Course Structure and Syllabi
B. Sc. (Information Technology)

Academic Programmes
July, 2013
## BSc-IT Syllabus at JECRC University

### Semester – I

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>L (Hr.)</th>
<th>T (Hr.)</th>
<th>P (Hr.)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-1011</td>
<td>“C” Programming</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-1012</td>
<td>Basics of Electrical Engineering</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-1013</td>
<td>Computer Concepts &amp; Problem Solving</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-1014</td>
<td>C Programming Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-1015</td>
<td>Electrical Engineering Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-1016</td>
<td>Computer Concepts and Problem Solving Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G1001</td>
<td>Current Affairs</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G1002</td>
<td>Computer Applications</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G1003</td>
<td>Computer Lab - I</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G1004</td>
<td>Communication Skills</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>
### Semester – II

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>L (Hr.)</th>
<th>T (Hr.)</th>
<th>P (Hr.)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-2011</td>
<td>Data Structures</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-2012</td>
<td>Operating Systems</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-2013</td>
<td>Digital Principles</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-2014</td>
<td>Data Structures Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-2015</td>
<td>Operating Systems Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-2016</td>
<td>Digital Principles Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G2001</td>
<td>Current Affairs</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G2002</td>
<td>Computer Applications</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G2003</td>
<td>Computer Lab - II</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G2004</td>
<td>Communication Skills</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>
# Semester – III

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>L (Hr.)</th>
<th>T (Hr.)</th>
<th>P (Hr.)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-3011</td>
<td>Data structures &amp; Algorithms</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-3012</td>
<td>Database Management Systems</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-3013</td>
<td>Object Oriented Programming</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-3014</td>
<td>Data structures &amp; Algorithms Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-3015</td>
<td>Database Management Systems Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-3016</td>
<td>Object Oriented Programming Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G3001</td>
<td>Current Affairs</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G3002</td>
<td>Computer Applications</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G3003</td>
<td>Computer Lab - III</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G3004</td>
<td>Environmental Studies</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>25</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Semester – IV

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>L (Hr.)</th>
<th>T (Hr.)</th>
<th>P (Hr.)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-4011</td>
<td>OOP&amp;C++</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-4012</td>
<td>JAVA Programming</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-4013</td>
<td>Fundamentals of Digital Signal Processing</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>CA-4014</td>
<td>OOP&amp;C++ Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-4015</td>
<td>JAVA Programming Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>CA-4016</td>
<td>Fundamentals of Digital Signal Processing Lab.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G4001</td>
<td>Current Affairs</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G4002</td>
<td>Computer Applications</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G4003</td>
<td>Computer Lab - IV</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>G4004</td>
<td>Value Education</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>25</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Semester – V

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>L (Hr.)</th>
<th>T (Hr.)</th>
<th>P (Hr.)</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-5011</td>
<td>Data communication</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CA-5012</td>
<td>Software Engineering</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CA-5013</td>
<td>DBMS</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>CA-5014</td>
<td>Elective I:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A. Java,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B. .Net Computing,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C. Grid Computing,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>D. Simulation &amp; Modeling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA-5015</td>
<td>Mini Project</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>CA-5016</td>
<td>A. Web Programming,</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>B. Introduction to Computers &amp; Office Automation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G5001</td>
<td>Current Affairs</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G5004</td>
<td>Communication Skills</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Name</td>
<td>L (Hr.)</td>
<td>T (Hr.)</td>
<td>P (Hr.)</td>
<td>C</td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
<td>---------</td>
<td>---</td>
</tr>
<tr>
<td>CA-6011</td>
<td>Computer Network Security and Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CA-6012</td>
<td>Operating System</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CA-6013</td>
<td>Elective II: A. Mobile Computing B. Data Mining &amp; Warehousing C. Software Testing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CA-6014</td>
<td>Multimedia Technologies</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>CA-6015</td>
<td>Project</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>CA-6016</td>
<td>A. Cryptography &amp; Network Security B. Image Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G6001</td>
<td>Current Affairs</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>G6004</td>
<td>Communication Skills</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>25</strong></td>
</tr>
</tbody>
</table>
Course Code: CA-1011
Course Name: “C” Programming

Unit – I (10 Hours)

Unit – II: (10 Hours)
Flow of Control: Branching: If statement, If – else and Else – If constructs, nested if statements, switch statements. Looping: for loops, while and do-while loops, nested loops, break and continue statements.

Unit – III: (12 Hours)
Arrays: Definition, One-dimensional arrays, Two-dimensional arrays, Initializing one and two dimensional arrays. Strings: Declaring and initializing strings, Reading and writing strings. Functions: Definition, Types of functions, Function prototyping, Arguments and return values, Nesting of functions, Recursive functions, String functions. Scope and Extent of Variables: Local and global variables, auto, static and register variables.

Unit – IV: (12 Hours)

Unit – V: (10 Hours)
Input and output: Character I/O, Formatted I/O, print and scan functions. File: Defining and opening a file, Closing a file, I/O operations on files, Error handling, Random access. The preprocessors: #define, #include, #if, #undef, etc. Command line arguments. Dynamic memory allocation.

REFERENCES
1. E Balaguruswamy, “Programming in ANSIC”.
4. S.G.Kochen, “Programming in C”.
Course Code: CA-1012
Course Name: Basics of Electrical Engineering

UNIT I

UNIT II

UNIT III
DC MACHINES AND TRANSFORMER Construction - emf equation of DC generator - types of generators- characteristics of generators- single phase transformer – construction - EMF equation-transformation ratio - types of single phase transformer.

UNIT IV

UNIT V
POWER SUPPLIES Half and Full wave rectifier - Bridge rectifier - rectification efficiency – transformer utility factor - voltage regulator- introduction to SMPS and UPS.

REFERENCE BOOKS:
Course Code: CA-1013
Course Name: Computer Concepts & Problem Solving

UNIT I

UNIT II

UNIT III
SPREADSHEET SOFTWARE  Spreadsheet Programs – applications – Spreadsheet package features, attributes - structure, label, data, importing data, formula, functions – data handling – Managing workbooks.

UNIT IV

UNIT V
FACTORIZING AND ARRAY TECHNIQUES  Factoring Methods-finding the square root of a number-generating prime numbers- Array techniques-array order reversal-Finding the maximum number in a set- Removal of duplicates from an ordered Array-finding the kth smallest element.

REFERENCE BOOKS:
Course Code: CA-1014
Course Name: C Programming Laboratory

C Programming

Implementation of

1. Input / output function
2. Control Functions
3. Functions
4. Arrays
5. Pointers
6. Structures and Unions
7. Files

Using case studies on: Roots of a quadratic equation, Measures of location – Matrix Operations – Evaluation of trigonometric functions – Pay roll problems. String operations like substring, concatenation, finding a string from a given paragraph, finding the number of words in a paragraph.
Course Code: CA-1015
Course Name: Electrical Engineering Laboratory

1. Verification of Ohm’s and Kirchhoff Law
2. Verification of Circuit Theorem
3. Load Test on Single Phase Transformer
4. Load Test on D.C. Shunt Motor
5. Load Test on D.C. Shunt Generator
6. Swinburn’s Test on D.C. Shunt Motor
7. OC & SC Test on Single Phase Transformer
8. Load Test on 1 Phase Induction Motor
9. Study of SMPS
10. Study of Half Wave and Full Wave Rectifiers
Course Code: CA-1016
Course Name: Computer Concepts and Problem Solving Laboratory

1. Word Processing
2. Spreadsheet
3. Power point
4. Factorial
5. Fibonacci
6. Prime Generation
7. Removal of duplicates from an ordered Array
8. Finding the kth smallest element.
Course Code: G1002  
Course Name: Presentation, Publication and Graphing Techniques  

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>1</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

**Unit – I**

**Presentation Techniques**  

**Unit – II**

**Documentation and Publication Techniques**  

**Unit – III**

**Graphing Techniques**  

**REFERENCES**

1. MATLAB (An Introduction with Application): Amos Gilat, Wiley India.  
2. Getting Started with MATLAB: RudraPratap, Oxford University Press.  
Course Code: G1003  
Course Name: Computer Lab - I  

L T P C  
0 0 2 1

**PowerPoint:**
Introduction to the IDE of Power Point, Introduction to various toolbars like – Quick access, Placeholders, Creating title slides, slide shows, Introduction to layouts, themes, Clipboard, font paragraph, Drawing & Editing, Animations, Transitions, Spell Check, Outline, Tab, slides tabs, Sorter view and Printing

**MS Word:**
Introduction to IDE of Microsoft Word, Functionality of various tool bars – Quick Access, Title, Ribbon, Ruler, and Status Bars. Understanding document Views, Formatting, Editing and Understanding non printing characters, Using AutoText, Using Indentation & Alignment, and Style set Page breaks, Page numbers and Setting Page Layouts and Printing Documents

**MS Excel:**
Introduction to Electronic Spreadsheet, Worksheet, Cells, Quick Access Toolbar, Formula Bar, Status Bar, Clipboard, Font, Alignment, Number, Cells, Styles, Editing, Perform Mathematical Calculations, Working with Headers & Footers, Perform Automatic Calculations, Perform Advanced Mathematical Calculations, Work with Long Text, format Numbers, Excel Functions, Using Reference Operators and Printing
Charts: Creating and applying chart layout, Adding Labels, Switching Data, Changing the Chart Style, Size and Position, Chart Type
Course Code: CA-2011  
Course Name: Data Structures

UNIT I
PROBLEM SOLVING

UNIT II
LISTS, STACKS AND QUEUES
Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT

UNIT III
TREES

UNIT IV
SORTING

UNIT V
GRAPHS

REFERENCE BOOKS:
Course Code: CA-2012
Course Name: Operating Systems

UNIT I
INTRODUCTION  History of OS – Operating System Concepts - Functions - Structures - Types

UNIT II
PROCESS MANAGEMENT  Processes - Inter process communication - Scheduling criteria - algorithms - Process Synchronization – Deadlocks

UNIT III
MEMORY MANAGEMENT  Storage organization - contiguous – non-contiguous allocation – fixed partition multiprogramming - multiprogramming with variable partitions - Swapping - Virtual memory - Paging - Segmentation - Page replacement algorithms - Demand paging.

UNIT IV

UNIT V

REFERENCE BOOKS:
Course Code: CA-2013  
Course Name: Digital Principles  

UNIT I  

UNIT II  

UNIT III  

UNIT IV  
Registers and Counters: Registers, Shift Registers, Ripple Counters, Synchronous Counters, Ring Counters-Johnson Counter.

UNIT V  

REFERENCE BOOKS:  
Course Code: CA-2014
Course Name: Digital Laboratory

LIST OF EXERCISES:
1 Binary and BCD counter
2 Verification of NAND, NOR, XOR, AND, OR Gate Logic
3 Parity Generator
4 Multiplexer / Demultiplexers
5 Adder / Subtractor
6 Code Converters
7 Up / Down 4 bit Binary Counter
8 Up / Down 4 bit Decimal Counter
9 Shift Register
10 Ring Counter

L T P C
0 0 2 1
Course Code: CA-2015
Course Name: Operating System

LIST OF EXERCISES
1. Concurrency in Unix/ C- creating child processes using fork, exec
2. Implementation of Interprocess communication
3. Implementation of Process Scheduling Algorithms
4. Implementation of Process Synchronization
5. Design and Implementation of Deadlock algorithms
6. Implementation of Memory Management Algorithms
7. Implementation of Page replacement Algorithms
8. File system implementation
9. Directory implementation
10. Implementation of Disk Scheduling Algorithms
BSc-IT Syllabus at JECRC University

Course Code: CA-2016
Course Name: Data Structure Laboratory

LIST OF EXERCISES
Implement the following exercises using C:
1 Array implementation of List Abstract Data Type (ADT)
2 Linked list implementation of List ADT
3 Cursor implementation of List ADT
4 Array implementations of Stack ADT
5 Linked list implementations of Stack ADT The following three exercises are to be done by implementing the following source files
   (a) Program for ‘Balanced Paranthesis’
   (b) Array implementation of Stack ADT
   (c) Linked list implementation of Stack ADT
   (d) Program for ‘Evaluating Postfix Expressions’ An appropriate header file for the Stack ADT should be included in (a) and (d)
6 Implement the application for checking ‘Balanced Paranthesis’ using array implementation of Stack ADT (by implementing files (a) and (b) given above)
7 Implement the application for checking ‘Balanced Paranthesis’ using linked list implementation of Stack ADT (by using file (a) from experiment 6 and implementing file (c))
8 Implement the application for ‘Evaluating Postfix Expressions’ using array and linked list implementations of Stack ADT (by implementing file (d) and using file (b), and then by using files (d) and (c))
9 Queue ADT
10 Search Tree ADT - Binary Search Tree
11 Heap Sort
12 Quick Sort
Course Code: G2002
Course Name: Introduction to Computer Programming (Programming with C)

UNIT I
Introduction
Stored Program Architecture of Computers, Evolution of Processors (In terms of word length & Speed only), Storage Device- Primary Memory and Secondary Storage, Working Principle of Primary Storage devices- RAM, ROM, PROM, EPROM, EEPROM, Random, Direct, Sequential access methods.

UNIT II
Number System
Data Representation, Concept of radix and representation of numbers in radix r with special cases of r=2, 8, 10 and 16 with conversion from radix r1 to radix r2. r’s and (r-1)’s complement. Representation of Integer in sign-magnitude, signed 1’s and 2’s complement. Floating point representation. Concept of bias and normalization. Representation of alphabets.

UNIT III
Binary Codes: Binary arithmetic, Addition and subtraction of Integers and floating point numbers. Multiplication of Integers. Gray code, BCD 8421 and 2421, Excess-3 and Excess-3 gray codes. (Not)

UNIT IV
Programming in C

Arrays in C, Pointers, Using pointers to represent arrays, Dynamic Memory allocation, Structures, using typedef, Arrays of Structures & pointers. Functions in C, Passing Parameters (By value & Reference), using returned data, Passing arrays, structures, array of structures, pointer to structures etc., passing characters and strings, The void pointer.

REFERENCE BOOKS:
1. Let Us C: BalaGuruswami, TATA McGraw Hill.
The lab is to be conducted on Linux platform. vi editor is to be used.

1. Simple OS Commands, vi editor, compiling program, compiler options, linking libraries.
2. Simple input output program integer, real character and string. (Formatted & Unformatted)
3. Conditional statement programs (if, if-else-if, switch-case)
4. Looping Program. (for, while, do-while)
5. Program based on array (one, two and three dimensions)
6. Program using Structure and Union.
7. Program using Function (with and without recursion)
8. Simple programs using pointers.
Course Code: CA-3011
Course Name: Data structures & Algorithms

Unit – I: (10 Hours)
Introduction: Elementary data organization, Data structures, Data structure operations, Algorithmic notation, Control structures, Complexity of algorithms, String processing, Structured approach in programming, Top-down design, Recursive procedures and algorithms.

Unit – II: (10 Hours)

Unit – III: (14 Hours)
Linked Lists: Concept, Representation, Traversing, Inserting and deleting, Searching, Types of linked lists (circular, doubly circular doubly), garbage collection. Stacks and Queues: Definition, Fundamental operations on stacks, array representation, linked list representation, polish notation, Applications of stack, Concepts of queues, dequesues and priority queues.

Unit – IV: (10 Hours)

Unit – V: (12 Hours)
Sorting and Searching: Sorting types, Insertion sort, Selection sort, Merging, Merge sort, quick sort, radix sort, bubble sort, heap sort; Searching: Binary search and linear search comparison, Hashing.

REFERENCES
Course Code: CA-3012
Course Name: Database Management Systems

UNIT I
INTRODUCTION AND CONCEPTUAL MODELING
Introduction to File and Database systems- Database system structure – Data Models –
Introduction to Network and Hierarchical Models – ER model – Relational Model – Relational
Algebra and Calculus.

UNIT II
RELATIONAL MODEL
SQL – Data definition- Queries in SQL- Updates- Views – Integrity and Security – Relational
Database design – Functional dependences and Normalization for Relational Databases (up to
BCNF).

UNIT III
DATA STORAGE AND QUERY PROCESSING
Record storage and Primary file organization- Secondary storage Devices- Operations onFiles-
Heap File- Sorted Files- Hashing Techniques – Index Structure for files –Different types of
Indexes- B-Tree - B+Tree – Query Processing.

UNIT IV
TRANSACTION MANAGEMENT
Transaction Processing – Introduction- Need for Concurrency control- Desirable properties of
Transaction- Schedule and Recoverability- Serializability and Schedules – Concurrency Control
– Types of Locks- Two Phases locking- Deadlock- Time stamp based concurrency control –

UNIT V
CURRENT TRENDS
Object Oriented Databases – Need for Complex Data types- OO data Model- Nested relations-
Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and
Heterogenous- Distributed data Storage – XML – Structure of XML- Data- XML Document-
Schema- Querying and Transformation. – Data Mining and Data Warehousing.

REFERENCES:
Course Code: CA-3013
Course Name: Object Oriented Programming

UNIT I

INTRODUCTION
Object-oriented paradigm, elements of object oriented programming – Merits and demerits of OO methodology – C++ fundamentals – data types, operators and expressions, control flow, arrays, strings, pointers and functions.

UNIT II

PROGRAMMING IN C++
Classes and objects – constructors and destructors, operator overloading – inheritance, virtual functions and polymorphism.

UNIT III

FILE HANDLING
C++ streams – console streams – console stream classes-formatted and unformatted console I/O operations, manipulators - File streams - classes file modes file pointers and manipulations file I/O – Exception handling.

UNIT IV

JAVA INTRODUCTION
An overview of Java, data types, variables and arrays, operators, control statements, classes, objects, methods – Inheritance.

UNIT V

JAVA PROGRAMMING
Packages and Interfaces, Exception handling, Multithreaded programming, Strings, Input/Output.

REFERENCES:
1. Herbert Schildt, "the Java 2 : Complete Reference", Fourth edition, TMH, 2002 (Unit IV, Unit-V)(Chapters 1-11,13,17)
6. E.Balagurusamy“ Object Oriented Programming with C++”, TMH 2/e
Course Code: CA-3014
Course Name: Algorithm Design Laboratory

1. Apply the divide and conquer technique to arrange a set of numbers using merge sort method.
2. Perform Strassen’s matrix multiplication using divide and conquer method.
4. Construct a minimum spanning tree using greedy method.
6. Find the solution for traveling salesperson problem using dynamic programming approach.
7. Perform graph traversals.
8. Implement the 8-Queens Problem using backtracking.
10. Find the solution of traveling salesperson problem using backtracking.
Course Code: CA-3015
Course Name: Database Management Systems Laboratory

L T P C
0 0 2 1

1. Data Definition Language (DDL) commands in RDBMS.
2. Data Manipulation Language (DML) and Data Control Language (DCL) commands in RDBMS.
3. High-level language extension with Cursors.
4. High level language extension with Triggers
5. Procedures and Functions.
6. Embedded SQL.
7. Database design using E-R model and Normalization.
8. Design and implementation of Payroll Processing System.
9. Design and implementation of Banking System.
10. Design and implementation of Library Information System.
Course Code: CA-3016
Course Name: Object Oriented Programming Laboratory

C++
1. Programs Using Functions
   - Functions with default arguments
   - Implementation of Call by Value, Call by Address and Call by Reference
2. Simple Classes for understanding objects, member functions and Constructors
   - Classes with primitive data members
   - Classes with arrays as data members
   - Classes with pointers as data members – String Class
   - Classes with constant data members
   - Classes with static member functions
3. Compile time Polymorphism
   - Operator Overloading including Unary and Binary Operators.
   - Function Overloading
4. Runtime Polymorphism
   - Inheritance
   - Virtual functions
   - Virtual Base Classes
   - Templates
5. File Handling
   - Sequential access
   - Random access

JAVA
6. Simple Java applications
   - for understanding reference to an instance of a class (object), methods
   - Handling Strings in Java
7. Simple Package creation.
   - Developing user defined packages in Java
8. Interfaces
   - Developing user-defined interfaces and implementation
   - Use of predefined interfaces
9. Threading
   - Creation of thread in Java applications
   - Multithreading
10. Exception Handling Mechanism in Java
    - Handling pre-defined exceptions
    - Handling user-defined exceptions
Course Code: CS3002
Course Name: Programming with C++ and JAVA

UNIT I

Programming in C++
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 Destorctors to Destroy Instances, Using Destorctors 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.

UNIT II

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

REFERENCES:
1. Let Us C: BalaGuruswami, TATA McGraw Hill.
2. Programming with C, C++: Yashwant Kanitkar
Course Code: CS3003
Course Name: Computer Lab - III

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
Course Code: CA-4011  
Course Name: OBJECT ORIENTED PROGRAMMING & C++  
L T P C  
3 1 0 4

**Unit – 1: (8 Hours)**
Object Oriented Paradigm: Evolution of programming paradigms, Structured versus object oriented development, Elements of OOP, Objects, Classes, Multiple views of the same object, Encapsulation and data abstraction, Inheritance, Delegation, Polymorphism, Message communication, Merits and demerits of OO methodology.

**Unit – II: (12 Hours)**

**Unit – III: (10 Hours)**
Modular Programming with Functions: Function components, Passing data to functions, Function return data type, Library functions, Parameter passing, Return by reference, Parameter passing, inline function, Function overloading, Function Templates, Arrays and functions, Complete syntax of main(). Pointers and Runtime Binding, Classes and Objects.

**Unit – IV: (12 Hours)**
Object Initialization and cleanup: Constructors, Parameterized constructors, Destructor, Constructor overloading, Order of constructor and destructor, Dynamic initialization through constructors, Constructors with dynamic operations, Copy constructors, Nested classes. Dynamic Objects. Operator Overloading, Inheritance, Virtual Functions.

**Unit – V: (12 Hours)**
Generic Programming with Templates, Stream Computation with Files, Exception Handling, Standard Template Library, Object Oriented System Development.

**REFERENCES**
Course Code: CA-4012  
Course Name: JAVA Programming  

UNIT I  
JAVA BASICS-REVIEW  
Java Streaming – Components and events handling – Threading concepts – Networking features – Byte code interpretation – Media Techniques.

UNIT II  
JAVA DATA STRUCTURES  

UNIT III  
ADVANCED NETWORKING AND BEANS  

UNIT IV  
JAVA DATABASE PROGRAMMING  

UNIT V  
RELATED JAVA TECHNIQUES  
3D graphics – JAR file format and creation – Internationalization – Swing Programming – Advanced Java Scripting Techniques.

REFERENCES:  
Course Code: CA-4013
Course Name: Fundamentals of Digital Signal Processing

UNIT I

SIGNALS AND SYSTEMS

UNIT II

FAST FOURIER TRANSFORMS

UNIT III

IIR FILTER DESIGN

UNIT IV

FIR FILTER DESIGN

UNIT V

FINITE WORD LENGTH EFFECTS

REFERENCES:
Course Code: CA-4014  
Course Name: OBJECT ORIENTED PROGRAMMING & C++  

Practical will be based on Paper Object Oriented Programming & C++: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus
Course Code: CA-4015  
Course Name: JAVA Programming Laboratory  

L T P C  
0 0 2 1  

1. Implementation of Interfaces and package.  
2. Implementation of Multithreading and Exception Handling concepts.  
3. Implementation of Applets.  
4. Front End Development using swing and AWT.  
6. Developing a simple Application using Servlets.  
7. Developing a simple Application using JSP.  
8. Developing a simple Application using JDBC.
Course Code: CA-4016  
Course Name: Fundamentals of Digital Signal Processing  

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

Practical will be based on Paper Fundamentals of Digital Signal Processing: Covers UNIT-III, UNIT-IV, UNIT-V, UNIT-VI of Syllabus
Course Code: CS4002  
Course Name: Web Designing Techniques  

UNIT I

Introduction to Networking Technology

UNIT II

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.

UNIT III

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.

UNIT IV

Web Designing with PHP (Introduction)

REFERENCES:
1. Herbert Schildt, "the Java 2 : Complete Reference", Fourth edition, TMH, 2002 (Unit IV, Unit-V)(Chapters 1-11,13,17)
6. E.Balagurusamy“ Object Oriented Programming with C++”, TMH 2/e
Course Code: CS4003  
Course Name: Computer Lab - IV

List of Exercises
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).
Course Code: CA-5011
Course Name: Data Communication

Unit – I : (10 Hours)
Evolution of modern communication system-PSTN-ISDN-Analog and digital signals-common terminology-Voice channels-RS 232 serial communication-Data communication equipments (DCE)-Data terminal equipments (DTE)-channel organization-Asynchronous and synchronous protocols-Binary synchronous protocols (BSP)-Bit-oriented protocols (BOP)-Modes of channel operation-simplex, half-duplex and full duplex-Modulation

Unit – II : (10 Hours)

Unit – III: (10 Hours)
Client-server network OS-Peer-to-Peer network OS-Desktop OS-application software Internetworking- Bridges and routers-Netware Internetworking-protocols-IPX-RIP-NLSP service advertising protocols (SAP)-Netware core protocols(NCP)-Sequence of packet exchange Gate ways-Basic ideas of WAN, ATM, FDDI, X.25, FRAME RELAY, ISDN AND SONET.

Unit – IV: (10 Hours)
Introduction-POPI-POP3-Point-to-point protocols (PPP)-link control protocols (LCP)-Network control protocols (NCP)-Simple mail transfer protocols (SMTP)

Unit – V: (10 Hours)

REFERENCES
Course Code: CA-5012
Course Name: Software Engineering

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Unit – I: (10 Hours)**
Introduction to software engineering – computer based system engineering – project management – activities, project planning, activity organization, project scheduling.

**Unit – II: (10 Hours)**

**Unit – III: (10 Hours)**
Software design-architectural design – object oriented design – function oriented design – real – time systems design – user interface design – software reliability – programming for reliability – software reuse.

**Unit – IV: (10 Hours)**

**Unit – V: (10 Hours)**

**REFERENCES**
Course Code: CA-5013  
Course Name: DATA BASE MANAGEMENT SYSTEMS

Unit – 1: (12 Hours)
Databases and Database Users: Characteristics of database approach, Actors behind the scene, Workers behind the scene. Advantages of using the DBMS approach, Database application, Disadvantages. Database System-Concepts and Architecture: Data Models, Schema, and Instances, Three schema architecture and data Independence, Database languages and interfaces, The database system environment, Centralized and client/server architecture for DBMS, Classification of DBMS.

Unit – II: (10 Hours)
Data Modeling using the E-R Model: Entity types, Entity sets, Attributes, and Keys, Relationship types, Weak entity types, EER modeling. The Relational Data Model and Relational Database Constraints. Relational algebra and Relational calculus

Unit – III: (12 Hours)

Unit – IV: (10 Hours)

Unit – V: (10 Hours)

REFERENCES
Course Code: CA-5014  
Course Name: Elective IA: JAVA

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Unit – I: (10 Hours)**

**Unit – II: (12 Hours)**
Operators and Expressions. Decision Making : Branching, Looping

**Unit – III: (12 Hours)**

**Unit – IV: (10 Hours)**

**Unit – V: (10 Hours)**
Managing Input/Output files. Java Collection. JDBC. Concepts of J2EE

**REFERENCES**
2. Andy Harris, “Java 2-Fast and Easy Web development”, Prentice-Hall
3. Peter Rossbach & HendriskSchereiber, “Java – Server And Servlets”, Person Education
4. Vivek Sharma & Rajiv Sharma, “Developing E-commerce Sites” Person Education
Course Code: CA-5014  
Course Name: Elective I: .NET TECHNOLOGY  

<table>
<thead>
<tr>
<th></th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit</td>
<td></td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>– I</td>
<td></td>
<td>20</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

**Unit – I: (10 Hours)**
Basic of the .net framework: .net architecture, Managed code, Assemblies, Execution of assembler code, .net framework class library, common type system, common language specification, interoperability with unmanaged code.

**Unit – II: (12 Hours)**
Introducing ASP.NET: Creating Web Forms, Adding ASP.NET Code to a page Handling page events, Discussion: ASP vs. ASP.NET: working model of architecture of server controls, Add an HTML server control to a page, Access the properties and methods of server controls in code, Add event handlers for page events, Use the IsPostBack property to handle postback forms, Using Web Controls: Web controls, using intrinsic Controls, Using input Validation controls, selecting controls for Applications. Bind two controls together.

**Unit – III: (12 Hours)**
Using Microsoft ADO.NET to Access Data: Overview of ADO.NET. Connecting to a Data Source. Accessing Data with DataReaders. Binding to Extensible Markup language (XML) Data.

**Unit – IV: (10 Hours)**

**Unit – V: (10 Hours)**
Using Trace in Microsoft ASP.NET Pages: Overview of Tracing. Trace information. Page-Level Trace. Application, Level Trace.

**REFERENCES**
3. “.NET Framework Essentials”. 3rd Edition (O’Reilly)
UNIT – I
INTRODUCTION

UNIT – II
THE ANATOMY OF THE GRID
The concept of virtual organizations – Grid architecture – Grid architecture and relationship to other Distributed Technologies – computational and data Grids, semantic grids

UNIT – III
THE OPEN GRID SERVICES ARCHITECTURE
Grid Management systems, security, Grid Grid-Enabling software and Gridenabling network services, Data Grid - Virtualization Services for Data Grids, Peer-to-Peer Grids - Peer-to-Peer Grid Databases for Web Service Discovery

UNIT – IV
THE OPEN GRID SERVICES INFRASTRUCTURE
Technical details of OSGI specification, service data concepts, Naming and Change Management Recommendations – OGSA basic services

UNIT – V
APPLICATION CASE STUDY
Molecular Modeling for Drug Design and Brain Activity Analysis, Resource management and scheduling, Setting up Grid, deployment of Grid software and tools, and application execution

REFERENCES:
3. Ian Foster, Carl Kesselman, "The Grid2: Blueprint for a New Computing Infrastructure". Morgan Kaufman, New Delhi, 2004
Course Code: CA-5014  
Course Name: Elective I: SIMULATION & MODELLING  


TEXT BOOK
2. Deo N, system Simulation and Digital Computer, Prentice hall of India  
3. Gordan G, system Simulation 2nd edn, Prentice Hall of India  
4. Law am and Ketton W D, Simulation Modelling and Analysis, Mc-Graw Hill
Course Code: CA-5015
Course Name: Mini Project

L T P C
2 1 2 4

Group project: A group contains at most three students.
Course Code: CA-5016
Course Name: A. Web Programming

Unit-I
WORLD WIDE WEB (WWW)- History, Working, Web Browsers and their versions, Its functions, URLs, web sites, Portals. Concept of Search Engines, Search Engines, Search engines types, searching the Web Servers, client and server techniques.

Unit-II
Internet basics:- Elements of the web, viewing web pages with a browser, using a browser for a mail, News and chat, security and privacy issues. Internet advantage and disadvantage. Internet Services.

Unit-III
Introduction – history of html, sgml - structure of html document, web page layout, html tags and types - font type, paragraph formatting, meta data, blockquote, hyperlinks, linking, comments, white space, horizontal ruler, images, ordered and unordered lists, frames, tables, forms

Unit-IV
Web server and proxy server, Web caches, FAQS, Web browser like Internet Explorer, Netscape Navigator, and Communication Suit, Internet Security issues, Embedded and Software based firewall, Data encryption and Digital Signature and Certificates.

Unit-V
The search and search engine for internet, Spiders, Robots, Bots, Internet Agents, Mobile agents, meta search sites, outlook express and front page. Web Hosting and publishing Concept. Do’s and don’ts for creating a good website.

Reference Books:
1. Deitel&Deitel, Goldberg, “Internet and world wide web- How to Program”, Pearson Education Asia, 2001
Course Code: CA-5016
Course Name: B. Introduction to Computers & Office Automation

Module I (7 Hours)

Module II (13 Hours)

Module III (10 Hours)

Module IV (10 Hours)
Presentation using MS-PowerPoint: Presentations, Creating, Manipulating & Enhancing Slides, Organizational Charts, Excel Charts, Word Art, Layering art Objects, Animations and Sounds, Inserting Animated Pictures or Accessing through Object, Inserting Recorded Sound Effect or In-Built Sound Effect.

Module V (10 Hours)
Internet - History of Internet – Intranet and Extranet – DNS – Connections-Dial-up, ISDN, DSL, T1, T3, WiFi, Wireless, and Satellite Communications – E-mail, Chat, Forum, Blog, and Newsgroups – Browsers – Search Engines.

References:
2. Learn Microsoft Office – Russell A. Stultz – BPB Publication
Course Code: CA-6011
Course Name: Computer Network Security and Management

Unit – I (8 Hours)

Unit – II (10 Hours)
Elementary Sockets: Sockets, TCP Sockets, TCP Client/Server.

Unit – III (12 Hours)
Elementary Sockets: UDP, SCTP, SCTP Client/Server. Domain Name System

Unit – IV (12 Hours)
Advanced Sockets: Ipv4 & Ipv6 Interoperability, Advanced I/O functions

Unit – V (12 Hours)

REFERENCES
Course Code: CA-6012  
Course Name: Operating System  

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Unit – I: (10 Hours)  
Basic features of OS, I/O devices, Single user and multi-user OS, I/O utilities, Multitasking OS, Various parts of OS, Loading of OS, Bootstrapping, Different types of OS, Shell, File system, Software tools, Program translation sequence, Compilers & interpreters, Linkers, Loaders, Assemblers, Fundamentals of DOS and Windows.

Unit – II: (10 Hours)  
Process concept, Process scheduling, Types of schedulers, Scheduling and performance criteria, Scheduling algorithms, Inter process communication and synchronization basic concepts, Mutual exclusion, Semaphores, Critical section, Deadlocks.

Unit – III: (10 Hours)  
Single process monitor, Multi-programming with fixed partitions and dynamic partitions, Paging, Hardware support for paging, Address translation by associative memory sharing system, Segmentation, Virtual memory, Demand paging with virtual memory management.

Unit – IV: (10 Hours)  
File concept, Directories, Disk organization, Disk space management methods, Linked list, Bitmap, Disk allocation methods, Contiguous allocation, Non-contiguous allocation, Disk scheduling, Different scheduling algorithms, File protection, Passwords access groups.

Unit – V: (10 Hours)  
Case Study (Unix): Basic commands, Permissions, Piping, Directory management, The shell, Background process, File system, Terminals, Devices, Shell history, Vi editor, Basic operations, Mail, Shell programming, Simple Network Management Protocols, System calls, Sockets and IPC, System administration.

REFERENCES  
1. Deitel, “Operating systems”, Addison Wesley  
Course Code: CA-6013
Course Name: Elective II: A. Mobile Computing

UNIT- I: (10 Hours)

UNIT- II: (12 Hours)
Telecommunication systems: GSM, GPRS, DECT, UMTS, IMT-2000, Satellite Networks, Basics, Parameters and Configurations, Capacity Allocation, FAMA and DAMA, Broadcast Systems, DAB, DVB.

UNIT- III: (12 Hours)
Wireless LAN: IEEE 802.11, Architecture, Services, MAC, Physical layer, IEEE 802.11a - 802.11b standards, HIPERLAN, Blue Tooth.

UNIT- IV: (10 Hours)
Mobile IP, Dynamic Host Configuration Protocol, Routing, DSDV, DSR, Alternative Metrics.

UNIT- V: (10 Hours)
Traditional TCP, Classical TCP improvements, WAP, WAP 2.0.

REFERENCES:
Course Code: CA-6013  
Course Name: Elective II: B. Data Mining & Warehousing  

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

**UNIT – I**

**Introduction:** Data mining application – data mining techniques – data mining case studies - the future of data mining – data mining software - Association rules mining:  
**Introduction:** basics - task and a naïve algorithm - apriori algorithm – improve the efficient of the apriori algorithm – mining frequent pattern without candidate generation.

**UNIT – II**  
**Classification:** Introduction – decision tree – over fitting and pruning - DT rules - estimation predictive accuracy of classification methods - other evaluation criteria for classification method – classification software.

**UNIT – III**  

**UNIT – IV**  
**Web data mining:** Introduction- web terminology and characteristics- locality and hierarchy in the web - web content mining-web usage mining- web structure mining – web mining software - **Search engines:** Search engines functionality- search engines architecture – ranking of web pages.

**UNIT – V**  
**Data warehousing:** Introduction – Operational data sources- data warehousing – Data warehousing design – Guidelines for data warehousing implementation – Data warehousing metadata - **Online analytical processing (OLAP):** Introduction – OLAP characteristics of OLAP system – Multidimensional view and data cube - Data cube implementation - Data cube operations OLAP implementation guidelines.

**TEXT BOOK:**  
1. “Introduction to Data mining with case studies”, G.K. Gupta, PHI Private limited, New
Course Code: CA-6013  
Course Name: Elective II: C. Software Testing

UNIT -I
Developing a test approach- addressing software system business risk-Defining a software system testing strategy-development software system testing tactics-testing software using a life cycle methodology-requirement phase testing. Self study: Development Software System Testing Tactics

UNIT -II
Design phase testing-program phase testing-Debugging and program peer view test tools evaluating test results-installation phase testing-Acceptance testing Self Study: Installation phase testing

UNIT -III
Trusting methodology for software maintenance-testing the correctness of the installing a software change-testing the validity of software cost estimate-testing the progress of the software system-inspecting test plan and test cases. Self Study: Inspecting test plan and test cases.

UNIT -IV
Assessing client-server and LAN risks-A testing strategy for a rapid prototyping-testing techniques-testing tools. Self Study: Testing Tools

UNIT -V
Test documentation-reporting test results-final test reporting-evaluating test effectiveness-using testing metrics-improving test process Self Study: Improving test process

TEXT BOOK:

Reference Books:
Course Code: CA-6014
Course Name: Multimedia Technologies

UNIT-I 12 Hrs


UNIT-II 12Hrs


UNIT-III 12Hrs

UNIT-IV 12 Hrs


UNIT-V 12Hrs


**Textbook:**
1. Multimedia: Making It Work – Tay Vaughan (TATA McGRAW-HILL)

**References:**
1. Multimedia: Computing Communications & Applications – Ralf Steinmetz and Klara Nahrstedt, Pearson Education
4. Adobe Premiere Pro Bible – Droblas, Greenberg, Wiley – India
Course Code: CA-6015
Course Name: Project

Individual project
Course Code: CA-6016
Course Name: A. Cryptography & Network Security

UNIT-I
Introduction to security attacks, services and mechanism, introduction to cryptography.
Conventional Encryption: Conventional encryption model, classical encryption techniques-substitution ciphers and transposition ciphers, cryptanalysis, stereography, stream and block ciphers. Modern Block Ciphers: Block ciphers principals, Shannon’s theory of confusion and diffusion, fiestal structure, data encryption standard(DES), strength of DES, differential and linear crypt analysis of DES, block cipher modes of operations, triple DES, IDEA encryption and decryption, strength of IDEA, confidentiality using conventional encryption, traffic confidentiality, key distribution, random number generation.

UNIT-II
Introduction to graph, ring and field, prime and relative prime numbers, modular arithmetic, Fermat’s and Euler’s theorem, primality testing, Euclid’s Algorithm, Chinese Remainder theorem, discrete logarithms. Principals of public key crypto systems, RSA algorithm, security of RSA, key management, Diffle-Hellman key exchange algorithm, introductory idea of Elliptic curve cryptography, Elganel encryption.

UNIT-III

UNIT-IV
Authentication Applications: Kerberos and X.509, directory authentication service, electronic mail security-pretty good privacy (PGP), S/MIME.

UNIT-V

Books:

BSc-IT Syllabus at JECRC University
Course Code: CA-6016
Course Name: B. Image Processing

UNIT-I
Introduction and Fundamentals

Image Enhancement in Spatial Domain
Introduction; Basic Gray Level Functions – Piecewise-Linear Transformation Functions: Contrast Stretching; Histogram Specification; Histogram Equalization; Local Enhancement; Enhancement using Arithmetic/Logic Operations – Image Subtraction, Image Averaging; Basics of Spatial Filtering; Smoothing – Mean filter, Ordered Statistic Filter; Sharpening – The Laplacian.

UNIT-II
Image Enhancement in Frequency Domain
Fourier Transform and the Frequency Domain, Basis of Filtering in Frequency Domain, Filters – Low-pass, High-pass; Correspondence Between Filtering in Spatial and Frequency Domain; Smoothing Frequency Domain Filters – Gaussian Lowpass Filters; Sharpening Frequency Domain Filters – Gaussian Highpass Filters; Homomorphic Filtering.

Image Restoration
A Model of Restoration Process, Noise Models, Restoration in the presence of Noise only-Spatial Filtering – Mean Filters: Arithmetic Mean filter, Geometric Mean Filter, Order Statistic Filters – Median Filter, Max and Min filters; Periodic Noise Reduction by Frequency Domain Filtering – Bandpass Filters; Minimum Mean-square Error Restoration.

UNIT-III
Color Image Processing
Color Fundamentals, Color Models, Converting Colors to different models, Color Transformation, Smoothing and Sharpening, Color Segmentation.

Morphological Image Processing
Introduction, Logic Operations involving Binary Images, Dilation and Erosion, Opening and Closing, Morphological Algorithms – Boundary Extraction, Region Filling, Extraction of Connected Components, Convex Hull, Thinning, Thickening

UNIT-IV
Registration
Introduction, Geometric Transformation – Plane to Plane transformation, Mapping, Stereo Imaging – Algorithms to Establish Correspondence, Algorithms to Recover Depth

Segmentation
UNIT-V

Feature Extraction
Representation, Topological Attributes, Geometric Attributes

Description
Boundary-based Description, Region-based Description, Relationship.

Object Recognition
Deterministic Methods, Clustering, Statistical Classification, Syntactic Recognition, Tree Search, Graph Matching

Books: