School of Engineering & Technology

Course Structure and Syllabi

B. Tech. (Computer Science)

Academic Programmes

July, 2013
### Course Structure

#### Semester III

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Contact Hours</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS3001</td>
<td>Discrete Mathematical Structure</td>
<td>3-1-0</td>
<td>4</td>
</tr>
<tr>
<td>CS3002</td>
<td>Data structures &amp; Algorithms</td>
<td>3-1-0</td>
<td>4</td>
</tr>
<tr>
<td>CS3003</td>
<td>Database Management System</td>
<td>4-0-0</td>
<td>4</td>
</tr>
<tr>
<td>CS3004</td>
<td>Software Engineering</td>
<td>3-0-0</td>
<td>3</td>
</tr>
<tr>
<td>CS3005</td>
<td>Digital Electronics</td>
<td>3-1-0</td>
<td>4</td>
</tr>
<tr>
<td>CS3007</td>
<td>DBMS Lab</td>
<td>0-0-2</td>
<td>1</td>
</tr>
<tr>
<td>CS3008</td>
<td>Data structure &amp; Algorithm Lab</td>
<td>0-0-2</td>
<td>1</td>
</tr>
<tr>
<td>CS3009</td>
<td>Digital Electronics Lab</td>
<td>0-0-2</td>
<td>1</td>
</tr>
<tr>
<td>G3002</td>
<td>Programming with C++ and Java</td>
<td>3-0-0</td>
<td>3</td>
</tr>
<tr>
<td>G3003</td>
<td>Computer Lab-III</td>
<td>0-0-2</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>19-3-8</td>
<td>26</td>
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</table>

#### Semester IV

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Subject</th>
<th>Contact Hours</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CS4001</td>
<td>Statistics &amp; probability Theory</td>
<td>3-1-0</td>
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<tr>
<td>CS4002</td>
<td>Computer Architecture</td>
<td>3-1-0</td>
<td>4</td>
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<tr>
<td>CS4003</td>
<td>Operating System</td>
<td>3-0-0</td>
<td>3</td>
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<tr>
<td>CS4004</td>
<td>Engineering Economics</td>
<td>3-0-0</td>
<td>3</td>
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<tr>
<td>CS4005</td>
<td>Computer Graphics</td>
<td>3-0-0</td>
<td>3</td>
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<tr>
<td>CS4007</td>
<td>Unix Lab</td>
<td>0-0-2</td>
<td>1</td>
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<tr>
<td>CS4008</td>
<td>Operating System Lab</td>
<td>0-0-2</td>
<td>1</td>
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<tr>
<td>CS4009</td>
<td>Computer Graphics Lab</td>
<td>0-0-2</td>
<td>1</td>
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<tr>
<td>G4002</td>
<td>Web Designing Techniques</td>
<td>3-0-0</td>
<td>3</td>
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<tr>
<td>G4003</td>
<td>Computer Lab-IV</td>
<td>0-0-2</td>
<td>1</td>
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<tr>
<td>TOTAL</td>
<td></td>
<td>18-2-8</td>
<td>24</td>
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</table>
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering

Course Structure

**Semester V**

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Contact Hours</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CS5001</td>
<td>Introduction to Data Communication</td>
<td>L-T-P</td>
<td>3-1-0</td>
</tr>
<tr>
<td>CS5002</td>
<td>Design Analysis &amp; Algorithms</td>
<td>L-T-P</td>
<td>3-1-0</td>
</tr>
<tr>
<td>CS5003</td>
<td>Java Programming Language</td>
<td>L-T-P</td>
<td>4-0-0</td>
</tr>
<tr>
<td>CS5004</td>
<td>Theory of Computation</td>
<td>L-T-P</td>
<td>3-1-0</td>
</tr>
<tr>
<td>CS5005</td>
<td>Organizational Behavior &amp; Management Practices</td>
<td>L-T-P</td>
<td>3-0-0</td>
</tr>
<tr>
<td>CS5006</td>
<td>Soft Skills –Vocabulary &amp; Usage</td>
<td>L-T-P</td>
<td>2-1-0</td>
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<tr>
<td>CS5007</td>
<td>DAA Lab</td>
<td>L-T-P</td>
<td>0-0-2</td>
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<tr>
<td>CS5008</td>
<td>JAVA Lab</td>
<td>L-T-P</td>
<td>0-0-2</td>
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<tr>
<td>CS5009</td>
<td>Network Lab – II</td>
<td>L-T-P</td>
<td>0-0-2</td>
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<tr>
<td>CS5010</td>
<td>Web Development Lab</td>
<td>L-T-P</td>
<td>0-0-2</td>
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<td></td>
<td><strong>TOTAL</strong></td>
<td>L-T-P</td>
<td>18-4-8</td>
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**Semester VI**

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
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<tbody>
<tr>
<td>CS6001</td>
<td>Compiler Construction</td>
<td>L-T-P</td>
<td>3-1-0</td>
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<tr>
<td>CS6002</td>
<td>Artificial Intelligence</td>
<td>L-T-P</td>
<td>3-0-0</td>
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<tr>
<td>CS6003</td>
<td>Computer Networks</td>
<td>L-T-P</td>
<td>3-1-0</td>
</tr>
<tr>
<td>CS6004</td>
<td>Microcontroller &amp; Microprocessor</td>
<td>L-T-P</td>
<td>4-0-0</td>
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<tr>
<td>CS6005</td>
<td>Software Project Management</td>
<td>L-T-P</td>
<td>3-0-0</td>
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<td>CS6006</td>
<td>Technical Writings</td>
<td>L-T-P</td>
<td>3-1-0</td>
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<td>CS6007</td>
<td>Aptitude/Reasoning</td>
<td>L-T-P</td>
<td>3-0-0</td>
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<tr>
<td>CS6008</td>
<td>Network Programming Lab</td>
<td>L-T-P</td>
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<td>CS6009</td>
<td>Microcontroller &amp; Microprocessor Lab</td>
<td>L-T-P</td>
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<tr>
<td>CS6010</td>
<td>Compiler Designing Lab</td>
<td>L-T-P</td>
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<td><strong>TOTAL</strong></td>
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Faculty of Engineering & Technology

*B.Tech. in Computer Science & Engineering*

**Course Structure**

**Semester VII**

<table>
<thead>
<tr>
<th>Code</th>
<th>Subject</th>
<th>Contact Hours</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CS7001</td>
<td>Information System Security</td>
<td>4-0-0</td>
<td>4</td>
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<tr>
<td>CS7002</td>
<td>Real Time System</td>
<td>4-0-0</td>
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<tr>
<td>CS7003</td>
<td>Data Mining &amp; Warehousing</td>
<td>4-0-0</td>
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<tr>
<td>CS7101 - CS7104</td>
<td>Elective-I</td>
<td>3-0-0</td>
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</tr>
<tr>
<td>CS7105 - CS7108</td>
<td>Elective – II</td>
<td>3-0-0</td>
<td>3</td>
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<tr>
<td>CS7109</td>
<td>Practical Training Seminar</td>
<td>0-0-2</td>
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</tr>
<tr>
<td>CS7004</td>
<td>Data Mining &amp; Warehousing Lab</td>
<td>0-0-2</td>
<td>1</td>
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<tr>
<td>CS7005</td>
<td>Minor Project</td>
<td>0-0-4</td>
<td>2</td>
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<tr>
<td>CS7006</td>
<td>Seminar</td>
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<td>2</td>
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<tr>
<td>CS7007</td>
<td>Training Seminar</td>
<td>0-0-0</td>
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<td><strong>TOTAL</strong></td>
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**Semester VIII**

<table>
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<tr>
<th>Code</th>
<th>Subject</th>
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<tr>
<td>CS8001</td>
<td>Major Project</td>
<td>0-0-0</td>
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<td><strong>TOTAL</strong></td>
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**Proposed ELECTIVE Theory Subjects:**

<table>
<thead>
<tr>
<th>Code</th>
<th>Elective I</th>
<th>Code</th>
<th>Elective II</th>
<th>Code</th>
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</thead>
<tbody>
<tr>
<td>CS7101</td>
<td>Parallel Computing</td>
<td>CS7105</td>
<td>Mobile Computing</td>
<td>CS7107</td>
</tr>
<tr>
<td>CS7102</td>
<td>Simulation &amp; Modeling</td>
<td>CS7106</td>
<td>Multimedia Technology</td>
<td>CS7108</td>
</tr>
<tr>
<td>CS7103</td>
<td>Bio-informatics</td>
<td>CS7107</td>
<td>Natural Language Processing</td>
<td>CS7109</td>
</tr>
<tr>
<td>CS7104</td>
<td>Human Computer Interaction</td>
<td>CS7108</td>
<td>Neural Networks</td>
<td>16</td>
</tr>
</tbody>
</table>
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B.Tech. in Computer Science & Engineering Semester III

Contact Hours (L-T-P) : 3-1-0

CS3001- Discrete Mathematics: Course Outlines

Sets: Definition and types, Set operations, Partition of set, Cardinality (Inclusion- Exclusion & Addition Principles), Recursive definition of set. Functions: Concept, Some Special Functions (Polynomial, Exponential & Logarithmic, Absolute Value, Floor & Ceiling, Mod & Div Functions), Properties of Functions, Cardinality of Infinite Set, Countable & Uncountable Sets,

Graph Theory: Graphs – Directed, Undirected, Simple,. Adjacency & Incidence, Degree of Vertex, Subgraph, Complete graph, Cycle & Wheel Graph, Bipartite & Complete Bipartite Graph, Weighed Graph, Union of Simple Graphs. Complete Graphs. Isomorphic Graphs, Path, Cycles & Circuits.

Euclidean & Hamiltonian Graphs.

Planar Graph: Kuratowski’s Two Graphs, Euler’s Formula, Kuratowski’s Theorem. Trees: Spanning trees- Kruskal’s Algo, Finding Spanning Tree using Depth First Search, Breadth First Search, Complexity of Graph, Minimal Spanning Tree.

Semigroups, Groups and Coding: Binary Operations, Semigroups, Products and Quotients of Semigroups, Groups, Product and Quotients of Groups, Coding of Binary Information and Error Correction, Decoding and Error Correction.

Language of Logic: Proposition, Compound Proposition, Conjunction, Disjunction, Implication, Converse, Inverse & Contrapositive, Biconditional Statements, Tautology, Contradiction & Contingency, Logical Equivalences, Quantifiers, Arguments.


Suggested Books

Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester III

Contact Hours (L-T-P) : 3-1-0

CS3002- Data Structures and Algorithms - Course Outlines

Introduction: Data structure, abstract data types.

Linear Data Structures: Arrays, linked lists, stacks, queues, postfix, infix, prefix expressions and their conversion, evaluation of postfix expression, recursion, Tower of Hanoi problem, hashing and symbol tables, Huffman algorithm.

Non-Linear Data Structures: Trees and their traversals, binary trees, binary search trees, heaps, AVL trees, graph and their traversal.

Sorting and Searching: Sorting - insertion, selection, bubble, quick, heap, merge, shell, counting, bucket and radix sort, searching – sequential and binary.

Analysis of Algorithms: Time and space complexity of algorithms, Big oh, Theta and Omega notations, performance analysis, best, worst, average case analysis of simple algorithms, performance measurement.

Suggested Books:

1. DSA by Herbert Schildt, Tata McGraw Hills, 3rd Edition
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester III

Contact Hours (L-T-P): 4-0-0

CS3003-Database Management Systems: Course Outlines

Overview of DBMS: File system versus DBMS, advantages of DBMS, database users, data abstraction, data independence, and database system structure. **Data Models:** Relational model, hierarchical model and network model.

**Entity Relationship Model** - overview of data design, entities, attributes and entity sets, relationship and relationship sets, features of the ER model – key constraints, participation constraints, weak entities, class hierarchies, aggregation, conceptual data base design with ER model – entity versus attribute, entity versus relationship, binary versus ternary relationship and aggregation versus ternary relationship.

**Relational Algebra and Calculus:** Relational algebra – selection, projection, set operations, renaming, joins, division, relational calculus, expressive power of algebra and calculus. **SQL Queries, Programming and Triggers:** The forms of a basic SQL query, union, intersect and except, nested queries, correlated nested queries, set comparison operations, aggregate operators, null values and embedded SQL.

**Schema Refinement and Normal Forms:** Introduction to schema refinement, functional dependencies, normalization-decomposition, 1NF, 2NF, 3NF, BCNF, multi valued functional dependencies, 4NF.

**File Organization:** Secondary storage devices, RAID, buffer management, heap files, sorted files, hashing – static and dynamic, indexing – single level, multi level, static and dynamic, B-tree, B+tree, ISAM.

**Transaction Management:** Transaction-concepts, states, ACID property, schedule, serializability of schedules, concurrency control techniques - locking, timestamp, deadlock handling, recovery-log based recovery, shadow paging.

**Concurrency Control:** Implementation of Concurrency: Lock-based protocols, Timestamp-based protocols, Validation-based protocols, Deadlock handling,

**Database Failure and Recovery:** Database Failures, Recovery Schemes: Shadow Paging and Log-based Recovery, Recovery with Concurrent transactions.

**Suggested Books:**
4. C.J. Date: Data Base Design, Addison Wesley
5. Hansen and Hansen : DBM and Design, PHI
**CS3004 - Software Engineering - Course Outlines**

**System Analysis:** Characteristics, Problems in system Development, System Level project Planning, System Development Life cycle (SDLC), computer system engineering system analysis, modeling the architecture, system specification.

**Software Project Management:** Objectives, Resources and their estimation, LOC and FP estimation, effort estimation, COCOMO estimation model, risk analysis, software project scheduling. Software Development : Life Cycle (SWDLC), SWDLC models software engineering approaches.

**Requirement Analysis:** Requirement analysis tasks, Analysis principles. Software prototyping and specification data dictionary finite state machine (FSM) models. Structured Analysis: Data and control flow diagrams, control and process specification behavioral modeling, extension for data intensive applications.

**Software Design:** Design fundamentals, Effective modular design: Data architectural and procedural design, design documentation.

**Object Oriented Analysis:** Object oriented Analysis Modeling, Data modeling. Object Oriented Design: OOD concepts and methods class and object definitions, refining operations. Class and object relationships, object modularization. Introduction to Unified Modeling Language.

**Suggested Books:**

1. *Software Engineering* by Pankaj Jalote by New Age International Publishers
2. *Software Engineering* by Pressman


Counters and shift registers: Ripple, decade, up-down counters, Mod-n counters and series, parallel registers. General characteristic of sequential circuits, clock, pulse and level mode sequential circuits. Analysis and design of sequential circuit. Synthesis of state diagrams, finite memory circuits, equivalence relations, equivalent states and circuits, determination of classes of in distinguishable states and simplification by implicant tables. Mealy and Moore machines, state assignment and memory element input equation, Partitioning and state assignment. General pulse-mode circuits, clock input counters, extended state tables.

Asynchronous Mode Circuits: Analysis of a fundamental mode circuits, Synthesis of flow tables, minimization, transition tables, excitation maps and output maps, Cycles and Races, Race free assignments, Hazards in sequential circuits. Introduction to A/D and D/A converters.

Suggested Books:

1. Digital Systems and Hardware and Firmware Algorithms: M.Ercegovac and T. Lang, Pearson.
5. Malvino leech: Digital Electronics
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester III

Contact Hours (L-T-P) : 3-0-0

G3002- Programming with C++ and JAVA Course Outlines

C++ Overview, C++ Characteristics, Object-Oriented Terminology, Polymorphism, Object-Oriented Paradigm, Abstract Data Types, I/O Services, Standard Template Library, Standards Compliance, Functions and Variables, Functions: Declaration and Definition, Variables: Definition, Declaration, and Scope, Variables: Dynamic Creation and Derived Data, Arrays and Strings in C++, Qualifiers, Classes in C++, Defining Classes in C++, Classes and Encapsulation, Member Functions, Instantiating and Using Classes, Using Constructors, Multiple Constructors and Initialization Lists, Using Destructors to Destroy Instances, Using Destructors to Destroy Instances, Operator Overloading, Operator Overloading, Working with Overloaded Operator Methods, Initialization and Assignment, Initialization vs. Assignment, The Copy Constructor, Assigning Values, Specialized Constructors and Methods, Constant and Static Class Members, Inheritance, Overview of Inheritance, Defining Base and Derived Classes, Constructor and Destructor Calls, Input and Output in C++ Programs, Input and Output in C++ Programs, Standard Streams, Manipulators, Unformatted Input and Output.

Introduction to JAVA Tools

Introduction to Object Orientated Programming, Abstraction, Object Oriented Programming Principles, Features of JAVA, Introduction to Java byte code, Java Virtual machine. Differences between C++ and JAVA

Suggested Books

1. Let Us C: Bala Guruswami, TATA McGraw Hill.
2. Programming with C, C++: Yashwant Kanitkar
CS3007 - Database Management Systems Lab

List of Experiments

1. Stating a database design & application problem.
2. Preparing ER diagram
3. Finding the data fields to be used in the database.
4. Selecting fields for keys.
5. Normalizing the database including analysis of functional dependencies.
6. Installing and configuring the database server and the front end tools.
7. Designing database and writing applications for manipulation of data for a standalone and shared database including concepts like concurrency control, transaction roll back, logging, report generation etc.
8. Get acquainted with SQL.
<table>
<thead>
<tr>
<th>S. No.</th>
<th>Experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Write a simple C program on a 32 bit compiler to understand the concept of array storage, size of a word. The program shall be written illustrating the concept of row major and column major storage. Find the address of element and verify it with the theoretical value. Program may be written for arrays upto 4-dimensions.</td>
</tr>
<tr>
<td>2.</td>
<td>Simulate a stack, queue, circular queue and dequeue using a one dimensional array as storage element. The program should implement the basic addition, deletion and traversal operations.</td>
</tr>
<tr>
<td>3.</td>
<td>Represent a 2-variable polynomial using array. Use this representation to implement addition of polynomials.</td>
</tr>
<tr>
<td>4.</td>
<td>Represent a sparse matrix using array. Implement addition and transposition operations using the representation.</td>
</tr>
<tr>
<td>5.</td>
<td>Implement singly, doubly and circularly connected linked lists illustrating operations like addition at different locations, deletion from specified locations and traversal.</td>
</tr>
<tr>
<td>6.</td>
<td>Repeat exercises 2, 3 &amp; 4 with linked structures.</td>
</tr>
<tr>
<td>7.</td>
<td>Implementation of binary tree with operations like addition, deletion, traversal.</td>
</tr>
<tr>
<td>8.</td>
<td>Depth first and breadth first traversal of graphs represented using adjacency matrix and list.</td>
</tr>
<tr>
<td>9.</td>
<td>Implementation of binary search in arrays and on linked Binary Search Tree.</td>
</tr>
<tr>
<td>10.</td>
<td>Implementation of insertion, quick, heap, topological and bubble sorting algorithms.</td>
</tr>
</tbody>
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Faculty of Engineering & Technology
B.Tech. Computer Science & Engineering  Semester III
Contact Hours per week: 2 hrs
(Associated Theory Course 3 L- 1T)

CS3009- Digital Electronics Lab

List of Experiments

1. Truth table verification – NAND gate, NOR gate, OR gate, AND gate, NOT gate
2. Verifying if NAND gate is a universal gate.
3. Constructing XOR gate using NOR gate only.
4. Realizing given truth table using SOP form.
5. Realizing given truth table using POS form.
7. Design of binary-gray encoder.
8. Design of parity generator and detector.
G3003- Computer Lab-III (Object Oriented Programming) Course Outlines

List of Experiments

1. To write a simple program for understanding of C++ program structure without any CLASS declaration. Program may be based on simple input output, understanding of keyword using.

2. Write a C++ program to demonstrate concept of declaration of class with public & private member, constructors, object creation using constructors, access restrictions, defining member functions within and outside a class. Scope resolution operators, accessing an object’s data members and functions through different type of object handle name of object, reference to object, pointer to object, assigning class objects to each other.

3. Program involving multiple classes (without inheritance) to accomplish a task. Demonstrate composition of class.

4. Demonstration Friend function friend classes and this pointer.

5. Demonstration dynamic memory management using new & delete & static class members.

6. Demonstration of restrictions an operator overloading, operator functions as member function and/ or friend function, overloading stream insertion and stream extraction, operators, overloading operators etc.

7. Demonstrator use of protected members, public & private protected classes, multilevel inheritance etc.

8. Demonstrating multiple inheritance, virtual functions, virtual base classes, abstract classes
Introduction: Discrete random variables Sample space, events, algebra of events, Bernoulli’s trials, Probability & Baye’s theorem. Random variable & their event space, probability generating function, expectations, moments, computations of mean time to failure, Bernoulli & Poisson processes.

Discrete & continuous distributions Probability distribution & probability densities: Binomial, Poisson, normal rectangular and exponential distribution & their PDF’s, moments and MGF’s for above distributions.

Correlation & Regression Correlation & regression: Linear regression, Rank correlation, Method of least squares Fitting of straight lines & second degree parabola. Normal regression and correlation analysis.

Queuing Theory Pure birth, pure death and birth-death processes. Mathematical models for M/M/1, M/M/N, M/M/S and M/M/S/N queues. Discrete Parameter mark on chains: M/G/1 Queuing model, discrete parameter birth-death process.


Suggested Books:

1. Eddington, Sir A.S. "The Philosophy of Physical Science" (1939)
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester IV

Contact Hours (L-T-P) : 3-1-0

CS4002-Computer Architecture: Course Outlines


Computer Organization and Design: Instruction cycle, computer registers, common bus system, computer instructions, addressing modes, design of a basic computer.

Central Processing Unit: General register organization, stack organization, Instruction formats, Data transfer and manipulation, program control. RISC, CISC characteristics. Pipeline and Vector processing: Pipeline structure, speedup, efficiency, throughput and bottlenecks. Arithmetic pipeline and Instruction pipeline.


Memory Organization: RAM, ROM, Memory Hierarchy, Organization, Associative memory, Cache memory, and Virtual memory: Paging and Segmentation.

Input-Output Organization: Input-Output Interface, Modes of Transfer, Priority Interrupt, DMA, IOP processor.

Suggested Books-

Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester IV

Contact Hours (L-T-P) : 3-0-0

CS4003-Operating Systems: Course Outlines

Overview: Definition, types of operating systems- mainframe, server, multiprocessor, personal computer, real-time, embedded and smart card, system calls and utilities. File Systems: File concept, user and system programmer view of file systems, different modules of a file system, disk organization, tape organization, disk-space allocation methods- contiguous, linked, indexed, directory structures, file protection, disk scheduling algorithms.

Process Management: Process concepts, threads, scheduling concepts, types of schedulers, scheduling algorithms, process state diagram, comparison of various algorithms.

Memory Management: Memory management techniques – partitioning, swapping, segmentation, paging, paged segmentation, comparison of techniques, techniques for supporting the execution of large programs - overlays, dynamic linking and loading, virtual memory- concepts, implementation by demand paging.

Process Synchronization: Real and virtual concurrency, mutual exclusion, synchronization, inter process communication, critical section problem and its solution to semaphores – binary and counting semaphores, wait / signal operations and their implementation.


Suggested Books-

1. A. Silberschatz and Peter B Galvin: Operating System Principals, Wiley India Pvt. Ltd.
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester IV
Contact Hours(L-T-P) : 3-0-0

CS4004- Engineering Economics - Course Outlines

UNIT-1

Introduction to Engineering Economics: Origin, principles, engineering economics and the design process, engineering for economic competitiveness, engineering economy and the engineer.

UNIT-2

Elements of Economics: Definition, demand and supply, income, equilibrium, utility.

UNIT-3

Economics Applied to Industries: Market demand analysis, production analysis for decision making, cost analysis, pricing techniques in regards of goods and services, break-even analysis, interest, annuities and profits.

UNIT-4

Replacement Analysis: Capital recovery, depreciation methods for replacement studies.

UNIT-5


Suggested Books:

2. Schaum’s Outline for Engineering Economics by Jose A Sepulveda
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester IV

Contact Hours (L-T-P): 3-0-0

CS4005- Computer Graphics: Course Outlines


2D & 3D Co-ordinate system: Homogeneous Co-ordinates, Translation, Rotation, Scaling, Reflection, Inverse transformation, Composite transformation. Polygon Representation, Flood Filling, Boundary filling, Point Clipping, Cohen-Sutherland Line Clipping Algorithm, Polygon Clipping algorithms.

Hidden Lines & Surfaces: Image and Object space, Depth Buffer Methods, Hidden Facets removal, Scan line algorithm, Area based algorithms. Curves and Splines: Parametric and Non parametric Representations, Bezier curve, BSpline Curves.

Rendering: Basic illumination model, diffuse reflection, specular reflection, phong shading, Gourand shading, ray tracing, color models like RGB, YIQ, CMY, HSV


Suggested Books –

4. Multimedia Information Networking, N.K.Sharda, PHI.
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester IV

Contact Hours (L-T-P) : 3-1-0

G4002- Web Designing Techniques: Course Outlines


The World Wide Web (WWW)


List: Numbered list, Non-Numbered lists, Definition lists

Formatting HTML Documents: Logical styles (source code, text enhancements, variables), Physical Styles (Bold, Italic, underlined, crossed),

Managing images in html: Image format (quality, size, type), Importing images (scanners), Tags used to insert images.

Frames

Tables in HTML documents: Tags used in table definition, Tags used for border thickness, Tags used for cell spacing, Tags used for table size, Dividing table with lines, Dividing lines with cells, Cell types: Titles cells, Data cells

Hypertext and Link in HTML Documents

URL/FTP/HTTP

Types of links: Internal Links, External Link, Link Tags, Links with images and buttons, Links that send email messages Special effects in HTML documents.

Web Designing with PHP (Introduction)

List of Experiments

1. Use of Basic Unix Shell Commands: ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.
2. Commands related to inode, I/O redirection and piping, process control commands, mails.
3. Shell Programming: Shell script exercises based on following
   (i) Interactive shell scripts
   (ii) Positional parameters
   (iii) Arithmetic
   (iv) If then- fi, if-then-else-fi, nested if-else
   (v) Logical operators
   (vi) else + if equals elif, case structure
   (vii) while, until, for loops, use of break
   (viii) Metacharacters
   (ix) System administration: disk management and daily administration
4. Write a shell script to create a file in $USER /class/batch directory. Follow the instructions
   (i) Input a page profile to yourself, copy it into other existing file;
   (ii) Start printing file at certain line
   (iii) Print all the difference between two file, copy the two files at $USER/CSC/2007 directory.
   (iv) Print lines matching certain word pattern.
5. Write shell script for-
   (i) Showing the count of users logged in,
   (ii) Printing Column list of files in your home directory
   (iii) Listing your job with below normal priority
   (iv) Continue running your job after logging out.
6. Write a shell script to change data format. Show the time taken in execution of this script
7. Write a shell script to print files names in a directory showing date of creation and serial number of the file.
8. Write a shell script to count lines, words and characters in its input(do not use wc).
9. Write a shell script to print end of a Glossary file in reverse order using Array. (Use awk tail)
10. Write a shell script to check whether Ram logged in, Continue checking further after every 30 seconds till success.
11. Write a shell script to compute gcd lcm and of two numbers. Use the basic function to find gcd and lcm of N numbers.
12. Write a shell script to find whether a given number is prime. Take a large
number such as 15 digits or higher and use a proper algorithm.

Faculty of Engineering & Technology
B.Tech. Computer Science & Engineering  Semester IV
Contact Hours per week: 2 hrs
(Associated Theory Course 3 L- 0T)

CS4008-Operating Systems Lab

List of Experiments

1. Exercises shall be given on simulation of algorithms used for the tasks performed by the operating systems. Following modules of the simulator may be used:
   - Scheduling
   - Deadlock
   - Memory Management Systems
   - File system simulator

   Algorithms described in the text may be assigned. The simulation results such as average latency, hit & Miss Ratios or other performance parameters may be computed.

2. One exercise shall be on simulation of algorithms reported in the recent conferences/ journals and reproducing the results reported therein.
List of Experiments

1. To produce a single pixel and pre specified pattern on screen
2. To implement features like changing background color, foreground color, resizing of window, repositioning of window:
3. To implement mid point algorithm to draw circle and ellipse:
4. Use the line drawing & circle drawing programs to draw composite objects containing only circle & lines. You can take shapes like a cart, car etc.
5. To Implement Clipping (various algorithms).
6. Simple fonts, graphical fonts, scalable fonts.
7. Input a polygon by drawing lines,
Develop a static html page using style sheet to show your own profile.
• Add a page to show 5 photos and
• Add a page to show your academics in a table
• Add a page containing 5 links to your favorite website
• Add navigational links to all above pages (add menu).
2. Update your homepage, by creating few html file.
3. Use Cascading Style Sheets to format your all pages in a common format.
4. Basic programs:
• Write a simple "hello word" program.
• Write a program to accept two strings (name and age) from user. Print welcome statement.
• Write a program to create a calculator, which can support add, subtraction and multiply and division operation.
• Write a program to take input parameters for a table (no. of rows and no. of columns), and create the desired table.
• Create a "Contact Me" page -
• Ask user to enter his name, email ID,
• Use Java-Script to verify entered email address.
• Store submitted value in a MySql database.
• Display latest 5 submitted records in contact me page.
• Display above record with navigation support. (e.g. next, prev
CS5001-Introduction to Data Communications

Introduction and Basic Concepts: Data communication, Networks, Network Topologies., Network categories, The internet

The OSI Model & TCP/IP Protocol: The layers and their functions

Signals: Digital: Signals, Analog signals, Composite signals

Transmission media: Twisted Pair, Coaxial Cable, Fiber-Optic Cable, Radio Waves, and Microwaves. Infrared.


Error Detection and Correction: Types of errors, Redundancy, Detection Versus Correction Error Detection, Error Correction, Hamming Code, Cyclic Redundancy Check, Checksum and Its idea.

Multiple Access: Random access, Controlled access, Channelization

Local Area Networks (LANs): LAN protocol architecture, Bridge, Layer 2 & layer 3 switches

High-speed LANs: Ethernet, Fiber channel

Wireless LANs: Main concepts, Bluetooth

Reference Books:
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester V

Contact Hours (L-T-P): 3-1-0

CS5002- Design & Analysis of Algorithms: Course Outlines

**Background:** Introduction, algorithms specification, time and space complexity, performance analysis, recurrence relations. **Basic Traversal and Search Techniques:** Breadth first traversal, depth first traversal, breadth first search and depth first search.

**Divide and Conquer:** Binary search, merge sort, bubble sort, quick sort, Strassen matrix multiplication. **Greedy Methods:** General method, optimal merges patterns, minimum cost spanning trees, Knapsack problem.

**Dynamic Programming:** General method, 0/1 Knapsack problem, least common subsequence, matrix chain multiplication. **Back Tracking:** General method, 4-queen problem, sum of subset problem.

**Branch and Bound:** General method, assignment problem, traveling salesman problem. **String Matching Algorithms:** Naive algorithm, automata and KMP matcher algorithms, Boyer-Moore algorithm.


**Suggested Books**

4. Brassard : Fundamental of Algorithmics, PHI.
The Genesis of Java: The importance of Java to Internet, Java’s magic-the bytecode, the Java buzzwords, the continuing revolution, Java and HTML, using blocks of code, lexical issues, the Java class libraries.

Data Types, Variables and Arrays: strongly typed language, the simple types, integers, floating-point types, characters, literals, variables, type conversion and casting, automatic type promotion in expressions, arrays, string, pointers, operators-arithmetic operators, the bitwise operators, relational operators, Boolean logical operators, the assignment operator, the ? operator, operator precedence, using parentheses, control statements-Java selection statements, iteration statements, jump statements.

Classes: Class fundamentals, declaring objects, assigning object reference variables, introducing methods, constructors, the this keyword, garbage collection, the finalize () method, a stack class, overloading methods, using objects as parameters, a closer look at argument passing, returning objects, recursion, introducing access control, understanding static, introducing final, arrays revisited, introducing nested and inner classes, exploring the string class, using command-line arguments.

Inheritance: Inheritance basics, using super, creating a multilevel hierarchy, when constructors are called, method overriding, dynamic method dispatch, using abstract classes, using final with inheritance, the object class.

Package, Interfaces and Exception Handling: Packages, access protection, importing packages, interfaces, exception-handling fundamentals, exception types, uncaught exceptions, using try and catch, multiple catch clauses, nested try statements, throw, throws, finally, Java’s built-in exceptions, creating your own exception subclasses, using exceptions.

Multithreaded Programming: The Java thread model, the main thread, creating a thread, creating multiple threads, using isAlive () and join (), thread priorities, synchronization, interthread communication, suspending, resuming, and stopping threads, using multithreading.

I/O, Applets, and String Handling: I/O basics, reading console input, writing console output, the Print Writer class, reading and writing files, applet fundamentals, the transient and volatile modifiers, using instance of strictfp, native methods, problems with native methods, string constructors, string length, special string operations, character extraction, string comparison, searching strings, modifying a string, data conversion using value Of (), changing the case of characters within a string, String Buffer.

Suggested Books –
1. Herbert Schildt: JAVA 2 - The Complete Reference, TMH, Delhi
2. Deitel: How to Program JAVA, PHI

Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester V

Contact Hours (L-T-P) : 3-1-0

CS5004- Theory of Computation: Course Outlines

Finite Automata and Regular Expression: Finite state systems, basic definitions, regular languages and regular expression, finite automata, Kleen theorem, pumping lemma for regular sets, decision algorithms, Myhill-Nerode theorem and minimization of finite automata.

Context-Free Grammars: Context-free grammars, union, concatenation of CFG, derivation trees, simplification of context-free grammars, Chomsky normal form, Greibach normal form, the existence of inherently ambiguous context-free languages.

Context-Free Languages and Pushdown Automata: Pushdown automata and context-free languages, pumping lemma for CFL, closure properties of CFL, decision algorithms for CFL.

Turing Machine: Turing machine model, techniques for turing machine construction, turing machines as language acceptor, combining turing machines, properties of recursive and recursively enumerable languages, universal turing machine.

Chomsky Hierarchy of Languages: Regular grammars, unrestricted grammars and turing machines, context-sensitive grammars and linear bounded automata.

Suggested Books:

1. Aho, Hopcroft and Ullman, Introduction to Automata Theory, Formal Languages and Computation, Narosa
CS5005- Organizational Behavior and Management Practices: Course Outlines

Introduction: Definition of management, importance of management, management functions or the process of management, roles of a manager, levels of management.

Development of Management Thought: Classical, neo-classical, behavioral and modern schools of management.

Individual and Group Behavior: Introduction to organizations and individuals, components of organization, individual and group behavior, group development stages, formal and informal groups.

Motivation and Leadership: Theory X and Y, maturity-immaturity theory, motivation theories with special emphasis on Maslow’s need hierarchy and its implication, functions of a leader, various approaches to leadership.

Organizational Change and Conflict: Process of change, managing resistance to change, types of conflicts- intra personal, interpersonal and organizational, managing conflicts. Types of Modern Organizations and Their Practices: Learning organization, virtual organizations and recent management practices.

Suggested Books

1. Organizational behavior- Understanding and Managing Life at work ,Gary Johns , Alan Saks, Pearson

2. Management & Organizational Behaviour,Laurie J Mullins
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester V

Contact Hours (L-T-P) : 2-2-0

CS5006- Soft Skills – Vocabulary & Usage: Course Outlines

Vocabulary and Usage: Word Formations (by adding suffixes and prefixes); Technical Word Formation; Synonyms, Antonyms, Homophones, and Homonyms; One Word Substitution; Misappropriations; Indianisms; Redundant Words; Phrasal Verb Idioms

Suggested Books-

1. Maison, Margaret M. Examine Your English, Hyderabad: Orient Longman, 1980
Faculty of Engineering & Technology
B.Tech. Computer Science & Engineering  Semester V
Contact Hours per week: 2 hrs
(Associated Theory Course 3 L- 1T)

CS5007- Design & Analysis of Algorithms Lab

List of Experiments

1. Exploring a Binary Heap:
2. Merging two search trees:
3. Complete binary tree as an efficient data-structure:
4. Problems on Amortized Analysis
5. Computing a spanning tree having smallest value of largest edge
6. Shortest Path Problems:
7. A simple problem on sorted array
8. Finding the decimal dominant in linear time
Faculty of Engineering & Technology  
B.Tech. Computer Science & Engineering  Semester V  
Contact Hours per week: 2 hrs  
(Associated Theory Course 3 L- 0 T)  

CS5008- Java Lab  

List of Experiments  

1. Develop an in depth understanding of programming in Java  
2. Write Object Oriented programs  
3. Develop understanding to developing packages & Interfaces  
4. Develop understanding to developing Strings and exception handling  
5. Develop applications involving file handling: I/O streams, File I/O.  
6. Develop applications involving concurrency  
7. Develop applications involving multi threading
Faculty of Engineering & Technology  
B.Tech. Computer Science & Engineering  Semester V  
Contact Hours per week: 2 hrs  
(Associated Theory Course 3 L-0T)

CS5009- Network Lab

List of Experiments

1. IPC (Message queue)
2. NIC Installation & Configuration (Windows/Linux)

Familiarization with
   - Networking cables (CAT5, UTP)
   - Connectors (RJ45, T-connector)
   - Hubs, Switches
3. TCP/UDP Socket Programming
4. Multicast & Broadcast Sockets
5. Implementation of a Prototype Multithreaded Server
6. Implementation of
   - Data Link Layer Flow Control Mechanism (Stop & Wait, Sliding Window)
   - Data Link Layer Error Detection Mechanism (Cyclic Redundancy Check)
   - Data Link Layer Error Control Mechanism (Selective Repeat, Go Back N)
B.Tech. Computer Science & Engineering  Semester V
Contact Hours per week: 2 hrs

CS5010- Web Development Lab

List of Experiments

1. Develop a static html page using style sheet to show your own profile.
   - Add a page to show 5 photos and
   - Add a page to show your academics in a table
   - Add a page containing 5 links to your favorite website
   - Add navigational links to all above pages (add menu).
2. Update your homepage, by creating few html file.
3. Use Cascading Style Sheets to format your all pages in a common format.
4. Basic programs:
   - Write a simple "hello word" program.
   - Write a program to accept two strings (name and age) from user. Print welcome statement
   - Write a program to create a calculator, which can support add, subtraction and multiply and division operation.
   - Write a program to take input parameters for a table (no. of rows and no. of columns), and create the desired table.
   - Create a "Contact Me" page -
     - Ask user to enter his name, email ID,
     - Use Java-Script to verify entered email address.
     - Store submitted value in a MySql database.
     - Display latest 5 submitted records in contact me page.
     - Display above record with navigation support. e.g. (next, previous, first, last).
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester VI

Contact Hours (L-T-P): 3-0-0

CS6001- Compiler Construction: Course Outlines

Compiler, Translator, Interpreter definition, Phase of compiler introduction to one pass & Multipass compilers, Bootstrapping, Review of Finite automata lexical analyzer, Input, buffering, Recognition of tokens, Idea about LEX: A lexical analyzer generator, Error handling.

Review of CFG Ambiguity of grammars, Introduction to parsing, Bottom up parsing Top down parsing techniques, Shift reduce parsing, Operator precedence parsing, Recursive descent parsing predictive parsers. LL grammars & passers error handling of LL parser. LR parsers, Construction of SLR, Conical LR & LALR parsing tables, parsing with ambiguous grammar. Introduction of automatic parser generator: YACC error handling in LR parsers.

Syntax directed definitions; Construction of syntax trees, L-attributed definitions, Top down translation. Specification of a type checker, Intermediate code forms using postfix notation and three address code, Representing TAC using triples and quadruples, Translation of assignment statement. Boolean e xpression and control structures.

Storage organization, Storage allocation, Strategies, Activation records, Accessing local and non local names in a block structured language, Parameters passing, Symbol table organization, Data structures used in symbol tables.

Definition of basic block control flow graphs, DAG representation of basic block, Advantages of DAG, Sources of optimization, Loop optimization, Idea about global data flow analysis, Loop invariant computation, Peephole optimization, Issues in design of code generator, A simple code generator, Code generation from DAG.

Suggested Books –

1. Aho, Ullman and Sethi: Compilers, Addison Wesley.
2. Holub, Compiler Design in C, PHI.
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester VI

Contact Hours (L-T-P) : 3-0-0

CS6002- Artificial Intelligence: Course Outlines

Meaning and definition of artificial intelligence, Various types of production systems, Characteristics of production systems, Study and comparison of breadth first search and depth first search. Techniques, other Search Techniques like hill Climbing, Best first Search. A* algorithm, AO* algorithms etc, and various types of control strategies.

Knowledge Representation, Problems in representing knowledge, knowledge representation using propositional and predicate logic, comparison of propositional and predicate logic, Resolution, refutation, deduction, theorem proving, inferencing, monotonic and nonmonotonic reasoning.

Probabilistic reasoning, Baye's theorem, semantic networks scripts schemas, frames, conceptual dependency and fuzzy logic, forward and backward reasoning.

Game playing techniques like minimax procedure, alpha-beta cut-offs etc, planning. Study of the block world problem in robotics, Introduction to understanding and natural languages processing.

Introduction to learning, Various techniques used in learning, introduction to neural networks, applications of neural networks, common sense, reasoning, some example of expert systems.

Suggested Books-

2. Introduction to AI & Expert System: Dan W. Patterson, PHI.
3. Artificial Intelligence by Luger (Pearson Education)
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester VI

Contact Hours (L-T-P): 3-1-0

CS6003- Computer Networks: Course Outlines


Network Layer: Virtual circuits, datagram, IPv4, IP address classes, subnetworking, supernetting, IP fragmentation, ARP, RARP, routing algorithms, RIP, OSPF, BGP, congestion control algorithms, leaky bucket, token bucket, ICMP, IPv6.

Transport Layer: Duties of the transport layer, Transport service primitives. TCP, TCP services, TCP header, UDP header. Elements of Transport protocols: addressing, connection Establishment, connection release, TCP connection establishment and release, transmission policy, timer management, Transactional TCP Flow control & Buffering, Multiplexing, Crash Recovery, UDP, RPC, RTP. Principles of Reliable Data Transfer: Reliable data transfer over a perfectly reliable channel, Channel with bit errors and Lossy Channel with bit errors.

Application Layer: Client/Server model, DNS, FTP, HTTP, SMTP, telnet. SONET/SDH: Synchronous transport signals, physical configuration, SONET layers, SONET frame, multiplexing STS frames and applications.

Suggested Books-

3. Peterson, Davie; Computer Networks, 4rd Ed., ELSEVIER
Introduction to Microprocessors, microcontroller; 8085 Microprocessor Architecture, pin description, Bus concept and organization; concept of multiplexing and demultiplexing of buses; concept of static and dynamic RAM, type of ROM, memory map.

Software architecture registers and signals, Classification of instruction, Instruction set, addressing modes, Assembly Language Programming and Debugging, Programming Technique, instruction Format and timing.

Advance Assembly Language Programming, Counter and time delay; types of Interrupt and their uses, RST instructions and their uses, 8259 programmable interrupt controller; Macros, subroutine; Stack - implementation and uses with examples; Memory interfacing.

8085 Microprocessor interfacing; 8255 Programmable Peripheral Interface, 8254 programmable interval timer, interfacing of Input/output device, 8279 Key board/Display interface.

Microprocessor Application: Interfacing scanned multiplexed display and liquid crystal display, Interfacing and Matrix Keyboard, MPU Design; USART 8251, RS232C and RS422A, Parallel interface- Centronics and IEEE 488.

Suggested Books -
3. Microprocessor architecture, programming, and applications with the 8085 By Ramesh S. Gaonkar
4. Introduction to Microprocessors By Aditya P. Mathur, TMH
5. Microprocessor & Interfacing By Douglas V. Hall, TMH
CS6005 - Project Management: Course Outlines

**Introduction:** Definition, Life Cycle, Operation, Budgeting, Hierarchy, Strategic Management, Project Origination, Project feasibility

**Project Planning:** Estimating Time & cost scheduling, Resource allocation, Risk Management

**Project Execution, Monitoring & Control:** Project Organization structure & culture, Project Staffing and HR related issues, Project Monitoring & Control, content Management & partner.

**Project closure:** Audit & closure, Public Project with reference to Indian context.

**Case Studies:** Current scenario cases to be considered.

**Suggested Books –**

1. Project Management by Khanna, New Age Publications
**Faculty of Engineering & Technology**

**B.Tech. in Computer Science & Engineering Semester VI**

**Contact Hours (L-T-P) : 3-1-0**

**CS6006- Technical Writings: Course Outlines**

**Technical Writing:**

(A) Scientific Attitude and Impersonal Style; Plain Statements, Definitions; Description and Explanations (of objects, instruments, Processes, Scientific Principles, etc.)

(B) Summarizing and abstracting; Expressing ideas within a restricted word limit; Paragraph Writing (Paragraph division, introduction and the conclusion, Variety in sentences and paragraphs)

(C) Interpretation and use of charts, graphs and tables in technical writing.

(D) Punctuation

(E) Reading at various speeds (slow, fast, very fast); reading different kinds of texts for different purpose (e.g. for relaxation, for information, for discussion at a later stage, etc.); reading between the lines.

(F) Comprehension of Unseen Passages

**Suggested Books:**

1. Maison, Margaret M. Examine Your English. Hyderabad: Orient Longman, 1980
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester VI

Contact Hours (L-T-P) : 3-0-0

CS6007- Aptitude /Reasoning: Course Outlines

Covering all topics for Aptitude and Reasoning.
CS6009- Microcontrollers & Microprocessors Lab

List of Experiments

1. Add the contents of memory locations XX00 & XX01 & place the result in memory location XX02.

2. Add the 16 bit numbers stored in memory location & store the result in another memory location.

3. Transfer a block of data from memory location XX00 to another memory location XX00 in forward & reverse order.

4. Write a program to Swap two blocks of data stored in memory.

5. Write a program to find the square of a number.

6. Write a main program & a conversion subroutine to convert Binary to its equivalent BCD.

7. Write a program to find largest & smallest number from a given array.

8. Write a program to Sort an array in ascending & descending order.

9. Write a program to multiply two 8 bit numbers whose result is 16 bit.

10. Write a program of division of two 8 bit numbers.

11. Generate square wave from SOD pin of 8085 & observe on CRO.

12. Write a program to perform traffic light control operation.
Faculty of Engineering & Technology  
B.Tech. Computer Science & Engineering  Semester VI  
Contact Hours per week: 2 hrs  
(Associated Theory Course 3 L- 0T)

CS6010 - Compiler Designing Lab

List of Experiments

Objectives: At the end of the semester, the students should have clearly understood and implemented the following:

1. Develop an in depth understanding of system programming concept. Lexical analysis, syntax analysis, semantics analysis, code optimization, code generation. Language specification and processing

2. Develop an Understanding of Scanning by using concept of Finite state automaton. Parse tree and syntax tree, Top down parsing (recursive decent parsing, LL (1) parser) Bottom up parsing (operator precedence parsing). Managing symbol table, opcode table, literal table, pool table

3. Develop an Understanding of Intermediate code form: Three address code, Polish notation (Post Fix Strings)

4. Develop an Understanding of Allocation data structure. Heaps

5. Develop an Understanding about Language processor development tools: LEX, YACC.
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester VII
Contact Hours (L-T-P): 3-0-0

CS7001 - Information System Security: Course Outlines

Elements of Number Theory: Divisibility and Euclid Algorithm, Primes and the Sieve of Eratosthenes, testing for primes, Prime Number Theorem, Euler’s, Fermat’s Little theorems, Congruences, Computing Inverse in Congruences, Legendre and Jacobi Symbols, Chinese Remainder Theorem,

Algebraic Structures in Computing (Definitions, properties and Elementary Operations Only): Groups, subgroup, order of group, cyclic group, ring, field, division algorithm, polynomial over a field. Galois Field Elements of Information Theory: Entropy, redundancy of language, Key Equivocation & Unicity Distance, equivocation of a simple cryptographic system


Suggested Books –

Introduction: Definition, Typical Real Time Applications, concept of tasks, types of tasks and real time systems, block diagram of RTS, and tasks parameters –Release Times, execution time, period, Deadlines, and Timing Constraints etc. RTS requirements.


Periodic tasks scheduling: Clock Driven Scheduling – definition, notations and assumption, scheduler concepts, general scheduling structure, cyclic executives. Priority Driven Scheduling; notations and assumption, fixed priority verses dynamic priority, fixed priority scheduling algorithms (RM and DM) and their schedulability analysis, concept of schedulability tests – Inexact and exact schedulability tests for RM and DM, Optimality of the RM and DM algorithms, practical factors.

Aperiodic task scheduling; assumption and approaches, server based and non-server based fixed priority scheduling algorithms – polling server, deferrable server, simple sporadic server, priority exchange, extended priority exchange, slack stealing. Introduction to scheduling of flexible computations – flexible applications, imprecise computation model and firm deadline model.


Suggested Books –

3. C.M. Krisna & K. G. Shim- Real time systems- TMH
Overview, Motivation(for Data Mining), Data Mining—Definition & Functionalities, Data Processing, Form of Data Preprocessing, Data Cleaning: Missing Values, Noisy Data, (Binning, Clustering, Regression, Computer and Human inspection), Inconsistent Data, Data Integration and Transformation. Data Reduction:- Data Cube Aggregation, Dimensionality reduction, Data Compression, Numerosity Reduction, Clustering, Discretization and Concept hierarchy generation.

Concept Description: Definition, Data Generalization, Analytical characterization, Analysis of attribute relevance, Mining Class comparisons, Statistical measures in large Databases. Measuring Central Tendency, Measuring Dispersion of Data, Graph Displays of Basic Statistical class Description, Mining Association Rules in Large Databases, Association rule mining, mining Single-Dimensional Boolean Association rules from Transactional Databases—Apriori Algorithm, Mining Multilevel Association rules from Transaction Databases and Mining Multi-Dimensional Association rules from Relational Databases.

What is Classification & Prediction, Issues regarding Classification and prediction, Decision tree, Bayesian Classification, Classification by Back propagation, Multilayer feed-forward Neural Network, Back propagation Algorithm, Classification methods K-nearest neighbour classifiers, Genetic Algorithm. Cluster Analysis: Data types in cluster analysis, Categories of clustering methods, Partitioning methods, Hierarchical Clustering—CURE and Chameleon, Density Based Methods—DBSCAN, OPTICS. Grid Based Methods—STING, CLIQUE. Model Based Method—Statistical Approach, Neural Network approach, Outlier Analysis.

Data Warehousing: Overview, Definition, Delivery Process, Difference between Database System and Data Warehouse, Multi Dimensional Data Model, Data Cubes, Stars, Snow Flakes, Fact Constellations, Concept hierarchy, Process Architecture, 3 Tier Architecture, Data Mining.

Aggregation, Historical information, Query Facility, OLAP function and Tools. OLAP Servers, ROLAP, MOLAP, HOLAP, Data Mining interface, Security, Backup and Recovery, Tuning Data Warehouse, Testing Data Warehouse.

Suggested Books –

1. Data Warehousing in the Real World – Anahory and Murray, Pearson Education.
2. Data Mining – Concepts and Techniques – Jiawei Han and Micheline Kamber.
Faculty of Engineering & Technology
B.Tech. Computer Science & Engineering   Semester VII
Contact Hours per week: 2 hrs
(Associated Theory Course 3 L- 0T)

CS7004- Data Warehousing & Mining Lab

List of Experiments

1. Gain insight for running pre-defined decision trees and explore results using MS OLAP Analytics.
2. Using IBM OLAP Miner – Understand the use of data mining for evaluating the content of multidimensional cubes.
3. Using Teradata Warehouse Miner – Create mining models that are executed in SQL
4. Publish and analyze a business intelligence portal.
5. Import metadata from specific business intelligence tools and populate a meta data repository.
6. Publish metadata stored in the repository.
7. Load data from heterogeneous sources including text files into a pre-defined warehouse schema.
8. Design a data mart from scratch to store the credit history of customers of a bank. Use this credit profiling to process future loan applications.
9. Design and build a Data Warehouse using bottom up approach titled 'Citizen Information System'.
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester 7 ELECTIVE

Contact Hours (L-T-P) : 3-0-0

CS7101 - Parallel Computing: Course Outlines

Fundamental theoretical issues in designing parallel algorithms and architectures. Parallel computers based on interconnection networks such as hyper cubes, shuffle-exchanges, trees, meshes and butterfly networks.

Parallel algorithms for arithmetic, linear algebra, sorting, Fourier Transform, recurrence evaluation, and dense graph problems. Use of graph embedding techniques to compare different networks. Shared memory based parallel computers.

Algorithms for list ranking, maximal independent set, arithmetic expression evaluation, convex hull problems and others. Message routing on multidimensional meshes, Butterfly networks, Hyper cubes, Shuffle Exchange networks, Fat-trees and others.


Suggested Books-

**Faculty of Engineering & Technology**

**B.Tech. in Computer Science & Engineering Semester 7 ELECTIVE**

**Contact Hours (L-T-P) : 3-0-0**

**CS7102- Simulation and Modeling: Course Outlines**

Introduction to Probability theory, Random variables, commonly used continuous and discrete distributions.

Introduction to Stochastic Process, Poisson process, Markov chains, steady state and transient analysis.


Introduction to Probabilistic modelling, Maximum Likelihood Variance reduction techniques: antithetic variates, control variates, common random numbers, importance sampling.

Analysis of Simulation results: confidence intervals, design of experiments Markov Chain Monte Carlo techniques

**Suggested Books –**

INTRODUCTION: Bioinformatics objectives and overviews, Interdisciplinary nature of Bioinformatics, Data integration, Data analysis, Major Bioinformatics databases and tools. Metadata: Summary & reference systems, finding new type of data online. MOLECULAR

BIOLOGY AND BIOINFORMATICS: Systems approach in biology, Central dogma of molecular biology, problems in molecular approach and the bioinformatics approach, Overview of the bioinformatics applications.

THE INFORMATION MOLECULES AND INFORMATION FLOW: Basic chemistry of nucleic acids, Structure of DNA, Structure of RNA, DNA Replication, -Transcription, -Translation, Genes- the functional elements in DNA, Analyzing DNA,DNA sequencing. Proteins: Amino acids, Protein structure, Secondary, Tertiary and Quaternary structure, Protein folding and function, Nucleic acid-Protein interaction.

PERL: Perl Basics, Perl applications for bioinformatics- Bioperl, Linux Operating System, Understanding and Using Biological Databases, Java clients, CORBA, Introduction to biostatics.

NUCLEOTIDE SEQUENCE DATA: Genome, Genomic sequencing, expressed sequence tags, gene expression, transcription factor binding sites and single nucleotide polymorphism. Computational representations of molecular biological data storage techniques: databases (flat, relational and object oriented), and controlled vocabularies, general data retrieval techniques: indices, Boolean search, fuzzy search and neighboring, application to biological data warehouses.

BIOLOGICAL DATA TYPES AND THEIR SPECIAL REQUIREMENTS: sequences, macromolecular structures, chemical compounds, generic variability and its connection to clinical data. Representation of patterns and relationships: alignments, regular expressions, hierarchies and graphical models.

Suggested Books-
1. Bryan Bergerson, Bioinformatics Computing, Pearson Education
3. David W. Mount, Bioinformatics: Sequence and Genome analysis, cold Spring Harbor Lab
4. Warren J. Ewens & Gregory R Grant, Statistical Methods in Bioinformatics, springer
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester 7 ELECTIVE

Contact Hours (L-T-P) : 3-0-0

CS7104- Human Computer Interaction: Course Outlines


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

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


Suggested Books –

1. The essential guide to user interface design, Wilbert O Galitz, Wiley DreamTech.
2. Designing the user interface. 3rd Edition Ben Shneidermann, Pearson Education Asia
4. Interaction Design Prece, Rogers, Sharps. Wiley Dreamtech
5. User Interface Design, Soren Lauesen, Pearson Education.
Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester 7 ELECTIVE

Contact Hours (L-T-P): 3-0-0

CS7105- Mobile Computing: Course Outlines

Cellular Networks: Channel allocation, multiple access, Location management, Handoffs.


Applications: Mobility adaptations, disconnected operations, Data broadcasting, Mobile agents.


Suggested Books

1. Mobile Communications J. Schiller, Pearson education publishing 2003
2. Wireless Communications and Networks W. Stallings, Pearson education publishing 2002
8. Charles Perkins. Mobile IP. PEARSON Education.
CS7106- Multimedia Technology: Course Outlines

Computer Graphics: Introduction to computer graphics, Mathematical foundations, 2D translation, scaling, rotation, and shear, Windowing transformations, Instance transformations, Structured graphics, 3D translation, scaling, rotation,


Suggested Books-

Faculty of Engineering & Technology

B.Tech. in Computer Science & Engineering Semester 7 ELECTIVE

Contact Hours (L-T-P): 3-0-0

CS7107- Natural Language Processing: Course Outlines


Architecture of NLG systems, Generation tasks and representation, Applications of NLG

Machine translation: Introduction, Design features of information retrieval systems

Information retrieval models, Classical information retrieval models, Non classical models of IR, Alternative models of IR,


Suggested Books-


2. Winograd. Language as a Cognitive Process, PEARSON Education.


4. Gerald Gazdar and Chris Mellish, Natural Language Processing in Prolog, Addison Wesley.
Introduction to artificial neural networks: Biological neural networks, Pattern analysis tasks: Classification, Regression, Clustering, Computational models of neurons, Structures of neural networks, Learning principles

Linear models for regression and classification: Polynomial curve fitting, Bayesian curve fitting, Linear basis function models, Bias-variance decomposition, Bayesian linear regression, Least squares for classification, Logistic regression for classification, Bayesian logistic regression for classification


Radial basis function networks: Regularization theory, RBF networks for function approximation, RBF networks for pattern classification

Kernel methods for pattern analysis: Statistical learning theory, Support vector machines for pattern classification, Support vector regression for function approximation, Relevance vector machines for classification and regression


Suggested books –

1. B.Yegnanarayana, Artificial Neural Networks, Prentice Hall of India, 1999