Detailed Syllabus Of B. Tech. Programme in Computer Sciences and Engineering
Batch 2012 Onwards
Semester I & II
Detailed Syllabus Of B. Tech. Programme in Computer Sciences and Engineering
Batch 2011
Semester I & II
Detailed Syllabus Of B.Tech. Programme in Computer Sciences and Engineering
Batch 2009 Onwards
Semester III-VIII
COURSE NO: CSE 301
DISCRETE MATHEMATICAL STRUCTURES

Max. Marks : 100

Unit I

Unit II

Unit III
Groups and sub-groups(criteria),intersection and union of two sub-groups necessary and sufficient condition for the product of two sub groups, normal sub groups, their intersection, homomorphism and isomorphism of groups. Rings: definition and examples, Subrings, properties of rings.

Unit IV
Graph Theory: Graphs, Subgraphs, isomorphism of graphs, Connectivity, Walks, paths and circuits. Euler graphs, Konigsberg bridge problem, necessary and sufficient condition for a graph to be Eulerian, Hamiltonian graphs. Trees, Properties of Tree, pendant vertices in a tree, distance and centers in a tree, Rooted and Binary Trees, Spanning Trees and minimal Spanning Tree. Planar graphs, kuratowski’s two-graphs. Matrix representation of graphs (incidence matrix, path matrix and adjacency matrix)

Unit V

Books Recommended:
1. TEXT BOOK OF DISCRETE MATHEMATICS by swapan Kumar sarkar, S.Chand and company.
2. Discrete maths by DS Malik, MK Sen, cengage, learning india Pvt Ltd
6. Discrete mathematical sstructures by Kolman,Busby,Ross.
COURSE NO:  CSE- 302
DATA STRUCTURES

Max. Marks: 100

Unit I
Introduction to Data Structures: Definition of data structures and abstract data types, Static and Dynamic implementations. The Stacks: Definition, Array based implementation of stacks, Linked List based implementation of stacks, Examples: Infix, post-fix, prefix representation, Conversions, Applications.

Unit II
 Queues and Lists: Definition, Array based implementation of Queues / Lists, Linked List implementation of Queues / Lists, Circular implementation of Queues and Singly linked Lists, Straight/circular implementation of doubly linked Queues / Lists, Priority Queues, Applications.

Unit III
Trees: Definition of trees and Binary trees, Properties of Binary trees and Implementation, Binary Traversal pre-order, post order, In- order traversal, Binary Search Trees, Implementations, Threaded trees, AVL Trees, Implementations

Unit IV
Graphs: Definition of Undirected and Directed Graphs and Networks, The Array based implementation of graphs, Adjacency matrix, The Linked List representation of graphs, shortest path Algorithm, Graph Traversal – Breadth first Traversal, Depth first Traversal, hash tables: Definition, Hash function (basic idea).

Unit V

Books Recommended:
2. Data Structures through C-G.S.Baluja, Dhanpat Rai & Co.
3. Data structures & algorithms by Aho, Hopcroft, Ullman, Pearson

References:
3. Fundamentals of computer algorithms by Horowitz Sahni and Rajasekaran.
4. Data Structures and Program Design in C By Robert Kruse, PHI.
5. Theory & Problems of Data Structures by Jr. SymourLipschetz, Schaum’s outline by TMH.
COURSE NO: CSE- 303
BASIC ELECTRONICS ENGINEERING

Max. Marks: 100

Unit I
SEMICONDUCTORS, DIODES AND DIODE CIRCUITS:
Semiconductors- types & fabrication techniques, Mobility and conductivity, Intrinsic and extrinsic semiconductors and charge densities in semiconductors, current components in semiconductors, continuity equation, Hall Effect.
PN Junction diode – characteristic and analysis, Types of diodes – Zener diodes, Photodiodes, Light emitting diodes (LED’s) and Tunnel diodes. Rectifiers and filter circuit: Half wave, full wave and Bridge rectifier circuits and their analysis. L, C and +Pi filters.

Unit II

Unit III
FIELD EFFECT TRANSISTOR: JFET and MOSFET-fabrication techniques &characteristics.FET biasing and application as an amplifier. Volt-ampere characteristics: SCR, TRIAC, DIAC, UJT, Introduction to IC technology

Unit IV
AMPLIFIERS AND OSCILLATORS: Classification of amplifiers, concept of feedback, general characteristics of feedback amplifiers, Single stage RC coupled amplifier. OSCILLATORS – Criterion for Oscillation, type of oscillators: Hartley oscillator, Colpitt Oscillator & RC Phase shift oscillator.

Unit V

Books Recommended
1. Electronics Devices and circuits by Millman & Halkias.
2. Electronics devices and circuit theory by Robert Boylestad

References
1. Electronics Devices and circuits by P.John Paul
2. Electronics Devices and circuits by Y.N.Bapat.
3. Electronics devices and circuit by G.K. Mittal
4. Electronics Devices & Circuits BY J.B Gupta
COURSE NO: CSE-304

Max. Marks: 100

NUMERICAL METHODS

Unit I

Unit II

Unit III
Finite differences: meaning of Δ, E, μ, δ - interpolation using Newton’s forward and backward formula- central differences- problems using Stirling’s formula- Lagrange’s formula and Newton’s divided difference formula for unequal intervals.

Unit IV
Curve Fitting: Regression, Fitting Linear Equations, Fitting transcendental Equations, Fitting, polynomial function, multiple linear regression, Solution of partial Differential equations, Deriving Difference Equations, Elliptic equations, parabolic equations, hyperbolic equations

Unit V

Books Recommended:

References:
3. Miller and Fread’s Probability and statistics for engineers – Richard A Johnson, Pearson Education Asia / PHI.
COURSE NO:  CSE- 305
DIGITAL ELECTRONICS

Max. Marks : 100

UNIT 1. NUMBER SYSTEM & CODES:
Binary, Octal, Hexadecimal number systems and their inter-conversion, Binary Arithmetic (Addition, Subtraction, Multiplication and Division), Diminished radix and radix compliments, BCD codes, 8421 code, Excess-3 code, Gray code, error detection and correction, Hamming code.

UNIT 2. LOGIC GATES, BOOLEAN ALGEBRA & LOGIC FAMILIES:
Axiomatic definition of Boolean Algebra, Basic Theorems and properties of Boolean Algebra, Boolean Functions, Canonical and Standard forms, Digital Logic Gates. Various Logic Families like TTL and ECL etc., working and their characteristics, MOS and CMOS devices.

UNIT 3. COMBINATIONAL LOGIC DESIGN:

UNIT 4. MSI AND PLD COMPONENTS:
Binary adder and subtractor, Multiplexers, Decoders / Demultiplexers, Read Only Memory, Programmable Logic Arrays, Programmable Array Logic. Implementation of Combinatorial Logic using these devices.

SEMICONDUCTOR MEMORIES: Introduction, Memory organisation, Classification and characteristics of memories, Sequential memories, ROMs, R/W memories. Content addressable memories, Programmable logic arrays, Charged-Coupled device memory.

UNIT 5. INTRODUCTION TO SEQUENTIAL LOGIC:
Introduction, S-R Flip-flops, JK flip-flop, D flip-flop, T flip-flop, master slave flip-flop. Flip-flop excitation table, Classification of sequential circuits, Registers and A to D and D to A converter circuits, design & analysis of synchronous and asynchronous sequential circuits: Counters, Sequence Detector and Sequence Generator.

Books Recommended:
2. Thomas Downs and Mark F Schulz, Logic Design with Pascal, Van Nostrand Reinhold.

References:
1. Digital principle and applications Malvino and Leach- (TMH)
2. Modern digital systems design Cheung (WPC)
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<tr>
<th>COURSE NO: CSE 306</th>
<th>Max. Marks: 50</th>
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<tr>
<td>DATA STRUCTURES LAB</td>
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1. Searching algorithms: sequential and binary search algorithms on an ordered list.

2. Sorting algorithms (any five): Insertion Sort, Selection Sort, Shell Sort, Bubble Sort, Quick Sort, Heap Sort, Merge Sort.

4. Evaluation of arithmetic expression.

5. Implementation of stacks

6. Implementation of Queues, circular queues, d-queues.


8. Tree traversal techniques.

9. The graph traversal techniques.

10. Algorithm to obtain the shortest paths.
1. Design/study of power supply.
2. Study of wave shaping circuits using PN-diodes.
3. Study the I-V characteristics of PN junction diode (Applications as HWR, FWR, clamper, clippers).
4. Study of Zener diode as voltage regulator.
5. Study the I-V charts of tunnel diode.
6. Study frequency response in case of common emitter amplifier.
7. Verify the relation \( \beta = \frac{\alpha}{1 - \alpha} \)
8. Study the I-V characters of JFET & MOSFET.
9. Familiarization of electronics component and equipments like C.R.O, Function generator and power supplies etc.
10. To study the V-I characteristics of pn junction diode and determine static resistance and dynamic resistance.
11. To study the characteristics of zener diode and hence determine the dynamic resistance from the characteristics.
12. Determine the voltage regulation of zener diode stabilizer.
13. To study and plot the wave form of half wave and full wave rectifier with and without capacitor filter.
14. To study and plot the input and output characteristics of common emitter transistor and calculate its input and output resistance.
15. To study and plot the input and output characteristics of common base transistor and calculate its input and output resistance.
16. To study the characteristics of FET(Field effect transistor) and hence calculate dynamic (rd) , mutual conductance (gm) and amplification factor(\(\mu\)).
17. To study the frequency response of single stage CE amplifier and hence calculate the band width (3dbBW).
PART-I
1. To verify the truth table of logic gates realize AND, OR, NOT gates
2. To realize AND, OR gates using diodes and resistors
3. To verify the Boolean algebra function using digital IC gates (consensus theorem) only
4. To realize the function $F(A, B, C, D) = (C+D)(A+B)(B+D)$ using NOR gates only
5. Design a half/full adder circuit using FF for 2 bits
6. Design a half/full subtractor circuit using FF for 2 bits
7. Use Quine Mcclusky method for designing $F(A,B,C,D) = \Sigma m(1,3,5,7,9,15)+\Sigma d(4,6,12,13)$ realize it NOR-OR implementation.
8. Design a binary to gray code converter.
9. Design a function using K-map and verify its performance using SOP and POS form
10. Design BCD to seven-segment display using 7447 IC
11. Implement $F(A, B, C) = E(1, 3, 4, 5, 6)$ with a multiplexer.
12. Design a modulus N counter and a ring counter.
13. Design a shift register using flip-flops

PART-II
1. Interfacing of TTL and electromagnetic relay using transistor, opto coupler (4N33) and Darlington array (ULN2803).
2. Logic family interconnection (TTL to CMOS and CMOS to TTL).
3. Verification of the truth tables of TTL gates (7400, 7402, 7404, 7408, 7432, 7486...).
4. Verify the NAND and NOR gates as universal logic gates.
5. Verification of the truth table of the Multiplexer 74150.
7. Design and Verification of the truth table of half and full adder circuits.
8. Design and Verification of the truth table of half and full subtractor circuits.
10. Verify the truth table of a J-K F/F (7476).
11. Verify the truth table of a D F/F (7474).
12. Operate the counters 7490, 7493, and 74194. Verify the frequency division at each stage and with a low frequency clock (say 1 Hz) display the count on LED’s.
13. Verify the truth table of decoder driver 7447/7448. Hence operate a 7 segment LED display through a counter using a low frequency clock.
COURSE NO:  CSE 401
PROBABILITY STATISTICS & QUEUING

Max. Marks : 100

Unit I

Unit II
Correlation, coefficient of correlation, Linear Regression, regression coefficient, Method of Least Squares, Introduction to Sampling and Sampling Distribution, Standard Error, sampling distribution of the Mean (known) Sampling Distribution of the mean (unknown) – The sampling distribution of the variance, Estimation and confidence intervals.

Unit III
Hypothesis: Tests of Hypotheses, Null Hypotheses and Alternate Hypothesis, Critical Region, Type I and Type II Errors, one tail and two tail tests, Significance tests, Level of Significance, $\chi^2$—Test of Goodness of Fit, T-test and Z-test.

Unit IV
Markov Chain and Reliability: Markov chain, Transition probabilities, Limiting distributions, Concepts of reliability, Hazard function, Series and parallel systems, Reliability and Availability of Markovian systems, Maintainability, Preventive maintenance.

Unit V
Queuing Theory: Markovian queuing models, Little's formula, Multi-server queues, M/G/1 Queues, Pollaczek-Khintchine formula.

Books Recommended:
1. Miller and Fread’s Probability and statistics for engineers – Richard A Johnson, Pearson Education Asia / PHI.
4. Probability And Statistics With Reliability, Queuing With Reliability, Queuing And Computer Science Application - Kishor S. Trivedi, PHI.
UNIT I
Open loop and closed loop control systems: Transfer function – Poles and zeros – Transfer function of linear systems – Simple electrical, mechanical, and electromechanical systems – Block diagram representation – Block diagram reduction – Signal flow graph – Mason’s gain formula.

UNIT II

UNIT III

UNIT IV

UNIT V

Books Recommended:

References:
Unit 1:

Unit 2:
Divide & Conquer strategy, general method, binary search, maximum and minimum, merge sort, quick sort. Greedy method: examples of exact optimization solution (minimum cost spanning tree), approximate solution (Knapsack problem), job sequencing, optimal merge pattern.

Unit 3:

Unit 4:
Overview, difference between dynamic programming and divide and conquer, applications: shortest path in graph, matrix multiplication, travelling salesman problem, longest common sequence. Graph searching and traversal: Overview, representation of graphs, traversal methods, depth first and breadth first search.

Unit 5:
Complexity measures, Polynomial vs non-polynomial time complexity; NP hard and NP complete basic concepts. Approximate algorithms, need for developing approximate algorithms, vertex cover problem. Parallel computation model.

Books Recommended:
1. Fundamentals of computer algorithms; E.Horowitz and Sahni.
2. Introduction to algorithms, Cormen, Leiserson, Rivest, Stein: PHI 3rd edition

References:
1. The Art of Computer Programming by Donald Knuth: Pearson
COURSE NO:  CSE- 404  
OBJECT ORIENTED PROGRAMMING  
Max. Marks: 100

Unit 1: Introduction to object oriented programming
Basic features & concepts of Object Oriented Programming (OOP), Benefits, Languages and Applications of OOPs. Tokens, Keywords, Identifiers & Constants, Basic Data types, User-defined Data types, Derived Data Types, Memory Management Operators, Manipulators, Control Structures, functions: Main function, function prototyping, call by value, call by reference.

Unit 2: Classes and objects
Classes and Objects: Specifying a class, defining member functions, private member functions, array within a class, memory allocation for objects, arrays of objects, objects as function arguments, returning objects, pointers to members, local classes. Inline functions, default functions, function overloading. Friend functions, strings.

Unit 3: Constructors and destructors

Unit 4: Inheritance
Definition, single, multilevel, multiple, hierarchical and hybrid inheritance, virtual base classes, abstract classes Pointers, Virtual Functions and Polymorphism, Pointers, Pointers to Objects and derived classes, virtual functions, Pure virtual functions

Unit 5: Files and I/O Streams
Templates: function templates and class templates. Exception handling. Working with files (sequential and random), stream input/output classes and objects.

Books Recommended:

1. Object Oriented Programming in Turbo C++, Robert Lafore
2. Teach Yourself C++, Al Stevens
3. A Structured Approach using C++, Farouzan & Gilberg
UNIT I
Amplitude modulation: introduction, overview of communication system, communication channels, need for modulation, baseband and passband signals, amplitude modulation: double side band with carrier (DSB-C), double side band without carrier, single side band modulation, DSB-SC, DSB-C, SSB modulators and demodulators, Vestigial Side Band (VSB), Quadrature amplitude modulator, radio transmitter and receiver.

UNIT II
Angle Modulation: angle modulation: tone modulated FM signal, arbitrary modulated FM signal, FM modulators and demodulators, approximately compatible SSB systems, stereo phonic FM broadcasting, examples based on MATLAB.

UNIT III
Pulse Modulation: pulse modulation: digital transmission of analog signals, sampling theorem and its applications, pulse amplitude modulations, pulse width modulation, pulse position modulation, their generation and demodulation, digital representation of analog signals, pulse code modulation, PCM system, issues in digital transmission: Frequency Division multiplexing, time division multiplexing, line coding and their power spectral density, TI digital systems, TDM hierarchy.

UNIT IV

UNIT V
Performance of communication systems in presence of noise: noise in amplitude modulation, analysis, signal to noise ratio, figure of merit, noise in frequency modulation, pre emphasis, de emphasis and SNR improvement, phase locked loops: analog and digital.

Books recommended:
2. Communication Systems by Simon Haykins, John Wiley and Sons
5. Communication systems by B.P. Lathi, Wiley Eastern Ltd.

References:
2. Digital and Analog Communication Systems by Leon W. Couch, II, Pearsons Education
3. Communication Engineering by Bakshi & Godse ; Technical publishers
List of Experiments:

1. To study the performance of Relay control Combination of P,I and D control schemes in a typical thermal system (oven).
2. To study the torque-speed characteristics of an AC servomotor.
3. To study the time response of a variety of simulated linear systems.
4. To study the role of feedback in a DC speed control system.
5. To study the role of feedback in a DC position control system.
6. To study the role of a combination of P,I and D control actions in a variety of simulated linear systems.
7. To study the computer simulation of a number of systems.
8. Use of MATLAB / SIMULINK /Control System tool boxes.
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<th>COURSE NO:</th>
<th>CSE-407</th>
<th>Max. Marks : 50</th>
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<tr>
<td>OBJECT ORIENTED</td>
<td>PROGRAMMING LAB</td>
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1. Classes and objects. Access specifiers (private, public and protected)
2. Constructors and destructors.
3. Static functions and variables, this, new and delete operators.
4. Function overloading.
5. Operator overloading (overloading ++,>>,<< etc)
7. Polymorphism, friend functions, virtual function and pure virtual function.
8. Operations on files.
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<th>COURSE No. CSE-408</th>
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<tr>
<td>PRINCIPLES OF COMMUNICATION LAB</td>
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1. Generation and detection of amplitude modulated signals.
2. Generation and detection of frequency modulated signals.
3. To measure sensitivity, selectivity, and fidelity of a radio receiver.
4. To generate PAM and PDM signals using IC 555.
5. To test a pulse code modulator.
6. To measure the noise figure of the following systems:-
7. A.M. System.
8. F.M. System.
UNIT I: Introduction

Review of number systems, evolution of computers, Von-Neumann architecture, structure and components of computers, computer functions, instruction execution and instruction cycle, state diagram, computer buses, bus interconnection.

UNIT 2: Instructions and Registers

Instructions and instruction set, characteristics, types, functions, execution, representation, format, addressing modes. CPU registers, organization, programmer visible, status/control, Accumulator and general purpose registers, stack based CPU, micro-operations (arithmetic, logical and shift), register transfer, bus and memory transfer.

UNIT 3: Data Representation and Memory

Scalar data types- sign, magnitude, ones and two’s compliment representation of integers, integer arithmetic (negation, addition, subtraction, multiplication, division, incrementation and decrementation). Memory hierarchy, types and characteristics, primary memory, cache memory, mapping schemes

UNIT 4: ALU and Control Unit

ALU and its organization, control unit- functional requirements, structure, control signals, hardware and micro-programmed CU, micro instructions and its format, Control memory. Introduction to pipelining and parallel processing

UNIT 5: Storage and I/O

Computer storage- magnetic and optical storage, virtual memory- overlays, paging, segmentation and fragmentation. I/O organization- I/O module, its function and structure. I/O interfacing and techniques

Books Recommended:

2. Computer system architecture, Morris Mano, Pearson Education.
3. Computer Architecture, Hanessey and Patterson, Morgan Kaufman

References:

2. Circuit Design with VHDL, Volnei Pedroni.
COURSE NO: CSE 502
DATABASE MANAGEMENT SYSTEMS

Max. Marks : 100

UNIT I
Basic of Database Management: database & database users, characteristics of the database, database systems, concepts and architecture, date models, schemas & instances, DBMS architecture & data independence, database languages & interfaces, data modeling using the entity-relationship approach. Overview of hierarchical, Network & Relational Data Base Management Systems.

UNIT II
Relational model, languages & systems: relational data model & relational algebra: relational model concepts, relational model constraints, relational algebra, SQL - a relational database language: date definition in SQL, view and queries in SQL, specifying constraints and indexes in SQL.

UNIT III
RELATIONAL SYSTEMS: a relational database management systems, DB2. DB2 Architecture, Logical Data Structures Physical Data Structure, Instances, Table Spaces, Types of Table spaces, Internal Memory Structure, Background Processes, Data Types, Roles & Privileges, Stored Procedures, User Defined Functions, Cursors, Error Handling, Triggers.

UNIT IV
Relational data base design: function dependencies & normalization for relational databases: functional dependencies, normal forms based on primary keys, (1NF, 2NF, 3NF & BCNF), lossless join and dependency preserving decomposition.

UNIT V
Concurrency control & recovery techniques: concurrency control techniques, locking techniques, time stamp ordering, granularity of data items, recovery techniques: recovery concepts, database backup and recovery from catastrophic failures. Object-oriented Databases, Distributed and Parallel Databases, Multi-databases, Access Methods, Transaction Management, Query Processing, Deductive Databases, multimedia Databases, Real-Time Databases, Active Databases, Temporal Databases, Mobile Databases, Database Benchmarks, Database Security, Data Mining and Data Warehousing.

Books Recommended:

References:
COURSE NO: CSE 503  
DATA COMMUNICATION  

Max. Marks : 100

Unit 1:
Introduction: Data: data transmission, Signals, Types of Signals, Bandwidth, spectrum, Types of errors, error detection and correction techniques, nature of transmission errors, error detecting codes, error correcting codes, retransmission techniques.

Unit 2:
Communication network: Data communication network and network topologies: Basic concept of network, Advantages and applications, Types of networks (LAN, MAN and WAN), Different network topologies (star, ring, hybrid, tree etc).

Data transmission media and transmission techniques: simplex, half duplex and full duplex, Asynchronous and synchronous data transmission. Guided and un-guided media, twisted wire pair, co-axial cable, optical fibre, microwave links, satellite microwave link, their characteristic features and applications for data transmission.

Unit 3:
Circuit switching, message switching and packet switching, relative advantages and disadvantages. Routing techniques, flooding, and static routing, centralized routing, distributed routing.

Unit 4:
Digital networks, digital modulation and Line coding: their techniques, ASK, RZ, PSK, DPSK, QAM. NRZ, RZ, Biphasic, Manchester coding, AMI, HDBn Integrated services, broadband ISDN.

Unit 5:
Multiplexing and demultiplexing techniques: Frequency Division Multiplexing, Time Division Multiplexing, Wavelength division Multiplexing and Code Division Multiplexing, Spread Spectrum, demultiplexing

Books Recommended:
1. William Stallings: Data & Computer Communications, 7th Ed, PHI
2. Andrew Tanenbaum, “Computer Networks” PHI

References:
1. Data communication and networks by A.S. Godbole and A.Kahate. 2nd ed., Tata McGRaw Hill
2. Sklar, “Digital Communications fundamentals & Applications” 2nd Ed Pearson
COURSE No. CSE-504
SYSTEMS PROGRAMMING

Max. Marks: 100

UNIT 1:
INTRODUCTION TO ASSEMBLER DESIGN
General Machine Structure: review of instruction format, data formats, addressing modes of the chosen machine (IBM 360), assembly language, functions of an assembler, design of assembler, data structure used in assembler design, single pass assembler, two pass assembler.

UNIT 2:
MACROS
Macros and macro preprocessor: macro instruction, advantage of macros, macro definition, macro call and macro expansion, features of macro facilities, implementation of macros; macro preprocessor design; single pass and two pass macro preprocessor.

UNIT 3:
LINKING AND LOADING
Linking and loading, Function of loader, various loading schemes, compile and go, general loader, absolute loader, relocating loader, direct linking design of loader: loader, binder, dynamic loading, dynamic linking, design of absolute loader, design of direct linking loader.

UNIT 4:
PROGRAMMING LANGUAGES
Importance and features of high level languages, Data types and data structures, Accessing flexibility, functional modularity, interfacing assembly language with other programming languages, assembly language tools – masm, debugging assembly language subroutine accessing hardware ports, bios services.

UNIT 5:
SYSTEM TOOLS AND UTILITIES
Introduction to device drivers, common utilities- disk defragmenter, operating systems and its functions; I/O management, memory management, processor management, file management.

Books Recommended:

References:
UNIT 1:
INTRODUCTION TO OPERATING SYSTEMS: Operating system and function, Evolution of operating system, Batch, Interactive, Time Sharing and Real Time System, introduction to distributed systems, advantages over centralized systems, System protection, System Components, Operating System Services.

UNIT 2:

UNIT 3:
MEMORY MANAGEMENT: Multiprogramming with fixed partition, Multiprogramming with variable partition, Multiple base register, Paging, Segmentation, Virtual memory concept, Demand paging, Performance, Paged replaced algorithm, Allocation of frames, Thrashing, Cache memory, Organization, Impact on performance.

UNIT 4:

UNIT 5:
I/O MANAGEMENT AND DISK SCHEDULING: Input/ output devices, organization of input/output functions, I/O buffering, memory mapped I/O, I/O mapped I/O. Disk scheduling algorithms, RAID.

Books Recommended:

References:
2. Operating systems-a design oriented approach by charles Crowley; THM
3. Modern operating systems by A.S.Tanenbaum, 2nd edition. PHI
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<th>COURSE NO: CSE 506</th>
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<td>DATABASE LAB</td>
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The student will be exposed to database access techniques using an interactive approach. This approach will use Industry Standard Structured Query Language (SQL) to maintain tables to answer queries and maintain data using single tables and multiple table joins.

The student would have to develop and write SQL queries that will

1. Extract data from a single table.
2. Use predicates and operators.
3. Use SQL functions.
4. Add, change and remove data in a database.
5. Manage database transactions.
6. Create and manage tables and other database objects.
7. Control access to data.
8. Join together data items from multiple tables.
9. Use sub-queries for selection of data.
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<th>COURSE No. CSE-507</th>
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<td>DATA COMMUNICATION LAB</td>
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1. Making Straight, Rollover and Cross-Over cables
2. Cable & RJ-45 Jack outlet installation
3. Installation of NIC Card & using TCP/IP
4. Design, build & test a simple communication system
5. Overview and basic Configuration of Router
6. Router show Command
7. Basic LAN Setup
8. Designing & Implementing LAN using subnetting
9. Study of Amplitude Modulation
10. Study of frequency Modulation
11. Study of ASK Modulation
12. Study of FSK Modulation
13. Simple point-to-point communication & error detection
14. Implementation of STOP and Wait protocol
15. Implementation of Sliding Window protocol

Note: This is only the suggested list of practicals. Instructor may frame additional practicals relevant to the course contents.
1. Symbol table (Tree Storage) construction, Implementation of single pass, two pass Assembler, Macro Preprocessor, module binder (with Limited instruction set).
2. Implementation of software tools like Text editor, Interpreter, program generator etc.

Note: This is only the suggested list of practicals. Instructor may frame additional practicals relevant to the course contents.
UNIT 1: INTRODUCTION
What is software Engineering? Program Vs Software; Characteristics of Software; Evolution of Software Engineering, Software categories; Software Development life cycle; Software Quality; Software Development Processes; Waterfall model, Prototyping Incremental Methods, Spiral Model.

UNIT 2: REQUIREMENTS AND TOOLS
Software requirement analysis, requirement -types, steps involved in SRA, software requirement specification(SRS), informal and formal specifications, need and characteristics for an SRS, components of an SRS, prototype for a good SRS. Software reuse.

UNIT 3: DESIGN METHODOLOGIES
Architectural design, distributed systems design, application architectures, object oriented design, real time software design, user interface design,
Software process models: waterfall model, prototyping model, spiral model, incremental model, concurrent development model.

UNIT 4: TESTING
Structural and Functional Testing: testing fundamentals, black-box and white-box testing, regression testing, smoke testing, alpha testing, beta testing, Verification and validation.

UNIT 5: COST ESTIMATION
Models for reliability and cost: Software cost estimation, quality management, process improvement, configuration management.
Security Engineering, Service oriented software engineering, aspect oriented software engineering

Books Recommended:
2. Software engineering by Pankaj Jalote, Narosa publishing house

References:
COURSE No. CSE-602
THEORY OF COMPUTATION

Max. Marks: 100

UNIT 1:
INTRODUCTION TO COMPUTATION: Complexity of computations, computability, complexity, mathematical notions and terminology, definitions, alphabets, strings and representations, theorems and proofs, types of proofs.

UNIT 2:
AUTOMATA & LANGUAGES: Finite Automata, two way finite automata, finite automata with output, deterministic and Non-determinism automata, pushdown automata, regular expressions, non-regular expressions, properties of regular sets, closure properties.

UNIT 3:
CONTEXT FREE LANGUAGES: Context free grammar (CFG), derivation trees, simplification normal forms, push down automata (PDA) and context free languages (CFL), properties of CFLs non-context free languages, CNF and GNF forms, concepts in parsing. Introduction to context sensitive grammars.

UNIT 4:
COMPUTABILITY THEORY: Turing machines, Turing machine model, variants of Turing machines, modifications of Turing machines, Church’s hypothesis. The definition of algorithm, Decidability, reducibility.

UNIT 5:
RECURSIVE ENUMERABLE LANGUAGES: recursive and enumerable languages and their properties, universal turing machine, post correspondence problem. CHOMSKY HIERARCHY, regular grammars, unrestricted grammars, context sensitive languages.

Books Recommended:
3. J.E. Hopcroft and J.D. Ullman. Introduction to Automata Theory,
5. Theory of computation by K.L.P. Mishra, PHI
INTERNET AND WEB TECHNOLOGY

Unit 1:
Introduction to internet: history of internet, internet architecture, internet’s client/server architecture, internet service providers, applications and services, ISDN

Unit 2:

Unit 3:
HTML concepts, elements, head and body sections, building HTML documents, inserting text, images, and hyperlinks background clours, different HTML tags, table layout, list types and its tags, use of frames and forms in web pages.

Unit 4:
VB script concepts: VB script language elements: constant, variables and data types, operators, looping and decision structures. VB script functions and objects:

Unit 5:
ASP concepts: response object, request object, cookies, application, session and server objects. Reading and writing files on web server.

Books recommended:
1. Teach yourself ASP in 21 days, Tech Media.
2. Mastering ASP by Rusell Jones, willey- India ed.

References:
1. Active server pages 2.0(unleashed) by Stephen Walther: Tec media.
2. ASP 3 programming bible by Eric A. Smith: IDG
COURSE NO:  CSE 604  
MICRO-PROCESSOR  

Max. Marks: 100

Unit 1: Introduction to microprocessor:
Microcomputer Structure and Organization, Basic Microcomputer Elements, Architecture. CPU, Memory System. Memory circuits, microprocessor architecture, Typical 8, 16 and 32 bit Microprocessors, 8085 Microprocessor Specification, Memory Technologies.

Unit 2: Instructions and Timing

Unit 3: Bus System and Interrupts
Bus system, System Bus Structure, Bus Operations, Cycle by Cycle Operations, Timing and Control, Address Decoding. Interrupts: mechanism, types and priority, interrupt vector table, interrupt instruction, enabling and disabling of interrupts, external hardware interrupts, software interrupts, non-maskable interrupts, internal interrupts.

Unit 4: Interfacing
Interfacing: Interfacing concepts, I/O interfacing and techniques, Parallel Input/Output, memory mapped input/output, DMA, serial communication interface, interfacing input/output devices to microprocessor, programmable peripheral interface.

Unit 5: Introduction to 8086 architecture
Introduction to 8086 architecture. Main features and addressing modes. Maximum and minimum mode systems and interface signals. Latest Developments in Microprocessor Technology

Books Recommended:
1. Microprocessor by Goankar.

References:
COURSE No. CSE-605  
COMPUTER NETWORKS  

Max. Marks: 100

Unit-I

Unit-II

Unit-III

Unit-IV

Unit-V

Books Recommended:
1. Peterson and Davis, “Computer Networks” Morgan Kaufman
2. D.P Bertsekas “ Data Networks” Prentice Hall
4. J.F. Kurose “Computer Networking” Addison-Wesley
COURSE NO. CSE- 606
INTERNET AND WEB TECHNOLOGY LAB

1. Building HTML documents.
2. Inserting texts, images, hyperlinks etc. in HTML documents.
3. Use of lists, tables and forms in web pages.
4. Write various programs to understand the VB script concepts.
5. Write various programs to understand the working of Active Server Pages.

Note: This is only the suggested list of practicals. Instructor may frame additional practicals relevant to the course contents.
**CO URSE NO: CSE 607**

**MICRO-PROCESSOR LABORATORY**

1. To develop a program to add two double byte numbers.
2. To develop a program to add two floating point numbers.
3. To develop a program to multiply two single byte numbers giving a 16 bit product.
4. To develop a program to multiply two positive floating point numbers.
5. To write a program to divide a 4 bit number by another 4 bit number.
6. To write a program to divide a 8 bit number by another 8 bit number.
7. Write a program for adding 1st N natural numbers and storing the result in memory location.
8. Write a program that increments a number stored in a register.
9. Write a program to introduce a time delay of 100 ms.

Note: This is only the suggested list of Practicals. Instructor may frame additional Practicals relevant to the course contents.
Experiments to support study of the Internet protocol stack:

1. Experimental study of application protocols such as HTTP, FTP, SMTP, using network packet sniffers. Small exercises in socket programming in C/C++/Java.
2. Experiments with packet sniffers to study the TCP protocol.
3. Introduction to ns2 (network simulator) - small simulation exercises to study TCP behavior under different scenarios.
4. Setting up a small IP network - configure interfaces, IP addresses and routing protocols to set up a small IP network.
5. Experiments with ns2 to study behaviour (especially performance of) link layer protocols such as Ethernet.

Note: This is only the suggested list of Practicals. Instructor may frame additional Practicals relevant to the course contents.
COURSE No. CSE-701
NETWORK SECURITY

Max. Marks : 100

Unit-I
Introduction to security attacks, services and mechanism, Classical encryption techniques substitution ciphers and
transposition ciphers, cryptanalysis, steganography, Stream and block ciphers.
Modern Block Ciphers: Block ciphers principles, Shannon’s theory of confusion and diffusion, fiestal structure,
Data encryption standard(DES), Strength of DES, Idea of differential cryptanalysis, block cipher modes of
operations, Triple DES

Unit-II
Introduction to group, field, finite field of the form GF(p), modular arithmetic, prime and relative prime numbers,
Extended Euclidean Algorithm, Advanced Encryption Standard (AES) encryption and decryption Fermat’s and
Euler’s theorem, Primality testing, Chinese Remainder theorem, Discrete Logarithmic Problem, Principals of public
key crypto systems, RSA algorithm, security of RSA

Unit-III
Message Authentication Codes: Authentication requirements, authentication functions, message authentication code,
hash functions, birthday attacks, security of hash functions, Secure hash algorithm (SHA) Digital Signatures: Digital
Signatures, Elgamal Digital Signature Techniques, Digital signature standards (DSS), proof of digital signature
algorithm

Unit-IV
Key Management and distribution: Symmetric key distribution, Diffie-Hellman Key Exchange, Public key
distribution, X.509 Certificates, Public key Infrastructure. Authentication Applications: Kerberos Electronic mail
security: pretty good privacy (PGP), S/MIME.

Unit-V
IP Security: Architecture, Authentication header, Encapsulating security payloads, combining security associations,
key management, Introduction to Secure Socket Layer, Secure electronic, transaction (SET) System Security:
Introductory idea of Intrusion, Intrusion detection, Viruses and related threats, Firewalls

Books Recommended:

References:
1. Network Security – Charlie Kaufman, Radia Perlman, Mike Speciner.
COURSE No. CSE-703

COMPUTER GRAPHICS

Max. Marks : 100

UNIT 1:
Introduction to computer graphics: applications and relevance of computer graphics, representing and preparing pictures for presentation, displaying prepared pictures. Graphics input devices- description and applications, graphics input techniques, positioning techniques and constraints, rubber band techniques, dragging and painting, pointing and selection. Introduction to Graphics Kernel systems, laser – scan and plasma panel display (GKS), GKS primitives.

UNIT 2:
Graphics display devices- raster, refresh, random, display processor, display buffer, concept of double buffering and augmentation of display buffer, display of dynamic motion. Color display- shadow masking and beam penetration, use of look up tables.

UNIT 3:
Cartesian and homogeneous coordinate systems, line drawing algorithm (Bresenhams and DDA), circle drawing algorithm, ellipse drawing algorithm, 2D transformation.

UNIT 4:
Clipping, concept of windows and viewport transformation, clipping algorithms: line clipping, area clipping/polygon clipping, text clipping, boundary and flood fill algorithms.

UNIT 5:

Books Recommended:
2. Computer graphics by Sinha and Udai, THM

References:
2. James D. Foley, Andries VanDam, “computer graphics”.
COURSE No. CSE- 704
COMPILER DESIGN

Max. Marks: 100

UNIT 1: INTRODUCTION
Introduction to compilers, translators, structure of a compiler. Programming languages: high level programming languages, lexical and syntactic structure of a language, parameter transmission, storage management.

UNIT 2: AUTOMATA
Finite automata and lexical analysis: role of lexical analyzer, design of lexical analyzers, regular expression, finite automata, minimizing number of states of DFA. Syntactic specification of programming languages: context free grammars, derivation and parse tree, capabilities of CFG's.

UNIT 3:
Basic parsing techniques: parsers, shift reduce parsers, operator precedence parsing, top down parsing, predictive parsers, LR parsers, SLR parsers.

UNIT 5: IMPLEMENTATION
Syntax directed translation: schemes, implementation, intermediate code, postfix notation, parse and syntax tree, three address code, quadruples and triples. Symbol tables, error detection and recovery, code optimization, loop optimization, code generation.

BOOKS RECOMMENDED:

References:
1. Fraser and Hanson. A Retargetable C Compiler: Design and Implementation, Addison-Wesley
1. Implementation of line generation using DDA and Bresenham’s algorithms.
2. Implementation of circle generation using Mid-point algorithm.
3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection.
5. Cohen Sutherland 2D line clipping and Windowing
7. Three dimensional transformations - Translation, Rotation, Scaling
COURSE No. CSE-706                                                                      Max. Marks (internal): 75
PRE-PROJECT

PROJECT DESIGN:
The project is aimed at improving the professional skill and competency of the students. The project is for a period of two semesters and students (not more than 4 members in a group) are expected to carry out a complete project. The titles of the projects and the guiding faculty members should be identified at the beginning of the seventh semester.

The design and development of the project may include hardware and/or software. The project is expected to be completed in the eighth semester. The seventh semester is mainly for the preliminary works of the project viz. design of the project, literature survey, collection of materials and fabrication methodology etc. An interim report is to be submitted by each student at the end of the seventh semester and appear in viva.

NOTE:
• Students are required to prepare a synopsis report reflecting a clear idea (i.e., project overview, project guide, cost, institutes / industry to visit during project, etc.) about the major project to be carried in 8th semester.
• The project must be related to core branch of computer engineering / technology.
• The students are advised to choose a project after receiving suggestions of the project guide & remain in contact with the project guide till the completion of the project.
• In no case the project shall be changed after submitting synopsis.
• The students are advised to prepare themselves for project viva / Presentation in their own interest.
• The weight-age for COURSE CSE-706 (PROJECT DESIGN/PRE – PROJECT) will be:

PROJECT SYNOPSIS =25 marks
Viva = 25 marks
PRE – PLACEMENT VIVA:
The Pre – Placement viva is aimed at improving the professional skill and competency of the students and give them the expression of placement interview, which they are going to face to get industrial jobs. Students are required to appear in viva / presentation, Group Discussion etc in presence of expert panel from core Engineering / Technology / Management branches and related branches, so that they will be able to face interview and achieve successes easily in future.

For the external award of the marks the performance of the candidate shall be assessed by a panel consisting of the External Expert Panel, Head of the Department, Placement Officer/ Coordinator, Guiding Faculty, and Senior Faculty Members. The chairman of the panel shall be from External Expert Panel. The students may be assessed individually and in groups.

NOTE:
- Students are required to appear in Pre-Placement Viva / Comprehensive viva at the end of 7th semester.
- The students are advised to prepare themselves for PRE – PLACEMENT VIVA in their own interest.
- The weight-age for Course CSE-707 (Pre-Placement) will be;

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<thead>
<tr>
<th>COURSE No. CSE-707</th>
<th>Max. Marks (External): 50</th>
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<tr>
<td>PRE – PLACEMENT VIVA</td>
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</table>

(EXTERNAL)
VIVA / PRESENTATION = 50 marks
INDUSTRIAL TRAINING
The Industrial Training is aimed at improving the professional skill and competency of the students and expose the students with the outside academic environment (industrial world), which they are going to face once they complete their degree. The Industrial Training is for a period of four to six weeks and are expected to carry out a complete training at any industry related to core branch of computer engineering / technology, at the end of 5th OR 6th semester (after the University Examinations are over).
After the industrial training the students are required to submit the industrial report during 7th semester & appear in viva / presentation.

NOTE:
- Students are required to go for industrial training (at any industry related to core branch of computer engineering / technology) at the end of 5th OR 6th semester (after the University Examinations are over) for four to six week duration. The actual schedule & dates for industrial will be framed by the university management (academics).
- The students are advised to prepare themselves for project viva / presentation in their own interest.
- After the industrial training the students are required to submit the industrial report during 7th semester & appear in viva The weightage for Course CSE-708 (Industrial Training) will be;

<table>
<thead>
<tr>
<th>REPORT FILE</th>
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<tbody>
<tr>
<td>VIVA</td>
<td>30 marks</td>
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</tbody>
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UNIT I:

Organizational behavior and HRM: Evolution of organizational behavior (industrial revolution, scientific management), personality-personality traits-MBTI-Big-five model, leadership-theories of leadership-trait theory-path-goal theory
Recruitment and Selection. Motivation-Herzberg-Maslow’s theories. Organization structure-line-line and staff-functional structures, training and development

UNIT II:


UNIT III:


UNIT IV:

Nature and Development of Entrepreneurship
Definition of Entrepreneur today
The Entrepreneurial decision process
Types of Start-ups
Role of Entrepreneurship in economic development

UNIT V:

Quantitative tools for Entrepreneurs: Formulation and graphical solution of linear programming problems, construction of network projects, PERT and CPM, calculation of earliest start, earliest finish, latest start and latest finish of activities crashing of activities (Basic concepts only).

BOOKS RECOMMENDED:

1. Organization and management,aggarwal.
2. Marketing management,Philip kotler,
3. Quantative techniques,N.D.vohra
5. Organizational behavior,S.p Robbins
COURSE No. CSE-802

ARTIFICIAL INTELLIGENCE

Max. Marks: 100

UNIT-I

UNIT-II

UNIT-III
Knowledge Representation & Reasoning: Propositional logic, Theory of first order logic, Inference in First order logic, Forward & Backward chaining, Resolution, Probabilistic reasoning, Utility theory, Hidden Markov Models (HMM), Bayesian Networks.

UNIT-IV

UNIT-V

BOOKS RECOMMENDED:

REFERENCES:
2. E Charniak and D McDermott, “Introduction to Artificial Intelligence”, Pearson Education
3. Dan W. Patterson, “Artificial Intelligence and Expert Systems”, Prentice Hall of India
PROJECT WORK:
The project is the continuation of the seventh semester project. Students are expected to utilize the project time for the development and implementation of the project whose design and other works have been completed in the seventh semester. A detailed project report in soft bound in an approved format is to be submitted at the end of the semester.

The performance of the students in the project work shall be assessed on a continuous basis. There shall be at least an interim evaluation and a final evaluation of the project work. Each student in the group may give a power point presentation on the project work during the evaluation process.

For the award of the Sessional marks, the project report and the power point presentation of the project work shall be assessed by a panel.

VIVA VOCE & PRESENTATION:
At the time of viva-voce examination, the project work has to be evaluated in addition to assessing the students’ knowledge in the field of Computer Science and Engineering and other related and advanced topics. He/she is expected to present his/her project report, at the time of viva-voce examination. Evaluation is a serious process that is to be conducted under the equal responsibility of both the internal and external examiners.

NOTE:
- Students are required to prepare a complete project report reflecting a clear idea / practical work about the task performed during 7th & 8th semester.
- The students are advised to prepare themselves for project viva / presentation in their own interest.
- The weightage for COURSE CSE-805 (MAJOR– PROJECT) will be;

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<th>(INTERNAL)</th>
<th>(EXTERNAL)</th>
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<td>PROJECT REPORT = 25 marks</td>
<td>PROJECT REPORT = 50 marks</td>
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<tr>
<td>VIVA = 25 marks</td>
<td>PRESENTATION &amp; VIVA= 100 marks</td>
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</tbody>
</table>
SEMINAR:
The seminar is aimed at improving the professional skill and competency of the students. Students are required to give a seminar/presentation about latest topics in core computer Engineering/technology branch or related branch. The titles of the seminar and the guiding faculty members should be identified at the beginning of the seventh semester.

For the award of the Sessional marks, the interim report and the students’ involvement in the works of the seminar shall be assessed by a panel. The students may be assessed individually and in groups.

NOTE:
• Students are required to give a seminar/presentation about latest topics in core computer Engineering/technology branch or related branch during 8th semester.
• The students are advised to prepare themselves for seminar/viva/presentation in their own interest.
• The weight age for Course CSE-806 (Seminar) will be:

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<th>Max. Marks (Internal): 75</th>
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<td>SEMINAR REPORT FILE</td>
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<td>VIVA &amp; PRESENTATION</td>
<td>30 marks</td>
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S. No. 1 | ELECTIVE – I
---|---
COURSE No. CSE-702 | ADVANCED DATABASE MANAGEMENT SYSTEM
Max. Marks : 100

UNIT I
Overview of relational database concepts - distributed DBMS – concepts and design- functions and architecture of DDBMS- distributed relational database design- transparencies in DDBMS

UNIT II
Distributed transaction management- concurrency control deadlock management- distributed database recovery replication servers- query optimization- mobile database

UNIT III
Object DBMS- weaknesses of RDBMS- object oriented concepts- storing objects in relational database- OODBMS concepts and design.

UNIT IV
Perspectives- persistence- issues in OODBMS- advantages and disadvantages- object group- object database standard – object store object-relational database examples

UNIT V
Web technology and DBMS- web as application platform – data warehousing concepts – data warehouse architecture- online analytical processing – OLAP benchmarks, applications, benefits and tools – introduction to data mining.

Books Recommended:
1. Database systems, a practical approach to design implementation and management – Thomas Connolly and Caroly Begg, Pearson Education.
2. Fundamentals of database systems – Elmasri and Navathe, Addison Wesley

References:
1. Object oriented interfaces and databases – Rajesh Narang, PHI
2. Object oriented database systems: approaches and architectures – C S R Prabhu, PHI
3. Database management systems – R Panneerselvam, PHI
4. Data Warehousing – C S R Prabhu, PHI
S. No. 2 | ELECTIVE – I
--|---
COURSE No. CSE-702 | Max. Marks: 100
EMBEDDED SYSTEMS

UNIT I:
EMBEDDED COMPUTING:
An overview of embedded systems, Formalisms for Systems Design, Design Description with Unified Modeling Language (UML), Introduction to FPGA and Hardware Description Language (VHDL)

UNIT II:

UNIT III:
EMBEDDED COMPUTING PLATFORM: Memory System Mechanism, CPU performance, CPU power consumption, CPU buses, ARM bus, SHARC bus, Memory devices, I/O devices, Component Interfacing: memory interfacing, device interfacing. The PC as a platform

UNIT IV:
EMBEDDED SYSTEMS SOFTWARE: Program Design and Analysis, Models of program, Data flow graphs, Control/Data Flow graphs, Program validation and Testing, Design Example, Embedded operating systems

UNIT V:
FUTURE TRENDS IN EMBEDDED SYSTEMS: Distributed Embedded Architecture, Networks for Embedded Systems, various networks and protocols, I²C, CAN etc. Internet Enabled Systems

BOOKS RECOMMENDED:
1. Computers as Components: principles of embedded computing system design, Wayne Wolf, Morgan Kaufman (Harcourt India).
4. The students guide to VHDL, Peter J. Ashenden, Harcourt India.
5. The design of small-scale embedded systems, Tim Wilmhurst, Palgrave.

References:
1. 8051 microcontroller and embedded systems by Keneth Ayala.
S. No. 3  
ELECTIVE – I  
COURSE No. CSE-702  
MULTI-MEDIA TECHNOLOGIES  
Max. Marks : 100

UNIT I

UNIT II
TEXT & IMAGE COMPRESSION
Basic compression principles, Text compression, Repetition suppression, Statistical Encoding Dictionary Modeling, Image formats & representation schemes, color schemes, Image compression principal, GIF, TIFF, JPEG.

UNIT III
AUDIO COMPRESSION
Audio compression techniques, Sub-band coding, DPCM, Adaptive Sub-Band Coding, Predictive Coding, CELP Coding Perceptual Coding, Voice Recognition, Types of voice recognition systems, Voice recognition performance.

UNIT IV
VIDEO COMPRESSION
Fundamentals of video compression, Temporal redundancy, Spatial redundancy, Frame Types, Motion estimation and compensation, Overview of some video coding standards.

UNIT V
STREAMING MULTIMEDIA

Books Recommended:
| S. No. | ELECTIVE – I |
| S.N. 4 | DIGITAL IMAGE PROCESSING |

**UNIT I**
Introduction - digital image representation - fundamental steps in image processing - elements of digital image processing systems - digital image fundamentals - elements of visual perception - a simple image model - sampling and quantization - basic relationship between pixels - image geometry. Image transforms.

**UNIT II**
Introduction to Fourier transform – discrete Fourier transform (DFT) - properties of DFT. Other separable image transforms - Walsh, Hadamard and Discrete Cosine Transforms. Hotelling transform.

**UNIT III**

**UNIT IV**
Image restoration - Model of Image Degradation/restoration process – Noise models –Inverse filtering -Least mean square filtering – Constrained least mean square filtering
Edge detection –Thresholding - Region Based segmentation – Boundary representation. Image compression.

**UNIT V**

**Books Recommended:**

**References:**
<table>
<thead>
<tr>
<th>S. No.</th>
<th>COURSE No. CSE-702</th>
<th>ELECTIVE – I</th>
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<td>5</td>
<td>JAVA PROGRAMMING</td>
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**UNIT I**
Java Program Development, Java Source File Structure, Comparison with other languages (C & C++), Java and Internet, Features of Java, Java Virtual machine, ByteCode, Lexical Tokens, Identifiers, Keywords, Literals, Comments, Primitive Datatypes, Variables: Assignment, Initialization and Conversions, Operators: Arithmetic, Assignment, Modulus, Relational, Boolean, Bitwise, Precedence Summary, Unicode Character Set, Arrays: Single and Multidimensional. Control Statements and Looping Structures

**UNIT II**
Class Fundamentals, Object reference, Garbage Collection, Constructors, Access Control, Modifiers, methods, Nested, Inner Class & Anonymous Classes, Abstract Class, Argument Passing Mechanism, Method Overloading, Recursion, Dealing with Static Members, Finalize() Method, Native Method. Use of “this” reference, Cloning Objects, Generic Class Types, Inheritance in Java, Overriding Super Class Methods, Use of “super”, Polymorphism in inheritance, Type Compatibility and Conversion.

**UNIT III**
Packages & Interfaces: Defining and importing packages, Understanding Class path, Implementing interfaces, Exceptions & Errors, Types of Exception, Control Flow In Exceptions, Use of try, catch, finally, throw, throws in Exception Handling, In-built and User Defined Exceptions, Checked and UnChecked Exceptions, Operation on String, Mutable & Immutable String, Using Collection Bases Loop for String, Tokenizing a String, Creating Strings using StringBuffer, Multi-Threaded Programming, Thread Life-Cycle, Thread Priorities, Synchronizing Threads, Inter -communication of Threads, DeadLock. Applet & Application, Applet Architecture, Parameters to Applet, Embedding Applets in Web page.

**UNIT IV**
Utility Methods for Arrays, Observable and Observer Objects, Date & Times, Using Scanner, Streams, Input and Output Classes, The Standard Streams, File Object, File I/O Basics, Reading and Writing to Files, Buffer and Buffer Management, Read/Write Operations with File Channel, Serializing Objects, The Collection Framework, Collection Types, Sets, Sequence, Map, Hashing, Use of ArrayList & Vector

**UNIT V**

**Books Recommended:**

**References:**
1. Thinking in Java By Bruce Ecket
<table>
<thead>
<tr>
<th>S. No.</th>
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<tbody>
<tr>
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<tr>
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<td><strong>ELECTIVE – II</strong></td>
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<tr>
<td><strong>COURSE No. CSE-803</strong></td>
<td><strong>Max. Marks: 100</strong></td>
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<tr>
<td><strong>SOFT COMPUTING</strong></td>
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UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

Books Recommended:

References:
1. Fuzzy Logic with Engineering Applications – T. J.Ross, Wiley India.
MOBILE AND WIRELESS COMMUNICATION

UNIT I

UNIT II

UNIT III

UNIT IV

UNIT V

Books Recommended:
1. Mobile communications, 2nd Edn – Jochen Schiller, Pearson Education
2. Wireless Communication And Networks – William Stallings, Pearson Education

References:
1. Wireless Communications, Principles and Practice 2nd Edn – Theodore S. Rappaport, PHI.
2. Wireless and Mobile Network Architectures – Yi-Bing Lin and Imrich Chlamtac, Wiley
ROBOTICS

UNIT – I

UNIT – II

UNIT III

UNIT IV

UNIT V

books Recommended :
1. Industrial Robotics / Groover M P /Pearson Edu.
2. Robotics and Control / Mittal R K &Nagrath I J / TMH.

References :
4. Robot Analysis and Intelligence / Asada and Slow time / Wiley Inter-Science.
5. Introduction to Robotics / John J Craig / Pearson Edu.

S. No.  4    ELECTIVE – II
COURSE No. CSE-803
DIGITAL SIGNAL PROCESSING
Max. Marks: 100
UNIT I

UNIT II

UNIT III
Discrete Fourier transform (DFT) - Properties of DFT – inverse DFT - Fast Fourier transform (FFT) - Radix-2 FFT algorithms – butterfly structure.

UNIT IV

UNIT V

Books Recommended:
1. Introduction to Signals and Systems and Digital Signal Processing – M.N. Bandyopadhyaya, PHI
2. Digital Signal Processing – S.D. Apte, Wiley India
3. Digital Signal Processing, Fundamentals and Applications – Li Tan, Elsevier

References:
4. Introduction to Digital Signal Processing – J.K. Proakis and D.G. Manolakis, MacMillan
6. Digital Signal Processing : A Practical Guide for Engineers and Scientists – S.W.Smith, Elsevier India
UNIT I

UNIT II
Remote Procedure Calling: Introduction, Features of RPC, User package, Design issues, Classes of RPC system, Interface definition language, exception handling, delivery guarantees, implementation, interface processing, binding, Locating the binder, RPC in Unix system, Synchronization in Distributed systems: Clock synchronization, Logical Clocks, Physical Clocks, Clock synchronization algorithms, Mutual exclusion, A centralized algorithms,

UNIT III
A distributed algorithms, A token ring algorithms, comparison of the three algorithms, Election algorithms, The Bully algorithms, Ring algorithms, Deadlocks in distributed systems, Distributed deadlock detection.

UNIT IV

UNIT V
Distributed File and Directory Services: Distributed file service requirements, File service components, Flat file service, Directory Service, Client module, Design issues, implementation techniques.
Distributed shared memory Introduction: Shared memory, Consistency models, Page based Distributed shared memory, Shared – variable Distributed shared memory, Object based Distributed Shared Memory.

Books Recommended:
Distributed Operating systems, Andrew S. Tanenbanm

References:
Advanced Concepts in Operating Systems, Singhal and Niranjan G. Shivaratna
Dietel, H.M. “An introduction to operating system” Pearson Education, 2/e.
UNIT I:

Introduction to the concept of a SOC, Backgrounder, microprocessor and Microcontroller based systems, Embedded systems. Differences between Embedded systems and SOCs.

UNIT II:

System design, Concept of system, importance of system architectures, introduction to IMD, SSID, MIMD and MISD architectures, concept of pipelining and parallelism.

UNIT III:

Designing microprocessor /Microcontroller based system and embedded system. System design issues in SOCs. System buses: Introduction to busses used in SOCs. Introduction to AMBA bus. Detailed study of IBM’s core connect bus, concept of PLB-processor local bus and OPB-on chip peripheral bus.

UNIT IV:

Processors used in SOCs : Introduction to CISC ,RISC, Von Neuman and Harward Architecture. Concept of Soft processors and study of Microblaze RISC processor. Study of IBM's power PC, SOC implementation , Backgrounder – programmable logic and FPGA Architecture .

UNIT V:

Concept of embedded processors and study of virtex II PRO Architecture. Study of features like embedded RAMs ,multipliers , Digital clock management etc. Introduction to tools used for SOC design, Xilinx embedded development kit.
UNIT I. Introduction
Introduction to nanoscale science and technology, why nanoscience and nanotechnology? Length energy and time scales, nanostructure types and properties, electronic and optical properties of materials, top down approach to nanolithography. Spatial resolution of optical, deep ultraviolet, X-ray, electron beam and ion beam lithography.

UNIT II. Quantum Mechanics-I
Band gap engineering, Quantum confinement of electrons in semiconductor Nano structures, one dimensional confinement (Quantum wires), two dimensional confinement (Quantum wells),

UNIT III. Quantum Mechanics-II
Three dimensional confinement (Quantum dots) and Bottom up approach, Single electron transistors, coulomb blockade effects in ultra small metallic tunnel junctions.

UNIT III. Molecular Techniques
Molecular Electronics, Chemical self-assembly, carbon fullerenes and nano tubes, Self assembled mono layers, Applications in biological and chemical detection.

UNIT IV. Surface analytical instrumentation techniques for nanotechnology Atomic scale characterization techniques, scanning probe microscopy, scanning tunneling microscopy and atomic force microscopy.

Books Recommended:

References:
2. Y. Imry “ Introduction to Mesoscopic Physics, Oxford University press 1997

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<tr>
<th>S. No.</th>
<th>3</th>
<th>ELECTIVE - III</th>
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<td>COURSE No.</td>
<td>CSE-804</td>
<td>Max. Marks: 100</td>
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<tr>
<td>BIOINFORMATICS</td>
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UNIT I
Introduction to Life Sciences: Levels of organization in nature: atom, molecule, organelle, cell, tissue, organ, organ system; Unicellular and multicellular organisms; Branches of Biology - Cell Biology - Cell as the structural and functional unit of life - Structural components of cell - Types of cells - Prokaryotic, Eukaryotic, Animal and Plant cell; Important Biomolecules- Nuclei acids, proteins, enzymes.
Central Dogma: DNA, RNA and Protein; Chromosome, Genome, Genes, Gene Loci, Gene Sequencing – Short gun and Contig approach; Restriction Enzyme, restriction sites, DNA copying/amplification, PCR and Electrophoresis.

UNIT II
Genomics & Proteomics: String view of DNA, Reading Frames (+1, +2, +3, -1, -2, -3), Open reading frame, codon, genetic code, transcription & translation- mRNA, sense and anti-sense strands, rRNA, tRNA, upstream and downstream, genomic DNA, complimentary DNA, introns and exons, alternative spicing, junk DNA, Sequence databases- GenBank, EMBL and DDBJ- concepts of similarity- homologous- orthologous and paralogous sequences, FASTA file format.

UNIT III

UNIT IV
Proteome and proteomics – proteins as workhorse molecules of life; protein separation using 2D gelelectrophoresis; Study on amino acids and four levels of protein structure – Protein databases – PDB, Uniprot

UNIT V

Books Recommended:

References:
Unit I:

Unit II:
Network Infrastructure for E-Commerce:

Unit III

Unit IV
Encryption: Encryption techniques, Symmetric Encryption: Keys and data encryption standard, Triple encryption, Secret key encryption; Asymmetric encryption: public and private pair key encryption, Digital Signatures, Virtual Private Network.

Unit V
Electronic Payments: Overview, The SET protocol, Payment Gateway, certificate, digital Tokens, Smart card, credit card, magnetic strip card, E-Checks, Credit/Debit card based EPS, online Banking.
EDI Application in business, E-Commerce Law, Forms of Agreement, Govt. policies and Agenda.

References:
2. Pete Lohsin , John Vacca “Electronic Commerce”, New Age International
3. Goel, Ritendra “E-commerce”, New Age International
5. Bajaj and Nag, “E-Commerce the cutting edge of Business”, TMH

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<tr>
<td>COURSE No. CSE-804</td>
<td>DATA MINING AND WAREHOUSING</td>
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<td>Max. Marks : 100</td>
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UNIT I
Data warehouse: Definitions, features, building blocks/ components, data marts, Meta data in data warehouse; planning a data warehouse, The project team, project management considerations, Business requirements; data design, the architectural plan, Data storage specifications, Information delivery strategy.

UNIT II
Architecture and Infrastructure: Concept of data warehouse architecture, operational infrastructure, physical infrastructure, hardware and operating systems, database software, tools. The role of metadata, metadata types, metadata requirements.

UNIT III
Principles of dimensional modeling: Dimensional modeling basics, Use of CASE tools, The STAR schema, The Snowflake Schema; Data Extraction, Data Transformation, Data Loading; Data Quality: Need, Data Quality Challenges, Data Quality Tools; Information access and delivery, Information delivery tools

UNIT IV
Online Analytical Processing (OLAP): Features, functions, OLAP models, Implementation considerations, OLAP platforms, OLAP tools and products; Introduction to Data Mining: definitions, Data mining techniques, applications. Physical Design in data warehouse: Steps, Physical Design considerations, Physical storage.

UNIT V
RAID technology, estimating storage sizes, Indexing the data warehouse: B-Tree Index, Bitmapped Index, Clustered Index; Performance Enhancement Techniques: Data Partitioning, Data Clustering, Parallel processing, data arrays. Data warehouse deployment

Books Recommended:
Paulraj Pooniah, “Data Warehousing Fundamentals, Wiley and Sons

References:
2. Sam Anahory, Dennis Murray,” Data Warehousing in the real world “, Pearson Education