods for handling deadlocks – Deadlock prevention – Deadlock avoidance –
Deadlock detection – Recovery from deadlock.
UNIT III  STORAGE MANAGEMENT

UNIT IV  FILE SYSTEMS

UNIT V  I/O SYSTEMS

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
UNIT III  ANALYSIS, DESIGN CONCEPTS AND PRINCIPLES  9

UNIT IV  TESTING  9

UNIT V  SOFTWARE QUALITY ASSURANCE  9

TOTAL = 45 PERIODS

TEXT BOOKS:

REFERENCES:

CS 2258  DATA BASE MANAGEMENT SYSTEM LAB  L T P C
(Common to CSE & IT)  0 0 3 2
1. Data Definition, Table Creation, Constraints,
2. Insert, Select Commands, Update & Delete Commands.
3. Nested Queries & Join Queries
4. Views
5. High level programming language extensions (Control structures, Procedures and Functions).
6. Front end tools
7. Forms
8. Triggers
LAB EQUIPMENTS

(Common to Information Technology & Computer Science Engineering)

Hardware and Software required for a batch of 30 students:

**Hardware:**
30 Personal Computers

**Software:**
Front end: VB/VC ++/JAVA
Back end: Oracle 11g, my SQL, DB2
Platform: Windows 2000 Professional/XP

Oracle server could be loaded and can be connected from individual PCs.

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**CS 2257 OPERATING SYSTEMS LAB**

(LCommon to CSE & IT)

0 0 3 2

(Implement the following on LINUX or other Unix like platform. Use C for high level language implementation)

1. Write programs using the following system calls of UNIX operating system: 
   fork, exec, getpid, exit, wait, close, stat, opendir, readdir

2. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc)

3. Write C programs to simulate UNIX commands like ls, grep, etc.

4. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for FCFS and SJF. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)

5. Given the list of processes, their CPU burst times and arrival times, display/print the Gantt chart for Priority and Round robin. For each of the scheduling policies, compute and print the average waiting time and average turnaround time. (2 sessions)

6. Developing Application using Inter Process communication (using shared memory, pipes or message queues)


8. Implement some memory management schemes – I
9. Implement some memory management schemes – II
10. Implement any file allocation technique (Linked, Indexed or Contiguous)

**Example for exercises 8 & 9:**
Free space is maintained as a linked list of nodes with each node having the starting byte address and the ending byte address of a free block. Each memory request consists of the process-id and the amount of storage space required in bytes. Allocated memory space is again maintained as a linked list of nodes with each node having the process-id, starting byte address and the ending byte address of the allocated space. When a process finishes (taken as input) the appropriate node from the allocated list should be deleted and this free disk space should be added to the free space list. [Care should be taken to merge contiguous free blocks into one single block. This results in deleting more than one node from the free space list and changing the start and end address in the appropriate node]. For allocation use first fit, worst fit and best fit.

**TOTAL: 45 PERIODS**

**Hardware and Software required for a batch of 30 students.**

**HARDWARE:**
- 30 Personal Computers

**SOFTWARE:**
**Linux:**
- Ubuntu / OpenSUSE / Fedora / Red Hat / Debian / Mint OS
- Linux could be loaded in individual PCs.

**(OR)**
A single server could be loaded with Linux and connected from the individual PCs.

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**CS2259 MICROPROCESSORS LABORATORY**

(Common to CSE & IT)

**AIM:**
- To learn the assembly language programming of 8085, 8086 and 8051 and also to give a practical training of interfacing the peripheral devices with the processor.

**OBJECTIVES:**
- To implement the assembly language programming of 8085, 8086 and 8051.
- To study the system function calls like BIOS/DOS.
- To experiment the interface concepts of various peripheral device with the processor.
EXPERIMENTS IN THE FOLLOWING
1. Programming with 8085
2. Programming with 8086-experiments including BIOS/DOS calls: Keyboard control, Display, File Manipulation.
3. Interfacing with 8085/8086-8255,8253
4. Interfacing with 8085/8086-8279,8251
5. 8051 Microcontroller based experiments for Control Applications
6. Mini- Project

TOTAL: 45 PERIODS

List of equipments/components for 30 students (two per batch)
1. 8085 Trainer Kit with onboard 8255, 8253, 8279 and 8251 – 15 nos.
2. TASM/MASTM simulator in PC (8086 programs) – 30 nos.
3. 8051 trainer kit – 15 nos.
4. Interfacing with 8086 – PC add-on cards with 8255, 8253, 8279 and 8251 – 15 nos.
5. Stepper motor interfacing module – 5 nos.
7. ADC, DAC interfacing module – 5 nos.
8. CRO’s – 5 nos.

MG2452  ENGINEERING ECONOMICS AND FINANCIAL ACCOUNTING   L T P C
3 0 0 3

UNIT I  INTRODUCTION
Managerial Economics - Relationship with other disciplines - Firms: Types, objectives and goals - Managerial decisions - Decision analysis.

UNIT II  DEMAND & SUPPLY ANALYSIS
Demand - Types of demand - Determinants of demand - Demand function - Demand elasticity - Demand forecasting - Supply - Determinants of supply - Supply function - Supply elasticity.

UNIT III  PRODUCTION AND COST ANALYSIS
Production function - Returns to scale - Production optimization - Least cost input - Isoquants - Managerial uses of production function.


UNIT IV  PRICING
Determinants of Price - Pricing under different objectives and different market structures - Price discrimination - Pricing methods in practice.
UNIT V  FINANCIAL ACCOUNTING (ELEMENTARY TREATMENT)  10
Balance sheet and related concepts - Profit & Loss Statement and related concepts - Financial Ratio Analysis - Cash flow analysis - Funds flow analysis - Comparative financial statements - Analysis & Interpretation of financial statements.

UNIT VI  CAPITAL BUDGETING. (ELEMENTARY TREATMENT)  5
Investments - Risks and return evaluation of investment decision - Average rate of return - Payback Period - Net Present Value - Internal rate of return.

TOTAL: 45 PERIODS

TEXT BOOKS:

IT2301  JAVA PROGRAMMING  L T P C  3 0 0 3

AIM
To understand the concepts of object-oriented, event driven, and concurrent programming paradigms and develop skills in using these paradigms using Java.

UNIT I  9

UNIT II  10

UNIT III  10

UNIT IV  8
UNIT V


TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES

CS2304 SYSTEM SOFTWARE

AIM
To have an understanding of foundations of design of assemblers, loaders, linkers, and macro processors.

OBJECTIVES
- To understand the relationship between system software and machine architecture.
- To know the design and implementation of assemblers
- To know the design and implementation of linkers and loaders.
- To have an understanding of macro processors.
- To have an understanding of system software tools.

UNIT I INTRODUCTION
System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

UNIT II ASSEMBLERS
UNIT III  LOADERS AND LINKERS  9

UNIT IV  MACRO PROCESSORS  9

UNIT V  SYSTEM SOFTWARE TOOLS  9
Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

L: 45, T: 15, TOTAL: 60 PERIODS

TEXT BOOK

REFERENCES

CS2302  COMPUTER NETWORKS  L T P C
3 0 0 3

UNIT I  9
Network architecture – layers – Physical links – Channel access on links – Hybrid multiple access techniques - Issues in the data link layer - Framing – Error correction and detection – Link-level Flow Control

UNIT II  9
Medium access – CSMA – Ethernet – Token ring – FDDI - Wireless LAN – Bridges and Switches

UNIT III  9
UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

CS2403 DIGITAL SIGNAL PROCESSING L T P C
3 0 0 3

UNIT I SIGNALS AND SYSTEMS

UNIT II FREQUENCY TRANSFORMATIONS

UNIT III IIR FILTER DESIGN
Structures of IIR – Analog filter design – Discrete time IIR filter from analog filter – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – (HPF, BPF, BRF) filter design using frequency translation

UNIT IV FIR FILTER DESIGN
Structures of FIR – Linear phase FIR filter – Filter design using windowing techniques, Frequency sampling techniques – Finite word length effects in digital Filters

UNIT V APPLICATIONS

TOTAL:45 PERIODS
TEXT BOOKS:

REFERENCES:

IT2302 INFORMATION THEORY AND CODING L T P C
3 0 0 3

UNIT I INFORMATION THEORY 9

UNIT II SOURCE CODING: TEXT, AUDIO AND SPEECH 9
Text: Adaptive Huffman Coding, Arithmetic Coding, LZW algorithm – Audio: Perceptual coding, Masking techniques, Psychoacoustic model, MEG Audio layers I,II,III, Dolby AC3 - Speech: Channel Vocoder, Linear Predictive Coding

UNIT III SOURCE CODING: IMAGE AND VIDEO 9

UNIT IV ERROR CONTROL CODING: BLOCK CODES 9
Definitions and Principles: Hamming weight, Hamming distance, Minimum distance decoding - Single parity codes, Hamming codes, Repetition codes - Linear block codes, Cyclic codes - Syndrome calculation, Encoder and decoder - CRC

UNIT V ERROR CONTROL CODING: CONVOLUTIONAL CODES 9
Convolutional codes – code tree, trellis, state diagram - Encoding – Decoding: Sequential search and Viterbi algorithm – Principle of Turbo coding

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES
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 two pass macro processor
6. Implement a single pass macro processor.
7. Implement an absolute loader.
8. Implement a relocating loader.
9. Implement pass one of a direct-linking loader.
10. Implement pass two of a direct-linking loader.
11. Implement a simple text editor with features like insertion / deletion of a character, word, and sentence.
12. Implement a symbol table with suitable hashing

(For loader exercises, output the snapshot of the main memory as it would be, after the loading has taken place)

TOTAL: 45 PERIODS

Requirement for a batch of 30 students

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<th>Quantity Required</th>
<th>Quantity Available</th>
<th>Deficiency %</th>
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<td>1.</td>
<td>Hardware – Pentium PC Desktops</td>
<td>30 Nos.</td>
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<td>2.</td>
<td>Software – Turbo C (Freely download)</td>
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IT2305 JAVA PROGRAMMING LAB

1. Develop a Java package with simple Stack and Queue classes. Use JavaDoc comments for documentation.
2. Design a class for Complex numbers in Java. In addition to methods for basic operations on complex numbers, provide a method to return the number of active objects created.
3. Design a Date class similar to the one provided in the java.util package.
4. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
5. Design a Java interface for ADT Stack. Develop two different classes that implement this interface, one using array and the other using linked-list. Provide necessary exception handling in both the implementations.

6. Write a Java program to read a file that contains DNA sequences of arbitrary length one per line (note that each DNA sequence is just a String). Your program should sort the sequences in descending order with respect to the number of 'TATA' subsequences present. Finally write the sequences in sorted order into another file.

7. Develop a simple paint-like program that can draw basic graphical primitives in different dimensions and colors. Use appropriate menu and buttons.

8. Develop a scientific calculator using event-driven programming paradigm of Java.

9. Develop a template for linked-list class along with its methods in Java.

10. Design a thread-safe implementation of Queue class. Write a multi-threaded producer-consumer application that uses this Queue class.

11. Write a multi-threaded Java program to print all numbers below 100,000 that are both prime and fibonacci number (some examples are 2, 3, 5, 13, etc.). Design a thread that generates prime numbers below 100,000 and writes them into a pipe. Design another thread that generates fibonacci numbers and writes them to another pipe. The main thread should read both the pipes to identify numbers common to both.

12. Develop a multi-threaded GUI application of your choice.

TOTAL: 45 PERIODS

Requirement for a batch of 30 students

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Description of Equipment</th>
<th>Quantity Required</th>
<th>Quantity available</th>
<th>Deficiency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td><strong>Hardware:</strong> Pentium IV with 2 GB RAM, 160 GB HARD Disk, Monitor 1024 x 768 colour 60 Hz.</td>
<td>30 Nodes</td>
<td></td>
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<tr>
<td>4.</td>
<td><strong>Software:</strong> Windows/Linux operating system JDK 1.6(or above)</td>
<td>30 user license</td>
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</tbody>
</table>

GE2321 COMMUNICATION SKILLS LABORATORY (Fifth / Sixth Semester) L T P C 0 0 4 2

Globalisation has brought in numerous opportunities for the teeming millions, with more focus on the students’ overall capability apart from academic competence. Many students, particularly those from non-English medium schools, find that they are not preferred due to their inadequacy of communication skills and soft skills, despite possessing sound knowledge in their subject area along with technical capability. Keeping in view their pre-employment needs and career requirements, this course on Communication Skills Laboratory will prepare students to adapt themselves with ease to the industry environment, thus rendering them as prospective assets to industries. The course will equip the students with the necessary communication skills that would go a long way in helping them in their profession.
OBJECTIVES:

- To equip students of engineering and technology with effective speaking and listening skills in English.
- To help them develop their soft skills and interpersonal skills, which will make the transition from college to workplace smoother and help them excel in their job.
- To enhance the performance of students at Placement Interviews, Group Discussions and other recruitment exercises.

<table>
<thead>
<tr>
<th>I. PC based session</th>
<th>(Weightage 40%)</th>
<th>24 periods</th>
</tr>
</thead>
</table>

A. ENGLISH LANGUAGE LAB (18 Periods)

UNIT I LISTENING COMPREHENSION: (6)
Listening and typing – Listening and sequencing of sentences – Filling in the blanks - Listening and answering questions.

UNIT II READING COMPREHENSION: (6)
Filling in the blanks - Close exercises – Vocabulary building - Reading and answering questions.

UNIT III SPEAKING: (6)

Conversations: Face to Face Conversation – Telephone conversation – Role play activities (Students take on roles and engage in conversation)

B. DISCUSSION OF AUDIO-VISUAL MATERIALS (6 PERIODS)
(Samples are available to learn and practice)

UNIT I RESUME / REPORT PREPARATION / LETTER WRITING (1)
Structuring the resume / report - Letter writing / Email Communication - Samples.

UNIT II PRESENTATION SKILLS: (1)
Elements of effective presentation – Structure of presentation - Presentation tools – Voice Modulation – Audience analysis - Body language – Video samples

UNIT III SOFT SKILLS: (2)
Time management – Articulateness – Assertiveness – Psychometrics – Innovation and Creativity - Stress Management & Poise - Video Samples

UNIT IV GROUP DISCUSSION: (1)
Why is GD part of selection process ? - Structure of GD – Moderator – led and other GDs - Strategies in GD – Team work - Body Language - Mock GD -Video samples

UNIT V INTERVIEW SKILLS: (1)
Kinds of interviews – Required Key Skills – Corporate culture – Mock interviews-Video samples.
II. Practice Session (Weightage – 60%) 24 periods

1. **Resume / Report Preparation / Letter writing**: Students prepare their own resume and report.  
2. **Presentation Skills**: Students make presentations on given topics.  
3. **Group Discussion**: Students participate in group discussions.  
4. **Interview Skills**: Students participate in Mock Interviews  

REFERENCES:

LAB REQUIREMENTS:
1. Teacher console and systems for students.  
2. English Language Lab Software  
3. Career Lab Software

**Requirement for a batch of 60 students**

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Description of Equipment</th>
<th>Quantity required</th>
<th>Quantity available</th>
<th>Deficiency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Server</td>
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<tr>
<td></td>
<td>o PIV system</td>
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<tr>
<td></td>
<td>o 1 GB RAM / 40 GB HDD</td>
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<td></td>
<td>o OS: Win 2000 server</td>
<td>1 No.</td>
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<tr>
<td></td>
<td>o Audio card with headphones (with mike)</td>
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<td></td>
<td>o JRE 1.3</td>
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<tr>
<td>2.</td>
<td>Client Systems</td>
<td>60 No.</td>
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<tr>
<td>UNIT III</td>
<td>Softwares</td>
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<td>---------------------------------------------------------------------------</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>a) Interactive Teacher Control Software</td>
<td>Available / Not Available</td>
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<td></td>
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<tr>
<td></td>
<td>b) English Language Lab Software</td>
<td>Available / Not Available</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>c) Career Lab software</td>
<td>Available / Not Available</td>
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<tr>
<td>4.</td>
<td>Handicam Video Camera (with video lights and mic input)</td>
<td>1 No.</td>
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<tr>
<td>5.</td>
<td>Television - 29”</td>
<td>1 No.</td>
<td></td>
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<tr>
<td>6.</td>
<td>Collar mike</td>
<td>1 No.</td>
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<tr>
<td>7.</td>
<td>Cordless mikes</td>
<td>1 No.</td>
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<tr>
<td>8.</td>
<td>Audio Mixer</td>
<td>1 No.</td>
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<tr>
<td>9.</td>
<td>DVD Recorder / Player</td>
<td>1 No.</td>
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</table>

L: 45, T: 15, TOTAL= 60 PERIODS

CS2353 OBJECT ORIENTED ANALYSIS AND DESIGN L T P C 3 0 0 3

OBJECTIVES

- To learn basic OO analysis and design skills through an elaborate case study.
- To use the UML design diagrams
- To apply the appropriate design patterns

UNIT I
Introduction to OOAD – What is OOAD? – What is UML? What are the United process(UP) phases - Case study – the NextGen POS system, Inception -Use case Modeling - Relating Use cases – include, extend and generalization.
UNIT I
Elaboration - Domain Models - Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class hierarchies- Aggregation and Composition- UML activity diagrams and modeling

UNIT III
System sequence diagrams - Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement - UML class diagrams - UML interaction diagrams

UNIT IV

UNIT V
UML state diagrams and modeling - Operation contracts- Mapping design to code -UML deployment and component diagrams

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:

CS2032 DATA WAREHOUSING AND DATA MINING  L T P C
3 0 0 3

UNIT I DATA WAREHOUSING

UNIT II BUSINESS ANALYSIS
UNIT III  DATA MINING  8

UNIT IV  ASSOCIATION RULE MINING AND CLASSIFICATION  11
Mining Frequent Patterns, Associations and Correlations – Mining Methods – Mining Various Kinds of Association Rules – Correlation Analysis – Constraint Based Association Mining – Classification and Prediction – Basic Concepts – Decision Tree Induction – Bayesian Classification – Rule Based Classification – Classification by Backpropagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods - Prediction

UNIT V  CLUSTERING AND APPLICATIONS AND TRENDS IN DATA MINING  8

TEXT BOOKS:

REFERENCES:

IT2351  NETWORK PROGRAMMING AND MANAGEMENT  L T P C
3 0 0 3

UNIT I  ELEMENTARY TCP SOCKETS  9
UNIT II APPLICATION DEVELOPMENT

UNIT III SOCKET OPTIONS, ELEMENTARY UDP SOCKETS

UNIT IV ADVANCED SOCKETS

UNIT V SIMPLE NETWORK MANAGEMENT
SNMP network management concepts – SNMP management information – standard MIB’s – SNMPv1 protocol and Practical issues – introduction to RMON, SNMPv2 and SNMPv

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

IT2352 CRYPTOGRAPHY AND NETWORK SECURITY L T P C
3 0 0 3

UNIT I

UNIT II
UNIT III  

UNIT IV  

UNIT V  

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

IT2353 WEB TECHNOLOGY  
UNIT I  

UNIT II  
UNIT III

UNIT IV

UNIT V

TEXT BOOK

REFERENCES

IT2354 EMBEDDED SYSTEMS
UNIT I EMBEDDED COMPUTING

UNIT II MEMORY AND INPUT / OUTPUT MANAGEMENT
Programming Input and Output – Memory system mechanisms – Memory and I/O devices and interfacing – Interrupts handling.
UNIT III   PROCESSES AND OPERATING SYSTEMS   9
Multiple tasks and processes – Context switching – Scheduling policies – Interprocess communication mechanisms – Performance issues.

UNIT IV   EMBEDDED SOFTWARE   9
Programming embedded systems in assembly and C – Meeting real time constraints – Multi-state systems and function sequences. Embedded software development tools – Emulators and debuggers.

UNIT V   EMBEDDED SYSTEM DEVELOPMENT   9
Design issues and techniques – Case studies – Complete design of example embedded systems.

TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES:

IT2357   WEB TECHNOLOGY LAB   L T P C
0 0 3 2

LIST OF EXPERIMENTS

1. Create a web page with the following using HTML
   i) To embed an image map in a web page
   ii) To fix the hot spots
   iii) Show all the related information when the hot spots are clicked.

2. Create a web page with all types of Cascading style sheets.

3. Client Side Scripts for Validating Web Form Controls using DHTML

4. Write programs in Java to create applets incorporating the following features:
   - Create a color palette with matrix of buttons
   - Set background and foreground of the control text area by selecting a color from color palette.
   - In order to select Foreground or background use check box control as radio buttons
   - To set background images

5. Write programs in Java using Servlets:
- To invoke servlets from HTML forms
- To invoke servlets from Applets
6. Write programs in Java to create three-tier applications using JSP and Databases
   - for conducting on-line examination.
   - for displaying student mark list. Assume that student information is available in a database which has been stored in a database server.
7. Programs using XML – Schema – XSLT/XSL
8. Programs using AJAX
9. Consider a case where we have two web Services- an airline service and a travel agent and the travel agent is searching for an airline. Implement this scenario using Web Services and Database.

CS2357  OBJECT ORIENTED ANALYSIS AND DESIGN LAB  L T P C
0 0 3 2

OBJECTIVES:
To develop a mini-project following the 12 exercises listed below.
1. To develop a problem statement.
2. Develop an IEEE standard SRS document. Also develop risk management and project plan (Gantt chart).
3. Identify Use Cases and develop the Use Case model.
4. Identify the business activities and develop an UML Activity diagram.
5. Identity the conceptual classes and develop a domain model with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
9. Implement the Technical services layer.
10. Implement the Domain objects layer.
11. Implement the User Interface layer.
12. Draw Component and Deployment diagrams.

Suggested domains for Mini-project.
1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Software personnel management system
8. Credit card processing
9. e-book management system
10. Recruitment system
11. Foreign trading system
12. Conference Management System
13. BPO Management System
Suggested Software Tools
ArgoUML, Eclipse IDE, Visual Paradigm, Visual case, and Rational Suite

CS2307 NETWORKS LAB L T P C 0 0 3 2
1. Programs using TCP Sockets (like date and time server & client, echo server & client, etc.)
2. Programs using UDP Sockets (like simple DNS)
3. Programs using Raw sockets (like packet capturing and filtering)
4. Programs using RPC
5. Simulation of sliding window protocols
6. Experiments using simulators (like OPNET)
7. Performance comparison of MAC protocols
8. Performance comparison of Routing protocols
9. Study of TCP/UDP performance

TOTAL: 60 PERIODS

IT2401 SERVICE ORIENTED ARCHITECTURE L T P C 3 0 0 3
OBJECTIVES:
• To gain understanding of the basic principles of service orientation
• To learn service oriented analysis techniques
• To learn technology underlying the service design
• To learn advanced concepts such as service composition, orchestration and Choreography
• To know about various WS-* specification standards

UNIT I

UNIT II
Web services – Service descriptions – Messaging with SOAP –Message exchange Patterns – Coordination –Atomic Transactions – Business activities – Orchestration – Choreography - Service layer abstraction – Application Service Layer – Business Service Layer – Orchestration Service Layer

UNIT III
UNIT IV
SOA platform basics – SOA support in J2EE – Java API for XML-based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC)- Web Services Interoperability Technologies (WSIT) - SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE)

UNIT V
WS-BPEL basics – WS-Coordination overview - WS-Choreography, WS-Policy, WS-Security

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

IT2402
MOBILE COMMUNICATION

UNIT I  WIRELESS COMMUNICATION
Cellular systems- Frequency Management and Channel Assignment- types of handoff and their characteristics, dropped call rates & their evaluation -MAC – SDMA – FDMA – TDMA – CDMA – Cellular Wireless Networks

UNIT II  WIRELESS NETWORKS
Wireless LAN – IEEE 802.11 Standards – Architecture – Services – Mobile Ad hoc Networks- WiFi and WiMAX - Wireless Local Loop

UNIT III  MOBILE COMMUNICATION SYSTEMS
UNIT IV MOBILE NETWORK AND TRANSPORT LAYERS 9
Multicast routing-TCP over Wireless Networks – Indirect TCP – Snooping TCP – Mobile
TCP – Fast Retransmit / Fast Recovery – Transmission/Timeout Freezing-Selective
Retransmission – Transaction Oriented TCP- TCP over 2.5 / 3G wireless Networks

UNIT V APPLICATION LAYER 9
WAP Model- Mobile Location based services -WAP Gateway –WAP protocols – WAP
user agent profile- caching model-wireless bearers for WAP - WML – WMLScripts - WTA
- iMode- SyncML

TOTAL :45PERIODS

TEXT BOOKS:
   200 UNIT III
2. William Stallings, “Wireless Communications and Networks”, Pearson Education,
   2002.

REFERENCES:
1. Kaveh Pahlavan, Prasanth Krishnamoorthy, “Principles of Wireless Networks”, First
2. Uwe Hansmann, Lothar Merk, Martin S. Nicklons and Thomas Stober, “Principles of
   Mobile Computing”, Springer, 200 UNIT III

CS2401 COMPUTER GRAPHICS L T P C
3 0 0 3

UNIT I 2D PRIMITIVES 9
Output primitives – Line, Circle and Ellipse drawing algorithms - Attributes of output
primitives – Two dimensional Geometric transformation - Two dimensional viewing –
Line, Polygon, Curve and Text clipping algorithms

UNIT II 3D CONCEPTS 9
Parallel and Perspective projections - Three dimensional object representation –
Polygons, Curved lines, Splines, Quadric Surfaces,- Visualization of data sets - 3D
transformations – Viewing -Visible surface identification.

UNIT III GRAPHICS PROGRAMMING 9
Color Models – RGB, YIQ, CMY, HSV – Animations – General Computer Animation,
Raster, Keyframe - Graphics programming using OPENGL – Basic graphics primitives –
Drawing three dimensional objects - Drawing three dimensional scenes

UNIT IV RENDERING 9
Introduction to Shading models – Flat and Smooth shading – Adding texture to faces –
Adding shadows of objects – Building a camera in a program – Creating shaded objects
– Rendering texture – Drawing Shadows.
UNIT V  FRACTALS
Fractals and Self similarity – Peano curves – Creating image by iterated functions – Mandelbrot sets – Julia Sets – Random Fractals – Overview of Ray Tracing – Intersecting rays with other primitives – Adding Surface texture – Reflections and Transparency – Boolean operations on Objects

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

IT2403 SOFTWARE PROJECT MANAGEMENT L T P C
3 0 0 3

UNIT I  INTRODUCTION TO SOFTWARE PROJECT MANAGEMENT
Project Definition – Contract Management – Activities Covered By Software Project Management – Overview Of Project Planning – Stepwise Project Planning.

UNIT II  PROJECT EVALUATION

UNIT III  ACTIVITY PLANNING

UNIT IV  MONITORING AND CONTROL

UNIT V  MANAGING PEOPLE AND ORGANIZING TEAMS

TOTAL: 45 PERIODS
TEXT BOOK

REFERENCES

IT2406 SERVICE ORIENTED ARCHITECTURE LABORATORY

1. Develop at least 5 components such as Order Processing, Payment Processing, etc., using .NET component technology.
2. Develop at least 5 components such as Order Processing, Payment Processing, etc., using EJB component technology.
3. Invoke .NET components as web services.
4. Invoke EJB components as web services.
5. Develop a Service Orchestration Engine (workflow) using WS-BPEL and implement service composition. For example, a business process for planning business travels will invoke several services. This process will invoke several airline companies (such as American Airlines, Delta Airlines etc.) to check the airfare price and buy at the lowest price.
6. Develop a J2EE client to access a .NET web service.
7. Develop a .NET client to access a J2EE web service.

TOTAL: 60 PERIODS

CS2405 COMPUTER GRAPHICS LABORATORY

1. Implementation of Bresenham’s Algorithm – Line, Circle, Ellipse.
2. Implementation of Line, Circle and ellipse Attributes.
3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.
5. Cohen Sutherland 2D line clipping and Windowing.
7. Three dimensional transformations - Translation, Rotation, Scaling.
8. Composite 3D transformations.
9. Drawing three dimensional objects and Scenes.

TOTAL: 60 PERIODS
AIM

With the present development of the computer technology, it is necessary to develop efficient algorithms for solving problems in science, engineering and technology. This course gives a complete procedure for solving different kinds of problems occur in engineering numerically.

OBJECTIVES
At the end of the course, the students would be acquainted with the basic concepts in numerical methods and their uses are summarized as follows:

i. The roots of nonlinear (algebraic or transcendental) equations, solutions of large system of linear equations and eigen value problem of a matrix can be obtained numerically where analytical methods fail to give solution.

ii. When huge amounts of experimental data are involved, the methods discussed on interpolation will be useful in constructing approximate polynomial to represent the data and to find the intermediate values.

iii. The numerical differentiation and integration find application when the function in the analytical form is too complicated or the huge amounts of data are given such as series of measurements, observations or some other empirical information.

iv. Since many physical laws are couched in terms of rate of change of one/two or more independent variables, most of the engineering problems are characterized in the form of either nonlinear ordinary differential equations or partial differential equations. The methods introduced in the solution of ordinary differential equations and partial differential equations will be useful in attempting any engineering problem.

UNIT I  
SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS


UNIT II 
INTERPOLATION AND APPROXIMATION

Lagrangian Polynomials – Divided differences – Interpolating with a cubic spline – Newton’s forward and backward difference formulas.

UNIT III  
NUMERICAL DIFFERENTIATION AND INTEGRATION


UNIT IV  
INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS

UNIT V  
BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS

Finite difference solution of second order ordinary differential equation – Finite difference solution of one dimensional heat equation by explicit and implicit methods – One dimensional wave equation and two dimensional Laplace and Poisson equations.

L = 45  TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES:

MA2265  
DISCRETE MATHEMATICS

AIM
To extend student’s Logical and Mathematical maturity and ability to deal with abstraction and to introduce most of the basic terminologies used in computer science courses and application of ideas to solve practical problems.

OBJECTIVES
At the end of the course, students would
- Have knowledge of the concepts needed to test the logic of a program.
- Have an understanding in identifying structures on many levels.
- Be aware of a class of functions which transform a finite set into another finite set which relates to input output functions in computer science.
- Be aware of the counting principles
- Be exposed to concepts and properties of algebraic structures such as semi groups, monoids and groups.

UNIT I  
LOGIC AND PROOFS
Propositional Logic – Propositional equivalences-Predicates and quantifiers-Nested Quantifiers-Rules of inference-introduction to Proofs-Proof Methods and strategy
UNIT II  COMBINATORICS  9 + 3
Mathematical inductions-Strong induction and well ordering-The basics of counting-The
pigeonhole principle-Permutations and combinations-Recurrence relations-Solving
Linear recurrence relations-generating functions-inclusion and exclusion and
applications.

UNIT III  GRAPHS  9 + 3
Graphs and graph models-Graph terminology and special types of graphs-Representing
graphs and graph isomorphism-connectivity-Euler and Hamilton paths

UNIT IV  ALGEBRAIC STRUCTURES  9 + 3
Algebraic systems-Semi groups and monoids-Groups-Subgroups and homomorphisms-
Cosets and Lagrange’s theorem- Ring & Fields (Definitions and examples)

UNIT V  LATTICES AND BOOLEAN ALGEBRA  9 + 3
Partial ordering-Posets-Lattices as Posets- Properties of lattices-Lattices as Algebraic
systems—Sub lattices —direct product and Homomorphism-Some Special lattices-
Boolean Algebra

LECTURES :45  TUTORIAL :15 TOTAL: 60 PERIODS

TEXT BOOKS:
1. Kenneth H.Rosen, "Discrete Mathematics and its Applications", Special Indian
Sections 1.1 to 1.7 , 4.1 & 4.2, 5.1 to 5.3, 6.1, 6.2, 6.4 to 6.6, 8.1 to 8.5)
2. Trembly J.P and Manohar R, “Discrete Mathematical Structures with Applications to
(2007).(For units 4 & 5, Sections 2-UNIT III8 & 2-UNIT III9,3-1,3-2 & 3-5, 4-1 & 4-2)

REFERENCES:
2. Thomas Koshy, “Discrete Mathematics with Applications”, Elsevier Publications,
3. Seymour Lipschutz and Mark Lipson, ”Discrete Mathematics”, Schaum’s Outlines,

IT2021  BUSINESS PROCESS MODEL  L T P C
3 0 0 3

UNIT I  ORGANIZATIONAL STRUCTURE  9
Types of Business Organizations-Organizational Structures-Definition-Complexity-
Formulization-Size-Technology-Culture-Forms and Outcomes-Explanations of
Structures-IT Industry and Organizational Structures-Processes of organizations-Case
Studies

UNIT II  PROCESS FLOW MEASUREMENT  9
Process flow measures - flow rate - flow time - inventory - flow-time analysis - process
flow chart - flow-time measurement - CPM - managing flow-time - flow-rate and capacity
analysis - resources and resource pools - flow-rate measurement - process capacity -
inventory analysis
UNIT III  PROCESS FLOW VARIABILITY
Managing flow variability - safety inventory - demand forecasts and forecast errors - optimal services level - lead time demand variability - safety capacity - service processes and performance measures - queueing process - buffer capacity - synchronization and capacity and demand - process control and capability - performance variability - process capability measurement and improvement - product and process design - process synchronization and improvement

UNIT IV  BUSINESS PROCESS REENGINEERING

UNIT V  BPR AND IT INDUSTRY
BPR and Information Technology Process-People View and Perspectives-Empowering People through IT-Managing Change in the Global Environment-BPR Rediscovering Indian Paradigm-Need of Reengineering-Case Studies

TOTAL : 45 PERIODS

TEXTBOOKS:

REFERENCES

IT2022  SOFTWARE REQUIREMENT ENGINEERING  L T P C
3 0 0 3

UNIT I  INTRODUCTION

UNIT II  ANALYSING THE PROBLEM
The five steps in problem analysis– business modeling – Systems engineering of software intensive systems – Understanding user and stakeholders needs – Features of a product or system –Interviewing – Requirements workshops- Brain storming and Idea reduction- storyboarding
UNIT III  DEFINING THE SYSTEM  9
Use case primer-Organizing requirement Information-Vision Document-Product Management-Managing scope-Establishing Project scope-Managing customer

UNIT IV  REFINING THE SYSTEM DEFINITION  9
Software requirement-Refining the use cases-developing the supplementary specification- Ambiguity and specificity -Technical methods for specifying requirements

UNIT V  BUILDING THE RIGHT SYSTEM  9
From use cases to Implementation-From use Cases to Test cases-Tracing requirements-Managing Change-Assessing Requirements Quality in Iterative Development-Agile Requirement methods.

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:

IT2023  DIGITAL IMAGE PROCESSING  L T P C
3 0 0 3

AIM:
The aim is to inculcate a basic training in the processing of images for practical applications in the domain of medical, remoting sessions and in general.

OBJECTIVES:
- To introduce basic concepts in acquiring, storage and Process of images
- To introduce for enhancing the quality of images.
- To introduce techniques for extraction and processing of region of interest
- To introduce case studies of Image Processing.

UNIT I  FUNDAMENTALS OF IMAGE PROCESSING  9

UNIT II  IMAGE ENHANCEMENT  9
UNIT III IMAGE SEGMENTATION AND FEATURE ANALYSIS 9

UNIT IV MULTI RESOLUTION ANALYSIS AND COMPRESSIONS 9

UNIT V APPLICATIONS OF IMAGE PROCESSING 9

TOTAL : 45 PERIODS

TEXT BOOK:

UNIT III REFERENCES:

IT2024 USER INTERFACE DESIGN

UNIT I INTRODUCTION

UNIT II HUMAN COMPUTER INTERACTION

UNIT III WINDOWS
UNIT IV MULTIMEDIA 9

UNIT V WINDOWS LAYOUT– TEST 9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCE:

CS2022 VISUAL PROGRAMMING L T P C
3 0 0 3

UNIT I 9

UNIT II 9
Controls – Modal and Modeless Dialog – Property – Data I/O – Sound – Timer 1

UNIT III 9
Memory management – SDI – MDI – MFC for Advanced windows user Interface – status bar and Toolbars – Tree view – List view – Threads

UNIT IV 9
ODBC – MFC Database classes – DAO - DLLs – Working with Images

UNIT V 9
COM Fundamentals – ActiveX control – ATL – Internet Programming

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:
UNIT I        AUTOMATA

UNIT II        REGULAR EXPRESSIONS AND LANGUAGES
Regular Expression – FA and Regular Expressions – Proving languages not to be regular – Closure properties of regular languages – Equivalence and minimization of Automata.

UNIT III       CONTEXT-FREE GRAMMARS AND LANGUAGES

UNIT IV        PROPERTIES OF CONTEXT-FREE LANGUAGES
Normal forms for CFG – Pumping Lemma for CFL – Closure Properties of CFL – Turing Machines – Programming Techniques for TM.

UNIT V        UNDECIDABALITY
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.

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES:
UNIT I  PROBLEM SOLVING  9
Introduction – Agents – Problem formulation – uninformed search strategies – heuristics
– informed search strategies – constraint satisfaction

UNIT II  LOGICAL REASONING  9
Logical agents – propositional logic – inferences – first-order logic – inferences in first-
order logic – forward chaining – backward chaining – unification – resolution

UNIT III  PLANNING  9
Planning with state-space search – partial-order planning – planning graphs – planning
and acting in the real world

UNIT IV  UNCERTAIN KNOWLEDGE AND REASONING  9
Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks –
inferences in Bayesian networks – Temporal models – Hidden Markov models

UNIT V  LEARNING  9
Learning from observation - Inductive learning – Decision trees – Explanation based
learning – Statistical Learning methods - Reinforcement Learning

TOTAL: 45PERIODS

TEXT BOOK

REFERENCES
1. David Poole, Alan Mackworth, Randy Goebel, ”Computational Intelligence : a

CS2029  ADVANCED DATABASE TECHNOLOGY  L T P C
       3 0 0 3

UNIT I  RELATIONAL MODEL ISSUES  9
ER Model - Normalization – Query Processing – Query Optimization - Transaction
Processing - Concurrency Control – Recovery - Database Tuning.

UNIT II  DISTRIBUTED DATABASES  9
Parallel Databases – Inter and Intra Query Parallelism – Distributed Database
Features – Distributed Database Architecture – Fragmentation – Distributed Query
Processing – Distributed Transactions Processing – Concurrency Control – Recovery –
Commit Protocols.

UNIT III  OBJECT ORIENTED DATABASES  9
Introduction to Object Oriented Data Bases - Approaches - Modeling and Design -
Persistence – Query Languages - Transaction - Concurrency – Multi Version Locks –
UNIT IV    EMERGING SYSTEMS  
Enhanced Data Models - Client/Server Model - Data Warehousing and Data Mining - Web Databases – Mobile Databases- XML and Web Databases.

UNIT V    CURRENT ISSUES  

TOTAL : 45 PERIODS

TEXT BOOKS:

REFERENCES:

IT2031   ELECTRONIC COMMERCE  
L T P C  
3 0 0 3

UNIT I    INTRODUCTION  
Traditional commerce and E commerce – Internet and WWW – role of WWW – value chains – strategic business and Industry value chains – role of E commerce.

UNIT II   INFRASTRUCTURE FOR E COMMERCE  

UNIT III  WEB BASED TOOLS FOR E COMMERCE  

UNIT IV   SECURITY  
UNIT V INTELLIGENT AGENTS

TEXT BOOKS
1. Ravi Kalakota, “Electronic Commerce”, Pearson Education,

REFERENCES

IT2041 ENTERPRISE RESOURCE PLANNING L T P C
3 0 0 3

UNIT I RP AND TECHNOLOGY 10

UNIT II ERP IMPLEMENTATION 10

UNIT III ERP IN ACTION & BUSINESS MODULES 8

UNIT IV ERP MARKET 9


TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

<table>
<thead>
<tr>
<th>IT2042</th>
<th>INFORMATION SECURITY</th>
<th>L T P C</th>
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AIM:
To study the critical need for ensuring Information Security in Organizations

OBJECTIVES:
- To understand the basics of Information Security
- To know the legal, ethical and professional issues in Information Security
- To know the aspects of risk management
- To become aware of various standards in this area
- To know the technological aspects of Information Security

UNIT I  INTRODUCTION

UNIT II  SECURITY INVESTIGATION
Need for Security, Business Needs, Threats, Attacks, Legal, Ethical and Professional Issues

UNIT III  SECURITY ANALYSIS
Risk Management: Identifying and Assessing Risk, Assessing and Controlling Risk

UNIT IV  LOGICAL DESIGN

UNIT V  PHYSICAL DESIGN

TOTAL: 45 PERIODS

TEXT BOOK:
REFERENCES:
TEXT BOOKS:

REFERENCES:

IT2033 BIOINFORMATICS L T P C
3 0 0 3

UNIT I
Introduction to molecular biology – the genetic material – gene structure – protein structure – chemical bonds – molecular biology tools – genomic information content

UNIT II

UNIT III

UNIT IV

UNIT V

TOTAL: 45 PERIODS

TEXT BOOK:
REFERENCES:

IT2034 ADHOC SENSOR NETWORKS L T P C 3 0 0 3

UNIT I ROUTING 9

UNIT II QUALITY OF SERVICE 9

UNIT III ENERGY MANAGEMENT AD HOC NETWORKS 9

UNIT IV MESH NETWORKS 9

UNIT V SENSOR NETWORKS 9

TOTAL : 45 PERIODS

TEXT BOOK:

REFERENCES
UNIT I KNOWLEDGE MANAGEMENT 9

UNIT II KNOWLEDGE MANAGEMENT SYSTEM LIFE CYCLE 9

UNIT III CAPTURING KNOWLEDGE 9

UNIT IV KNOWLEDGE CODIFICATION 9

UNIT V KNOWLEDGE TRANSFER AND SHARING 9

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES:
UNIT I  CONCEPTS AND ARCHITECTURE
Introduction-Parallel and Distributed Computing-Cluster Computing-Grid Computing-Anatomy and Physiology of Grid-Review of Web Services-OGSA-WSRF.

UNIT II  GRID MONITORING
Grid Monitoring Architecture (GMA) - An Overview of Grid Monitoring Systems- GridICE – JAMM -MDS-Network Weather Service-R-GMA-Other Monitoring Systems- Ganglia and GridMon

UNIT III  GRID SECURITY AND RESOURCE MANAGEMENT

UNIT IV  DATA MANAGEMENT AND GRID PORTALS

UNIT V  GRID MIDDLEWARE
List of globally available Middlewares - Case Studies-Recent version of Globus Toolkit and gLite - Architecture, Components and Features.

TEXT BOOK:

REFERENCES:
UNIT II

UNIT IV

UNIT V

TOTAL : 45 PERIODS

TEXT BOOKS

REFERENCES

IT2050 PRINCIPLES OF COMPILER DESIGN L T P C 3 0 0 3

UNIT I BASICS OF COMPILATION

UNIT II TYPE CHECKING AND RUNTIME ENVIRONMENTS
UNIT III  INTERMEDIATE CODE GENERATION  9
Intermediate languages – Declarations – Assignment statements – Boolean expressions
– Case statements – Backpatching – Procedure calls.

UNIT IV  CODE GENERATION  9
Issues in the design of a code generator – The target machine – Runtime storage
management – Basic blocks and flow graphs – Next-use information – A simple code
generator – Register allocation and assignment – The DAG representation of basic
blocks – Generating code from DAG – Dynamic programming code generation algorithm
– Code-generator generators.

UNIT V  CODE OPTIMIZATION  9
Principal sources of optimization – Peephole optimization – Optimization of basic blocks
– Loops in flow graphs – Introduction to global data flow analysis – Iterative solution of

TOTAL: 45 PERIODS

TEXT BOOK:
1. Alfred V. Aho, Ravi Sethi, Jeffrey D. Ullman. “Compilers Principles, Techniques and

REFERENCES:
1. Steven S. Muchnick, “Advanced Compiler Design Implementation”, Morgan Koffman,
   1997.
2. Charles N. Fischer, Richard J. Leblanc, “Crafting a Compiler with C”, Benjamin

IT2051 KNOWLEDGE ENGINEERING   L T P C
UNIT I  INTRODUCTION  9
Key concepts – Why knowledge Representation and Reasoning – Language of first
order Logic – Syntax, Semantics Pragmatics – Expressing Knowledge – Levels of
Representation – Knowledge Acquisition and Sharing – Sharing Ontologies – Language
Ontologies –Language Patterns – Tools for Knowledge Acquisition

UNIT II  RESOLUTION AND REASONING  9
Proportional Case – Handling Variables and Qualifies – Dealing with Intractability –
Reasoning with Horn Clauses - Procedural Control of Reasoning – Rules in Production –
Description Logic - Vivid Knowledge – Beyond Vivid.

UNIT III  REPRESENTATION  9
Object Oriented Representations – Frame Formalism – Structured Descriptions –
Meaning and Entailment - Taxonomies and Classification – Inheritance – Networks –
Strategies for Defeasible Inheritance – Formal Account of Inheritance Networks.
UNIT IV  DEFAULTS, UNCERTAINTY AND EXPRESSIVENESS  9
Defaults – Introduction – Closed World Reasoning – Circumscription – Default Logic
Limitations of Logic – Fuzzy Logic – Nonmonotonic Logic – Theories and World –
Semiotics – Auto epistemic Logic - Vagueness – Uncertainty and Degrees of Belief –
Noncategorical Reasoning – Objective and Subjective Probability.

UNIT V  ACTIONS AND PLANNING  9
Explanation and Diagnosis – Purpose – Syntax, Semantics of Context – First Order
Reasoning – Modal Reasoning in Context – Encapsulating Objects in Context – Agents
– Actions – Situational Calculus – Frame Problem – Complex Actions – Planning –
Strips – Planning as Reasoning – Hierarchical and Conditional Planning.

TOTAL: 45 PERIODS

TEXT BOOK:
1. Ronald Brachman, Hector Levesque "Knowledge Representation and Reasoning ",
   the Morgan Kaufmann Series in Artificial Intelligence 2004

REFERENCES:
1. John F. Sowa, “Knowledge Representation: Logical, Philosophical, and
   Computational Foundations”, 2000

GE2022  TOTAL QUALITY MANAGEMENT  L T P C
UNIT I   INTRODUCTION  9
Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of
manufacturing and service quality - Basic concepts of TQM - Definition of TQM – TQM
Framework - Contributions of Deming, Juran and Crosby – Barriers to TQM.

UNIT II  TQM PRINCIPLES  9
Leadership – Strategic quality planning, Quality statements - Customer focus –
Customer orientation, Customer satisfaction, Customer complaints, Customer retention -
Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition
and Reward, Performance appraisal - Continuous process improvement – PDSA cycle,
5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III  TQM TOOLS & TECHNIQUES I  9
The seven traditional tools of quality – New management tools – Six-sigma: Concepts,
methodology, applications to manufacturing, service sector including IT – Bench marking
– Reason to bench mark, Bench marking process – FMEA – Stages, Types.

UNIT IV  TQM TOOLS & TECHNIQUES II  9
Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function –
TPM – Concepts, improvement needs – Cost of Quality – Performance measures.
UNIT V  QUALITY SYSTEMS

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES:

GE2072  INDIAN CONSTITUTION AND SOCIETY  L T P C
3 0 0 3

UNIT I

UNIT II
Union Government – Structures of the Union Government and Functions – President – Vice President – Prime Minister – Cabinet – Parliament – Supreme Court of India – Judicial Review.

UNIT III

UNIT IV
Indian Federal System – Center – State Relations – President’s Rule – Constitutional Amendments – Constitutional Functionaries – Assessment of working of the Parliamentary System in India.

UNIT V
Society : Nature, Meaning and definition; Indian Social Structure; Caste, Religion, Language in India; Constitutional Remedies for citizens – Political Parties and Pressure Groups; Right of Women, Children and Scheduled Castes and Scheduled Tribes and other Weaker Sections.

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

GE2025 PROFESSIONAL ETHICS IN ENGINEERING L T P C
3 0 0 3

UNIT I ENGINEERING ETHICS

UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as Experimentation – Engineers as responsible Experimenters – Research Ethics - Codes of Ethics – Industrial Standards - A Balanced Outlook on Law – The Challenger Case Study

UNIT III ENGINEER’S RESPONSIBILITY FOR SAFETY

UNIT IV RESPONSIBILITIES AND RIGHTS

UNIT V GLOBAL ISSUES

TOTAL: 45 PERIODS
TEXT BOOKS:

REFERENCES:

GE2071 INTELLECTUAL PROPERTY RIGHTS (IPR) L T P C
3 0 0 3

UNIT I

UNIT II
IP – Patents – Copyrights and related rights – Trade Marks and rights arising from Trademark registration – Definitions – Industrial Designs and Integrated circuits – Protection of Geographical Indications at national and International levels – Application Procedures..

UNIT III

UNIT IV

UNIT V
Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

TOTAL: 45 PERIODS
TEXT BOOK:

REFERENCES:

IT2052 MANAGEMENT INFORMATION SYSTEMS L T P C
3 0 0 3

UNIT I INFORMATION SYSTEM AND ORGANIZATION 9

UNIT II REPRESENTATION AND ANALYSIS OF SYSTEM STRUCTURE 9

UNIT III SYSTEMS, INFORMATION AND DECISION THEORY 9

UNIT IV INFORMATION SYSTEM APPLICATION 9

UNIT V DEVELOPMENT AND MAINTENANCE OF INFORMATION SYSTEMS 9

TOTAL: 45 PERIODS

TEXT BOOK
REFERENCES


IT2061 SYSTEM MODELING AND SIMULATION L T P C
3 0 0 3

UNIT I INTRODUCTION TO SIMULATION
9
Introduction – Simulation Terminologies- Application areas – Model Classification – Types of Simulation- Steps in a Simulation study- Concepts in Discrete Event Simulation - Simulation Examples

UNIT II MATHEMATICAL MODELS
9

UNIT III ANALYSIS OF SIMULATION DATA
9

UNIT IV VERIFICATION AND VALIDATION
9
Model Building – Verification of Simulation Models – Calibration and Validation of Models – Validation of Model Assumptions – Validating Input – Output Transformations.

UNIT V SIMULATION OF COMPUTER SYSTEMS AND CASE STUDIES
9
Simulation Tools – Model Input – High level computer system simulation – CPU – Memory Simulation – Comparison of systems via simulation – Simulation Programming techniques - Development of Simulation models.

TEXT BOOKS:

REFERENCES:
UNIT I
Introduction – Models -and Algorithms - The Turing Test -Regular Expressions Basic Regular Expression Patterns -Finite State Automata -Regular Languages and FSAs – Morphology -Inflectional Morphology - Derivational Morphology -Finite-State Morphological Parsing - Combining an FST Lexicon and Rules -Porter Stemmer

UNIT II
N-grams Models of Syntax - Counting Words - Unsmoothed N-grams – Smoothing- Backoff - Deleted Interpolation – Entropy - English Word Classes - Tagsets for English - Part of Speech Tagging -Rule-Based Part of Speech Tagging - Stochastic Part of Speech Tagging - Transformation-Based Tagging -

UNIT III

UNIT IV

UNIT V

TEXT BOOKS
1. D. Jurafsky and J. Martin “Speech and Language Processing: An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition”,
2. C. Manning and H. Schutze, “Foundations of Statistical Natural Language Processing”,

REFERENCE
UNIT II  STRUCTURED SYSTEM ANALYSIS AND DESIGN  9

UNIT III  OBJECT ORIENTED ANALYSIS AND DESIGN  9

UNIT IV  SOFTWARE DESIGN  9

UNIT V  CASE STUDIES  9

REFERENCES

GE2023  FUNDAMENTALS OF NANOSCIENCE  3 0 0 3
UNIT I  INTRODUCTION  9
Nanoscale Science and Technology- Implications for Physics, Chemistry, Biology and Engineering-Classifications of nanostructured materials- nano particles- quantum dots, nanowires-ultra-thinfilms-multilayered materials. Length Scales involved and effect on properties: Mechanical, Electronic, Optical, Magnetic and Thermal properties. Introduction to properties and motivation for study (qualitative only).

UNIT II  PREPARATION METHODS  10
Bottom-up Synthesis-Top-down Approach: Precipitation, Mechanical Milling, Colloidal routes, Self-assembly, Vapour phase deposition, MOCVD, Sputtering, Evaporation, Molecular Beam Epitaxy, Atomic Layer Epitaxy, MOMBE.
UNIT III PATTERNING AND LITHOGRAPHY FOR NANOSCALE DEVICES

Introduction to optical/UV electron beam and X-ray Lithography systems and processes, Wet etching, dry (Plasma/reactive ion) etching, Etch resists-dip pen lithography

UNIT IV PREPARATION ENVIRONMENTS

Clean rooms: specifications and design, air and water purity, requirements for particular processes, Vibration free environments: Services and facilities required. Working practices, sample cleaning, Chemical purification, chemical and biological contamination, Safety issues, flammable and toxic hazards, biohazards.

UNIT V CHARACTERISATION TECHNIQUES

X-ray diffraction technique, Scanning Electron Microscopy - environmental techniques, Transmission Electron Microscopy including high-resolution imaging, Surface Analysis techniques- AFM, SPM, STM, SNOM, ESCA, SIMS-Nanoindentation

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
1. G Timp (Editor), Nanotechnology, AIP press/Springer, 1999

CS2053 SOFT COMPUTING L T P C
3 0 0 3

UNIT I FUZZY SET THEORY

UNIT II OPTIMIZATION
UNIT III  ARTIFICIAL INTELLIGENCE  10

UNIT IV  NEURO FUZZY MODELING  9

UNIT V  APPLICATIONS OF COMPUTATIONAL INTELLIGENCE  8

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:

IT2064  SPEECH PROCESSING  L T P C  3 0 0 3

UNIT I  MECHANICS OF SPEECH  9
UNIT II  TIME DOMAIN METHODS FOR SPEECH PROCESSING  9
Time domain parameters of Speech signal – Methods for extracting the parameters
Energy, Average Magnitude, Zero crossing Rate – Silence Discrimination using ZCR
and energy – Short Time Auto Correlation Function – Pitch period estimation using Auto
Correlation Function.

UNIT III  FREQUENCY DOMAIN METHOD FOR SPEECH PROCESSING  9
Short Time Fourier analysis: Fourier transform and linear filtering interpretations,
Sampling rates - Spectrographic displays - Pitch and formant extraction - Analysis by
Synthesis - Analysis synthesis systems: Phase vocoder, Channel Vocoder -
Homomorphic speech analysis: Cepstral analysis of Speech, Formant and Pitch
Estimation, Homomorphic Vocoder.

UNIT IV  LINEAR PREDICTIVE ANALYSIS OF SPEECH  9
Basic Principles of linear predictive analysis – Auto correlation method – Covariance
method – Solution of LPC equations – Cholesky method – Durbin’s Recursive algorithm
– Application of LPC parameters – Pitch detection using LPC parameters – Formant
analysis – VELP – CELP.

UNIT V  APPLICATION OF SPEECH & AUDIO SIGNAL PROCESSING  9
Algorithms: Dynamic time warping, K-means clustering and Vector quantization,
Gaussian mixture modeling, hidden Markov modeling - Automatic Speech Recognition:
Feature Extraction for ASR, Deterministic sequence recognition, Statistical Sequence
recognition, Language models - Speaker identification and verification – Voice response
system – Speech synthesis: basics of articulatory, source-filter, and concatenative
synthesis – VOIP

TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
   199

CS2056  DISTRIBUTED SYSTEMS  L T P C
3 0 0 3

UNIT I
Characterization of Distributed Systems-Introduction-Examples-Resource Sharing and
the Web-Challenges. System Models- Architectural-Fundamental.
Interprocess Communication-Introduction-API for Internet protocols-External data
representation and marshalling--Client-server communication-Group communication-
Case study: Interprocess Communication in UNIX.
UNIT II
Distributed Objects and Remote Invocation-Introduction-Communication between distributed objects-Remote procedure calls-Events and notifications-Case study: Java RMI.
Operating System Support-Introduction-OS layer-Protection-Processes and threads-Communication and invocation OS architecture.

UNIT III
Distributed File Systems-Introduction-File service architecture-Case Study: Sun Network File System-Enhancements and further developments.
Name Services-Introduction-Name Services and the Domain Name System-Directory Services-Case Study: Global Name Service.

UNIT IV
Time and Global States-Introduction-Clocks, events and process states-Synchronizing physical clocks-Logical time and logical clocks-Global states-Distributed debugging.
Coordination and Agreement-Introduction-Distributed mutual exclusion-Elections-Multicast communication-Consensus and related problems.

UNIT V
Distributed Shared Memory-Introduction-Design and implementation issues-Sequential consistency and Ivy case study Release consistency and Munin case study-Other consistency models.
CORBA Case Study- Introduction-CORBA RMI-CORBA services.

TOTAL: 45 PERIODS

TEXT BOOK:

REFERENCES: