Course Structure And Syllabus for

Bachelor Of Computer Science (BSc. Computer Science)

(Six Semester Course)

Proposed for 2012 batch onwards

Department of Computer Science
Faculty of Science
St. Joseph's College (Autonomous)

SEMESTER WISE COURSE STRUCTURE

Semester	Code	Course Title	Hrs / Week	Credits
		Theory		
I	CS112	COMPUTER ORGANIZATION AND PROGRAMMING IN C	4	4
		Practical		
I	CS1P1	PROGRAMMING IN C LAB	2	1
		Theory		
II	CS212	DATA STRUCTURES AND OPERATING SYSTEM	4	4
		Practical		
II	CS2P1	DATA STRUCTURES LAB	2	1
		Theory		
III	CS312	OOPS USING C++ AND DBMS	4	4
		Practical		
III	CS3P1	OOPS USING C++ LAB	2	1
		Theory		
IV	CS412	SOFTWARE ENGINEERING AND VISUAL PROGRAMMING	4	4
		Practical		
IV	CS4P1	VISUAL PROGRAMMING LAB	2	1
		Theory		
V	CS5112	JAVA PROGRAMMING	4	4
	CS5212	WEB DESIGNING	4	4
		Practical		
V	CS5P1	JAVA PROGRAMMING LAB	2	1
	CS5P2	WEB DESIGNING LAB	2	1
		Theory		
VI	CS6112	COMPUTER NETWORKS	4	4
	CS6212	COMPUTER GRAPHICS	4	4
		Practical		
VI	CS6P1	MAJOR PROJECT LAB	2	1
	CS6P2	COMPUTER GRAPHICS LAB	2	1

THEORY QUESTION PAPER FORMAT

The question papers of the theory examinations should follow the pattern specified below:

Section	Marks for each question	Number Of Questions		Total Marks
		Total	Should Answer	
A	3	10	10	30
B	8	7	5	40
C	10	5	3	30
			Total Marks	100

While selecting the questions importance should be given to all major units.

PRACTICAL QUESTION PAPER FORMAT

Scheme of valuation:

1.	Writing two programs one from each section	10 marks
2.	Execution of one program	20 marks
3.	Formatting the program and output	10 marks
3.	Record verification	05 marks
4.	Viva voce related to practical topics only	05 marks
	Total	50 marks

The marks should be then divided and converted to 25 marks

PROJECT EVALUATION FORMAT

Scheme of valuation:

1.	Demonstration and presentation	25 marks
2.	Documentation	25 marks
	Total	50 marks

The marks should be then divided and converted to 25 marks

INTERNAL ASSESSMENT FORMAT

THEORY:

1.	CIA test	30 marks
2.	First Activity	10 marks
3.	Second Activity	10 marks
	Total	50 marks

PRACTICALS:

Every practical class the student should be assessed.

1.	Writing the observation book	3 marks
2.	Executing the programs	5 marks
3.	Record writing	2 marks
	Total	10 marks

Internal marks for the final semester project work can be awarded by the guide by evaluating the performance of the student during the course of the project work.

FIRST SEMESTER

TITLE: COMPUTER ORGANIZATION AND PROGRAMMING IN C
CODE: CS112
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT I: COMPUTER ORGANIZATION **30 Hrs**

Introduction to computers:
Functional block diagram of a digital computer, Generation of computers, Classification of Computers- Analog, Digital, Hybrid, Micro, Mini, Mainframe computers etc. **3 Hrs**

Representation of Data:
Number Systems, and Inter-conversions among them, Binary arithmetic (Addition, Subtraction, multiplication, division) Binary number system complements- 1's and 2's complements subtractions, ASCII,Excess-3 code and Gray code, EBCDIC code and BCD code. **6 Hrs**

Boolean Algebra and Logic Circuits:
Boolean Algebra Laws and theorems, Gates- AND, OR, NOT,NAND, NOR, EXOR truth tables, Boolean expressions and their simplifications, SOP & POS- Karnaugh map simplification methods. **6 Hrs**

Combinational and Sequential circuits:
Multiplexers, Demultiplexers, Decoders, Encoders, Half Adder, Full Adder, Parallel Adder-subtractor, Flip flops- RS, JK, D, T, Master Slave , Counters(Binary, modulus counters), Shift registers. **9 Hrs**

I/O Devices:
Data transfer Concept, Program control, Interrupt control, DMA Control, Keyboard, VDU, printer. **2 Hrs**

Memory:
Memory hierarchy, ROM, RAM (1 dimensional and 2 dimensional RAM), Cache Memory , Organization of Cache Memory , Virtual memory, Addressing modes, Instruction format, instruction set. **4 Hrs**

UNIT-II : PROGRAMMING IN C: **30 Hrs**

Introduction To Programming:
Problem Solving Using Computers: Language Classification, Problem Analysis, Algorithm and Flowchart design.
Algorithms: Steps in developing algorithms, advantages and disadvantages.
Flowcharts: Symbols used in developing flowcharts, advantages and disadvantages. Coding, testing, debugging, Documentation and maintenance.
Program development and modular design. **4 Hrs**

Introduction To C Programming
History, C Conventions, Character Set, Identifiers, Keywords, Simple Data types, Modifiers, Variables, Constants, Operators, Operator precedence, Structure of a C program. **3 Hrs**

Input and Output
Input and Output operation: Single character input and output, formatted input and output, Buffered input. **1 Hrs**

Control Structures.
Introduction, Conditional statement, if statement, if-else statement, nested if statement, else-if statement and switch statement. Goto statement. Looping

statement, while statement, do-while statement, for statement, break and continue, nested for statement. **6 Hrs**

Arrays.

Introduction (One and two dimensional), Declaration of arrays, Initialization of arrays, processing with arrays. String manipulation, declaration of string arrays, string operations. **5 Hrs**

Functions

Introduction, advantages of subprograms, Function definition, function call, Actual and formal arguments, local and global variables, function prototypes, types of functions, recursive functions, arrays and functions. **5 Hrs**

Storage Classes, Structures and Unions

Introduction, types of storage classes, Introduction to structures, Advantages of structures, accessing elements of a structure, nested structures, array of structures, functions and structures, Unions, bit-fields, enumerated data types. **4 Hrs**

Pointers.

Introduction, pointer variable, pointer operator, pointer arithmetic, pointers and arrays, pointers and strings, array pointers, dynamic allocation. **2 Hrs**

BOOKS:

1. Fundamentals of Computers by Rajaraman, PHI, 1986, 2nd Edition.
2. Digital Computer Fundaments by Thomas C Bartee, McGraw Hill, VI Edition, 1987
3. Computer Organization by Carl Hamacher V. Zaki, McGraw Hill, 1990
4. Digital computer Fundaments by Malvino & Leach.
5. Digital Computer Fundaments by Malvino.
6. ANSI C by Balaguruswamy
7. Computers today by Sanders, Mcgraw Hill, 1987.
8. C programming by Stephen C Kochan.
9. Spirit of C by Cooper, 1987

PRACTICALS
TITLE: PROGRAMMING IN C
CODE: CS1P1
Hrs / Week : 2 Hrs
CREDITS: 1

1. Finding the largest, smallest and second largest of three numbers.
2. Finding the roots of a quadratic equation.
3. Reverse a number (use while)
4. Find whether a number is prime (use while)
5. Convert a decimal number to its binary equivalent(use do-while)
6. Find whether a given number is a perfect number(use do-while)
7. Generate the fibonacci sequence (use for)
8. Find the factorial of a number (use for)
9. Generate the pattern

```
1                   1
1 2                   2 3
1 2 3                 4 5 6
```

10. Sorting a. Bubble b. Selection
11. Searching a. Linear b. Binary
12. Find whether a string is a palindrome.
13. Perform the addition and subtraction of two matrices.
14. Find whether a given matrix is a lower triangular matrix or upper triangular

matrix using functions.

15. Find x to the power of y using recursion.

SECOND SEMESTER

TITLE: DATA STRUCTURES AND OPERATING SYSTEM
CODE: CS212
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT I DATA STRUCTURES **30 Hrs**

Introduction to data structures : Definition, Classification of data structures. operations on data structures. Introduction to Time and Space complexity **2 Hrs**

Primitive data structures : Integer, Character, float, Strings, memory representation and primitive operations. String manipulations using pointers. **2 Hrs**

Arrays : Storage representation of 1D and 2D arrays. Insertion and deletion on 1D arrays, advantages and disadvanatges of arrays. **2 Hrs**

Stacks : Concepts, operations, sequential and linked implementation, Applications of stacks - recursion, tower of Hanoi, Infix to postfix, Evaluation of postfix expressions. **5 Hrs**

Queues : Concepts, operations, sequential and linked implementation, circular queues, Priority queues and Dequeues (Introductory Concept)- Application of queues. **5 Hrs**

Linked lists : Pointers, Dynamic memory allocation, Singly linked lists, operations on linked lists - Insertion and Deletion of a node. Introduction to circular linked list and doubly linked list. **5 Hrs**

Trees : Definitions and concepts-Binary trees, sequential and linked representation of Binary trees, Insertion and Deletion of binary trees, Binary tree traversals. **4 Hrs**

Searching and Sorting : Linear search and Binary search, Selection sort, Insertion sort, Qucik sort, Merge sort. **5 Hrs**

UNIT II OPERATING SYSTEM **30 Hrs**

Introduction to Operating Systems : What is an operating system (OS)? History of OS, Simple Batch systems, Multiprogrammed Batched Systems, Time sharing systems, Personal Computer Systems, Distributed Systems and Real time Systems. Operating System structures, Command Interpreter System, Operating System Services, System calls, system programs. **6 Hrs**

Process concept : Process control block, Process Scheduling, CPU Scheduling- Basic concepts, Scheduling criterian, Scheduling algorithms- FIFO, RR, SJF, Multi level, Multi-level feed back. **9 Hrs**

Memory management : Basic Concepts, logical and Physical Address space, Swapping, Contiguous Allocation, paging, Segmentation, Virtual memory-Demand paging, page replacement, page replacement algorithm, allocation of frames, Thrashing and Demand Segmentation. **7 Hrs**

File System : File concept, access methods, directory structure, protection, File system structure, Allocation methods, Free space Management. **5 Hrs**

I-O Systems : Overview of I/O systems, I/O interface, secondary storage structure-Disk structure, Disk Scheduling **3 Hrs**

BOOKS:

1. Data Structure by Schaum Series
2. Fundamentals of Data Structure by Horowitz Sahni
3. Data Structure by Dale and Lilly
4. S. Sahni, **Data Structures**, **Algorithms and Applications**, Tata McGraw Hill.
5. Operating System by Milan Milenkovic, McGraw Hill.
6. Operating System by Madnick and Donoval, McGraw Hill.
7. Operating System Concepts by James L Peterson
8. Operating System Design and Implementation by Andrew S Tenenbaum

PRACTICAL
TITLE:DATA STRUCTURES LAB
CODE: CS2P1
Hrs / Week : 2 Hrs
CREDITS: 1

PART A (Data Structures)

1. Finding the length of a string using functions and pointers
2. Copying the contents of one string to another using functions and pointers
3. Concatenating two strings using functions and pointers
4. Comparing two strings using functions and pointers
5. Extracting a sub string using functions and pointers
6. Array implementation of a stack.
7. Array implementation of a queue.
8. Array implementation of circular queue.
9. Creating a linked list.
10. Adding nodes at various positions in a linked list.
11. Deleting nodes from various positions from a linked list.
12. Creating a binary search tree.
13. Performing the various traversals on a binary search tree.

THIRD SEMESTER

TITLE: OOPS USING C++ AND DBMS
CODE: CS312
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT I. OOPS AND C++ 30 Hrs

Introduction to OOP and C++:
Characteristics and benefits of OOPs, History of OOP, Structure of C++ program, Data types and operators, Statements of C++, tokens, Expressions and control structures, operators in C++. **2 Hrs**

Input output objects
Usage of cin and cout objects, Comparison of stdio.h and iostream.h **2 Hrs**

Control structures
if, if-else, nested-if, switch, while, do-while, for, nested for, break and continue statements (use of conditional and logical operators). **2 Hrs**

Arrays, Functions and structures

Array fundamentals, types, strings, C supported functions, prototyping, Inline functions, overloaded functions, functions with default arguments, storage classes, call-by-reference, return by reference, defining and using a structure. **6 Hrs**

Objects and classes

Introduction-specifying a class-defining member function-nesting of member functions, arrays within a class, Arrays of objects, Objects as function arguments – Friend functions- pointer to members. **6 Hrs**

Constructors, destructors and operator overloading

Constructors, types of constructors, copy constructor, overloading constructs, destructors, OPERATORS overloading (Unary and binary operators), data conversion. **6 Hrs**

Inheritance

Extending Classes- defining derived classes-single, multilevel, multiple, hierarchical, and hybrid inheritance. Virtual base classes- Abstract classes- pointers. Virtual functions and polymorphism-pointers to objects, this pointer. **6 Hrs**

UNIT II. DATA BASE MANAGEMENT SYSTEM 30 Hrs

Introduction

Basic Concepts: Data, database, DBMS, Disadvantages of File oriented systems, Advantages of DBMS, database users, Database Languages, Characteristics of Database, Role of DBA, Data Abstraction (Views) – Logical, Conceptual & Physical, Data independence – physical and logical independence. **10 Hrs**

Data Models

Introduction to Data Models: E-R model, Relational model, network model and hierarchical model. **6 Hrs**

RDBMS

Relational database concepts – attribute, tuple, types of attributes – single, multi-valued, stored, derived etc., keys – primary, index, candidate, alternate, foreign, Relationships, Relational algebra operations– UNION, INTERSECTION, DIFFERENCE, CARTESIAN PRODUCT, SELECTION, PROJECTION, JOIN, DIVISION, relational calculus, Domain, Domain integrity, Integrity rules – Entity integrity, referential integrity, Normalization and its properties (1^{st} , 2^{nd} and 3^{rd} and BCNF). **8 Hrs**

DDL and DML

DDL commands - create table/views/index, drop, alter, DML commands – select, insert, delete, update, etc., DCL commands – grant, revoke, commit, TCL commands, SQL – query, sub-query, nested query, Joins – natural, inner, outer join. **5 Hrs**

Database design and Distributed databases

Design guidelines, Overview of distributed databases. **1 Hrs**

BOOKS :

1. E. Balaguruswamy : Object Oriented Programming with C++, Tata McGraw Hill Publications.
2. Strousstrup : The C++ Programming Language, Pearson Edition, 3^{rd} Edition
3. Kamthane : Object Oriented Programming with ANSI and Turbo C++, Pearson Education
4. Bhave : Object Oriented Programming Using C++, Pearson Education
5. Elmasri & Navathe, Fundamentals of Database Systems (Fourth Edition), Pearson Education, 2003.
6. Sundarraman, Oracle 9i programming A Primer,1/e Pearson Education.

7. Karate, Introduction to Database Management System, Pearson Education 2004.

PRACTICALS

TITLE: C++ LAB
CODE: CS3P1
Hrs / Week : 2 Hrs
CREDITS: 1

PART A (Program related to C++ concepts)

1. Input the number of hours that an employee works and the employee wages and display the employees gross pay.
2. Find the largest and second largest of four numbers.
3. Check whether a given date is valid.
4. Find the GCD and LCM of two numbers
5. Find nCr where nCr = N ! / ((N-R)! * (R!))
6. Generate the fibonacci series using arrays.
7. Interchange the values of two variables using reference variables.
8. Find the factorial of a number using function overloading.
9. Find whether a given number is prime using function overloading.
10. Calculate compound interest using default arguments where $CI = P * (1 + R / 100)^{T}$.
11. Check whether a given number is odd or even using inline functions.

PART B (Program related to OOPS concepts)

1. Write a program to create a database for a bank account containing Name, Account No, Account type and Balance include the following:
    a. Constructors
    b. Destructors
    c. Default constructors
    d. Input and Output functions and

    Input and Output for 5 people using different methods.
2. Create a class to hold information for a customer about his current-account and savings-account in a bank. Using friend functions find the total balance of both the account.
3. Write a program to overload the following operators:
    a. Binary operator '+' to concatenate 2 strings
    b. Relational operator '< ' to find whether one date is less than other.
    c. Find the sum of 2 matrices using operator '+'
    d. Find the next date of a given date using '++' operator
    e. Using '+'. '-', '*' to find the sum , difference and product of 2 complex numbers
4. Create a base class for a stack and implement push and pop operation. Include derived class to check for stack criteria's such as
    a. Stack is empty b. Stack is full

FOURTH SEMESTER

TITLE: SOFTWARE ENGINEERING AND VISUAL PROGRAMMING
CODE: CS412
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT I. SOFTWARE ENGINEERING 30 Hrs

Software engineering and Project planning
Software characteristics, software components, Software process model: Classic life cycle model, prototyping model, spiral model. Planning software project: Defining the problem, developing solution strategy, planning development process, planning activities. **6 Hrs**

Software cost estimation
Cost factors, cost estimation techniques, staffing. **4 Hrs**

Software requirement definition
Software requirement specification, Formal specification techniques. **4 Hrs**

Software design
Fundamental design concepts, modules and modularization criteria, design notations, design techniques. Object oriented design: components of object oriented design modules. **4 Hrs**

Coding
Implementation issues, structured coding techniques, coding style, data abstraction, , Verification and validation, reviews. **4 Hrs**

Testing
Verification and validation techniques, Quality assurance, walkthrough and inspection, unit testing and debugging, system testing, formal verification. **4 Hrs**

Software maintenance
Types of maintenance, Enhancing maintainability during development. **4 Hrs**

UNIT II. VISUAL PROGRAMMING 30 Hrs

Introduction:
Windows Concepts, Objects and events, Define design and development process, Identify elements of IDE, Write, run, save, and print a project, Use online Help. **2 Hrs**

Introduce controls and their properties:
Text boxes, group boxes, check boxes, radio buttons, picture boxes and naming conventions, User friendly features: access keys, default and cancel buttons, tab sequence, Tool Tips, resetting focus, Changing properties at run-time, Concatenate strings. **4 Hrs**

Variables, constants and calculations:
Declaration of variables and constants considering data types and scope, Explicit data type conversions, Perform calculations using arithmetic operators and order of operations, Use of accumulators and counters, Use formatting functions to format output. **4 Hrs**

Decisions and conditions:
Use If statements to control the flow of logic, Use And and/or operators, Call event procedures, Input validation, Debug tools - set break points, stepping and observation of intermediate results. **4 Hrs**

Arrays:
Declare arrays and refer to elements using subscripts, Use For Each/Next statements, Structure Variables, Store data in multidimensional array. **2 Hrs**

Lists, Loops, and Printing:
Create and use list boxes and combo boxes, Use Do/Loops and For/Next statements, Send information to the printer. **2 Hrs**

Menus, procedures and functions:
Create menus and submenus for program control, Write reusable code in sub procedures and sub functions. **4 Hrs**

File handling and file controls in VB: 2 Hrs

Database Connectivity:
Data base basics & database engine, Create a database in Access Through VB, The nature of a relational databases, The data controls (DAO and ADO), Data Bound controls, Working with database objects in code, Data Manipulation through VB – Forms, Develop a database application. **6 Hrs**

BOOKS :

1. Ian Summerville, Software Engineering, 6th Edition, Pearson Publication Ltd. 2001
2. Roger Pressman, Software Engineering – A practitioner's approach (McGraw Hill).
3. Carlo Ghejgietal, Fundamentals of Software- Engineering, Pearson Education.
4. Panakaj Jalote, An Integrated Approach to Software Engineering – Narosa
5. Publishing houseDeitel, Visual Basic 6 How to Program. Pearson Education
6. Neol Jerke, The Complete Reference Visual Basic 6, Tata McGraw Hill (1999).
7. Evangelas and Petroutsos, Mastering VB 6, 1st Edition, BPB Publications (2001).
8. V.K. Jain, Introduction to OOP and VB, Vikas Publishing House (2003)
9. Gottfried, Programming with Visual Basic, Schaum's Series - Tata McGraw Hill.
10. Reselman, Peasley and Pruchniak, Using Visual Basic 6, PHI (2000).

TITLE: VISUAL PROGRAMMING LAB
CODE: CA4P1
Hrs / Week : 2 Hrs
CREDITS: 1

1. Design an application to validate the user name and password and display message.
2. Design an application to change font style, size, color using a combo box.
3. Design a caculator.
4. Design an application to show usage of timer.
5. Design an application to find the sum of numbers.
6. Design an application to authenticate travel system using list and combo box.
7. Design an application to add and remove item from list box.
8. Design an application to find the area and perimeter of a square using subroutine.

9. Design an application to create front end and back to implement ADO connection.
10. Design an application to implement scroll bar to the change the font size of the label.
11. Design an application to implement message box and input box.
12. Design an application to implement if then, if then else conditions.
13. Design an application to implement while, do while.

FIFTH SEMESTER

TITLE: JAVA PROGRAMMING
CODE: CS5112
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT-1: JAVA PROGRAMMING **45 Hrs**

Introduction

Features of Java, Data Types, Variable, Operators. Java Programming structure, **Arrays** – One Dimensional array, Two Dimensional array. Conrtol Structure:- if statement, switch statement, while statement, do-while statement, for loop, continue and break statement. Access specifiers – public, private. **15 Hrs**

Class and Objects

Class fundamentals, declaring objects, **Access modifiers** – final, static, abstract, native, volatile, synchronized. Introduction to methods, constructors, command line arguments. **Inheritance** – single or simple inheritance, Multi level inheritance. Using SUPER, abstract and final key word with inheritance. **10 Hrs**

Packages and Interfaces

Packages- define package, CLASS PATH, access protection, importing packages. **Interface-** define interface, implementing interface, variables in interface. Lang-**Package**:- Wrapper classes. Util-packages:- Date, Calendar, Random. IO-Packages:- File input stream and output stream. **10 Hrs**

Exception Handling and Multi Threading Exceptions

Fundamentals of Exception, Exception types, using try & catch, multiple catch, nested try, throw, finally, built-in –exception, user defined exceptions. **Multi Threading** : - Thread fundamentals, priorities, Creating thread using Thread class and Runnable interface. **10 Hrs**

TITLE: WEB DESIGNING **45 Hrs**
CODE: CS5212
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT-I: WEB DESIGNING **45 Hrs**

Internet Basics:

Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address, World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, netscape navigator etc. search engine, web saver –

apache, proxy server, HTTP protocols **10 Hrs**

Web Designing Technologies:
Introduction to HTML, ASP, JSP, Java scripts, VB scripts, HTML/DHTML – file creation, HTML tags, titles footers, text formatting, forms, images, lists, tables, linking documents, front page editing, frame sets, order list, un-order list, special characters **10 Hrs**

Java Script
Introduction to Java script, writing java script into HTML **8 Hrs**

Building of Java Script Syntax
Data types of variables, arrays, operators, expressions, programming construct of conditional checking, loop ends functions, dialogue boxes **7 Hrs**

Java Script Document Object Model
Understanding objects in HTML – properties and methods, browsers objects, understanding DOM, web page events **5 Hrs**

Forms Used by a Website
Forms objects, user defined object **5 Hrs**

REFERENCE BOOKS

1. E. Balaguruswamy, Programming with JAVA, A Primer, 2nd Edition., TMH
2. (1999), (Chapter 2 – 16)
3. KenArnold & James Gosling, The Java Programming Language, Addison – Wesley, (1998)
4. Patrick Naughton & Herbert Schildt, JAVA 2: The Complete Reference, 3rd Edition, TMH, (1999).
5. Internet 6-in-1 by Kraynak and Habraken, Prentice Hall of India Pvt. Ltd., New Delhi
6. Internet for Everyone by Alexis Leon and Mathews Leon; Vikas Publishing House Pvt. Ltd., New Delhi
7. HTML – 4 for World Wide Web by Castro Addison Wesley (Singapore) Pvt. Ltd., New Delhi
8. Principles of Web Designing Joel Sklar, Web Warrior Series Available with Vikas Publishing House Pvt. Ltd., New Delhi

PRACTICALS
TITLE: JAVA PROGRAMMING lab
CODE: CS5P1
Hrs / Week : 2 Hrs
CREDITS: 1

1. To check whether two strings are equal or not.
2. To Reverse a string
3. To find the sum of digits of a given number
4. To display multiplication table
5. To generate prime numbers between a range.
6. To sort an array
7. To create object for tree Set and Stack and use all methods
8. To check all math class functions.

TITLE: WEB DESIGNING
CODE: CS5P2
Hrs / Week : 2 Hrs
CREDITS: 1

Design Web pages for
a. A Business organization
b. A College
c. An Auction
d. A Friends club communication system
e. A registration form for a particular feast
Note: **All the programs should be interactive.**

SIXTH SEMESTER

TITLE: COMPUTER NETWORKS
CODE: CS6112
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT-I: COMPUTER NETWORKS 45 Hrs

Introduction:
Definition of networks, objectives of network, categories of network (LAN, MAN, WAN & Internet) , ISO OSI Reference Model, TCP reference model, topologies used in networking (Point-to-point, Broadcasting). **6 Hrs**

Physical layer:
DTE-DCE Interface, transmission media – magnetic media, twisted pair, base band coaxial cable, broad band coaxial cable, fiber optics, satellite communications, Multiplexing – FDM, TDM, Switching – circuit, message and packet, ISDN services. **6 Hrs**

Data link layer:
Design issues and services provided to higher layers, Framing, Error correction and error detection, DLL protocols – unrestricted simplex protocol, simplex protocol, stop and wait, piggybacking, sliding window protocol – 1-bit sliding protocol. **6 Hrs**

MAC sub layer
MAC protocols- Aloha and slotted aloha, CSMA and CSMA/CD, IEEE Standards – cabling, Manchester, Differential Manchester Encoding, 802.3 (Ethernet). **8 Hrs**

Network layer:
Design issues- services provided to transport layer, routing algorithms – optimality principle, shortest path, flooding-definition. Congestion control algorithm – principles of congestion control. **6 Hrs**

Transport layer
Concepts, services provided to the upper layer, quality of service. **4 Hrs**

Presentation layer
Data compression techniques, network security – traditional cryptography and other cryptography techniques (Introductory concepts only). **4 Hrs**

Application layer
E-mail, Overview of TCP\IP. **5 Hrs**

TITLE:COMPUTER GRAPHICS
CODE: CS6212
Hrs / Week : 4 Hrs
CREDITS: 4

UNIT-I:COMPUTER GRAPHICS **45 Hrs**

Introduction:
Practical applications of computer Graphics: Display, hard copy and Interactive input devices, Display processors, Graphics software. **5 Hrs**

Line drawing systems and point plotting techniques:
Introduction –Coordinate systems-Display Devices –The CRT –Inherent Memory devices, Line(DDA,Bresenhams), Circle(DDA,Bresenhams) and ellipse(midpoint) drawing algorithms. Character generation, instruction sets for display processors, line styles, color and intensity, Area filling, character attributes, Inquiry functions, bundled attributes **10 Hrs**

Two Dimensional Transformations:
Translation, Scaling, Rotation, reflection, Shearing, Matrix Representations – Clipping and windowing, window to viewport transformation, Line clipping algorithm –Cohen – Southerland and Mid point subdivision. **10 Hrs**

Interactive computer graphics:
Concept of a segment: Segment files, Segment attributes, Graphical Input devices – The mouse-Tablets-Light pen-joy stick. Input techniques-Round Robin technique. **10 Hrs**

Three Dimensional graphics:
3d Transformation .Hidden surface elimination :The depth buffer algorithm –scan line algorithm, Polygon surfaces, curved surfaces, Representation of solid objects surfaces. **10 Hrs**

BOOKS:

1. Andrew S.Tannenbaum, "***Computer Networks***", Fourth Edition, Tata McGraw-Hill Publishing Company Limited NewDelhi
2. Behrouz A. Forouzan, "***Data Communications and Networking***", TATA Mc-
3. Grow-Hill publications, Second Edition, 2003.
4. William Stallings, "***Data & Computer Communications***", Pearson Education
5. Asia, Sixth Edition, 2001.
6. Donald Hearn & M.Pauline Baker, Computer Graphics C Version, Pearson Educaiton/PHI
7. Computer Graphics – Steven Harrington, McGH
8. Principles of Interactive Computer Graphics – Newman and Sproull,
9. McGraw Hill

PRACTICALS

TITLE: MAJORPROJECT LAB
CODE: CS6P1
Hrs / Week : 2 Hrs
CREDITS: 1

Students will be required to pursue a project work for an organization of their choice with the permission of the HOD. This work generally involves collecting data, solving and implementing a problem for the organization, developing computer programs using the knowledge acquired in the theory and laboratory courses. They will have to submit a report of the work done by them. Finally a demonstration of the work with the help of a presentation has to be done.

TITLE: COMPUTER GRAPHICS LAB
CODE: CS6P2
Hrs / Week : 2 Hrs
CREDITS: 1

1. Line using (a) DDA algorithm and (b) Bresenham's algorithm
2. Circle using (a) DDA algorithm and (b) Midpoint circle algorithm
3. Translation and scaling of a rectangle.
4. Rotation of a triangle:
   (a) With respect to the origin.
   (b) With respect to a pivot point.
5. Shearing of a rectangle
   (a) With respect to x axis
   (b) With respect to y axis
6. Pie-chart.
7. Implementation of Cohen-Sutherland line clipping algorithm.
8. Animation- Man walking with an umbrella.

Course Structure And Syllabus for

Master of Science (M.Sc.) in Computer Science

(Four Semester Course)

Proposed for 2012 batch onwards

Department of Computer Science
Faculty of Science
St. Joseph's College (Autonomous)

SEMESTER WISE COURSE STRUCTURE

FIRST SEMESTER

THEORY				
SL.NO.	**CODE**	**COURSE TITLE**	**Hrs / Week**	**Credits**
1	CS7112	Theory of Computation	4	4
2	CS7212	Design Methods and Analysis of Algorithm	4	4
3	CS7312	Data Communication and Computer Network	4	4
4	CS7412	Object Oriented Programming	4	4
PRACTICALS				
1	MCS1P1	Design Methods and Analysis of Algorithm Lab	6	3
2	MCS1P2	Object Oriented Programming Lab	6	3

SECOND SEMESTER

THEORY				
SL.NO.	**CODE**	**COURSE TITLE**	**Hrs / Week**	**Credits**
1	CS8112	Artificial Intelligence	4	4
2	CS8212	Computer Graphics And Multimedia	4	4
3	CS8312	Advanced Course in DBMS	4	4
4	CS8412	Software Project Management	4	4
PRACTICALS				
1	MCS2P1	Artificial Intelligence Lab	6	3
2	MCS2P2	Computer Graphics And Multimedia Lab	6	3

THIRD SEMESTER

THEORY				
SL.NO.	**CODE**	**COURSE TITLE**	**Hrs / Week**	**Credits**
1	CS9112	Data mining and knowledge discovery	4	4
2	CS9212	Data storage technologies	4	4

3	**CS9312**	**Network Security**	**4**	**4**
4	**CS9412**	**Advanced Computer Architecture**	**4**	**4**
PRACTICALS				
1	**MCS3P1**	**Mini Project Lab**	**6**	**3**
2	**MCS3P2**	**Web Designing Lab**	**6**	**3**

FOURTH SEMESTER

THEORY				
SL.NO.	**CODE**	**COURSE TITLE**	**Hrs / Week**	**Credits**
1	**CS0112**	**Distributed Computing Systems**	**4**	**4**
2	**CS0212**	**Advanced operating system**	**4**	**4**
3	**CS0312**	**Wireless communication**	**4**	**4**
PRACTICALS				
1	**MCS4P1**	**Major Project Lab**	**6**	**2**

THEORY QUESTION PAPER FORMAT

The question papers of the theory examinations should follow the pattern specified below:

Section	**Marks for each question**	**Number Of Questions**		**Total Marks**
		Total	**Should Answer**	
A	20	8	5	100

Total Marks 100

While selecting the questions importance should be given to all major units.

PRACTICAL QUESTION PAPER FORMAT

Scheme of valuation:

1. Writing two programs one from each section 10 marks
2. Execution of one program 20 marks
3. Formatting the program and output 10 marks

3.	Record verification	05 marks
4.	Viva voce related to practical topics only	05 marks
	Total	50 marks

PROJECT EVALUATION FORMAT

Scheme of valuation:

1.	Demonstration and presentation	25 marks
2.	Documentation	25 marks
	Total	50 marks

INTERNAL ASSESSMENT FORMAT

THEORY:

1.	CIA test	30 marks
2.	First Activity	10 marks
3.	Second Activity	10 marks
	Total	50 marks

PRACTICALS:

Every practical class the student should be assessed.

1.	Writing the observation book	3 marks
2.	Executing the programs	5 marks
3.	Record writing	2 marks
	Total	10 marks

Internal marks for the final semester project work can be awarded by the guide by evaluating the performance of the student during the course of the project work.

DETAILED SYLLABUS

FIRST SEMESTER

TITLE: Theory of Computation
CODE: CS7112
Hrs / Week : 4 Hrs
CREDITS: 4

Finite Automata and Regular Expressions:
Introduction to Finite Automata,DFA, Notations of DFA, DFA Design Techniques, Applications of Finite Automata, NFA, conversion from NFA to DFA. FA with Epsilon Transitions, Extended Transition function of ϵ-NFA to Strings, Conversions from ϵ-NFA to DFA, Difference between NFA, DFA and NFA, Regular Expressions, Finite Automata and Regular Expressions.

20 Hrs

Regular Languages and Properties of Regular Languages:
Proving languages not to be regular, Pumping lemma for Regular Languages, Properties of Regular Languages, Applications of Pumping lemma Equivalence and Minimization of Finite Automata.
10 Hrs

Context free Grammars and Languages
Grammar, Chomsky Hierarchy, Grammar from Finite Automata, Derivations, Leftmost Derivation, Rightmost Derivation, Derivation Tree, Ambiguous Grammar,
Properties of Context free Languages:
Substitution, Left Recursion, Simplification of CFG, Eliminating ϵ-productions, Eliminating Unit Productions, Chomsky Normal Form, Greiback Normal Form.
20 Hrs

Pushdown Automata and Turing Machines:
Transitions, Graphical Representation of PDA, Instantaneous Description, Acceptance of a language by PDA, Construction of PDA, Turing Machine Model, Instantaneous Description, Construction of Turing Machine.
10 Hrs
BOOKS:

1. J.E.Hopcraft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computation", Pearson Education
2. Cohen, "Introduction to Computer Theory", John Wiley.
3. M. Sipser, Introduction to Theory of Computation, PWS Publishing Corporation, 1997.
4. J.E. Hopcroft, J.D. Ullman, Introduction to Automata Theory, Languages and Computation, Addison-Wisley, 1979.
5. T.C. Martin, Theory of Computation, Tata McGraw-Hill
6. H.R. Lewis, C.H. Papadimitrou, Elements of the Theory of Computation, PHI.

TITLE: Design Methods and Analysis of Algorithm
CODE: CS7212
Hrs / Week : 4 Hrs
CREDITS: 4

Elementary Data Structures:
Arrays, stacks, queue, linked list, Basic Computational Models.
Simple Algorithms. Analyzing Algorithms, Asymptotic Notation, Recurrence relations.
Design Methods:
General Consideration, Algorithm design paradigms and representative problems.
12 Hrs
Divide and Conquer:
Binary search, Merge Sort, Quick Sort, Arithmetic with Large integers. **12 Hrs**

Greedy Method:
Minimal Spanning Tree, Shortest Paths, Knapsack. Dynamic Programming, Chained Matrix Multiplication, Optimal Storage on Tapes, Shortest Paths, Optimal Search Trees. **12 Hrs**

Backtracking Method:
8-queens problem, Graph Colouring, Hamiltonian Cycles, Branch and Bound 0/1 Knapsack problem, Travelling Salesperson, Approximation Graph Colouring, Task Scheduling, Bin Packing.
12 Hrs

Graph Algorithms:
BFS, DFS and its applications. Polynomial Evaluation , Intractable Problems : Basic Concepts, Nondeterministic Algorithms, NP Completeness, Cook's Theorem, Examples of NP-Hard and NP-Complete problems.
12 Hrs

BOOKS:

1. A.Aho, J. Hopcroft and J.Ullman, The Design and Analysis of Computer Algorithms, Addison Wesley.
2. E. Horowitz and S. Sahani, Fundamentals of Computer Algorithms, Galgotia, New Delhi.
3. S.E.Goodman and S.T.Hedetniemi, Introduction to the Design and Analysis of Algorithms, McGraw Hill.
4. G.Brassard and P.Bratley, Algorithmics, PHI.
5. S.K.Basu, Design Methods and Analysis of Algorithms, PHI, 2005.

TITLE: Data Communication and Computer Network
CODE: CS7312
Hrs / Week : 4 Hrs
CREDITS: 4

Elements of data communication:

Concepts and terminology, analog and digital data transmission, signals, attenuation, delay distortion, noise, channel capacity, transmission media, data encoding, asynchronous and synchronous transmission, multiplexing.

Communication network, Circuit Switching, Message Switching and Packet Switching, Radio and Satellite Networks, Local Area Network topology, medium access control protocols.
15 Hrs

Design and Setting a practical Network:
Network Adaptors, Repeaters, Hubs, Bridges, Switches and Routers, Cables.
15 Hrs

Network Architecture and Distributed Processing:
OSI reference model, layered and hierarchical approaches, network interface, internet protocols and standards. Network services, electronic mail, Digital Signature, and Firewalls.
15 Hrs
Introduction to high-speed networks:
Routing, Scheduling and Congestion Control issues and algorithms.
15 Hrs

BOOKS:

1. B. A. Forouzan, Data Communications and Networking, TMH, 2003.
2. W.Stallings, Data and Computer Communication, McMillan.
3. A.S.Tanenbaum, Computer Networks, PHI.
4. J. Martin, Computer Network and Distributed Data Processing, Prentice Hall.
5. W.Stallings, Local Networks, McMillan.
6. M.Schwertz, Computer Communication Network Design and Analysis, Prentice Hall
7. Keshav, An Engineering Approach to Computer Networks, Addison-Wisley, 1998.
8. Peterson and Davie, Computer Networks, Morgan and Kaufmann, 2000.

TITLE: Object Oriented Programming
CODE: CS7412
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
OOAD and OOP, Object Oriented Programming paradigm and design; General Concepts: Object, Class, Data Abstraction and Encapsulation, Inheritance, Polymorphism, Dynamic Binding, Message Passing; Benefits of OOP, Object-oriented Languages. **12 Hrs**

Objects and Classes:
Object oriented Programming using C++: Data Types, Operators, Classes and Objects, Constructors and Destructors.
12 Hrs

Operator Overloading:
Operator Overloading, Type Conversions, Inheritance, Pointers, Virtual Functions, Polymorphism.
12 Hrs

Streams:
Stream I/O in C++, File Processing, Templates, Standard Template Library, Program defined exceptions, Events; Introduction to Class Wizard, Application Wizard and MFC.
12 Hrs
OOAD:
Use of OOAD and OOP concepts in different areas: - Object-oriented Software Engineering, Object-oriented OS.
12 Hrs

BOOKS:

1. B. Stroustrup, The C++ Programming Language, Addison-Wesley.
2. E. Balagurusamy, Object oriented Programming with C++, 2/ed, TMH.
3. G. Booch, Object Oriented Analysis and Design, Addison-Wesley.
4. Rumbagh et. Al., Object Oriented Modeling, PHI.
5. R. S. Pressman, Software Engineering – A Practitioner's Approach, McGraw Hill.

TITLE: Design Methods and Analysis of Algorithm Lab
CODE: MCS1P1
Hrs / Week : 6 Hrs
CREDITS: 3

1. A list of programs should be prepared by the lab in-charge and displayed at the beginning of the semester with the approval of the HOD.
2. The list should include at least 20 programs (more can be considered) covering all units equally.
3. The students should write the algorithm and the flow charts for the problems solved in the labs itself, this should be evaluated by the lab in-charge.
4. The questions can be designed with real time application in mind, the programs should not be conventional type.
5. All the students should execute the same set of problems.

TITLE: Object Oriented Programming Lab
CODE: MCS1P2
Hrs / Week : 6 Hrs
CREDITS: 3

1. A list of programs should be prepared by the lab in-charge and displayed at the beginning of the semester with the approval of the HOD.
2. The list should include at least 20 programs (more can be considered) covering all units equally.
3. The students should write the algorithm and the flow charts for the problems solved in the labs itself, this should be evaluated by the lab in-charge.
4. The questions can be designed with real time application in mind, the programs should not be conventional type.

5. All the students should execute the same set of problems.

SECOND SEMESTER

TITLE: Artificial Intelligence
CODE: CS8112
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Definitions and approaches, Foundations of A.I., History of AI, Areas and state of the art in A.I., A.I. Programming languages, Concept of Intelligent Agents.
15 Hrs

Problem Solving:
Problem solving as state space search, production system, control strategies and problem characteristics; Search techniques: Breadth First and Depth-first, Hill-climbing, Heuristics, Best-First Search, A* algorithm, Problem reduction and AO* algorithm, Constraints satisfaction, Means Ends Analysis, Game Playing.
15 Hrs

Knowledge Representation and Reasoning:
Syntactic and Semantic representations, Predicate and prepositional logic, Resolution, Unification, Deduction and theorem proving, Question answering, Overview of PROLOG; Forward versus backward reasoning, Matching, Indexing;
Ontological Engineering, Formal Theory of Beliefs, Semantic Net, Frames, Conceptual Dependencies and Scripts, Truth Maintenance Systems.
15 Hrs

Selected Topics and Applications:
Philosophical issues, Introduction to Natural Language Processing, Expert Systems and Multi-agent Systems.
15 Hrs

BOOKS:
1. S. Russel, P. Norvig, Artificial Intelligence: A Modern Approach, Pearson Education.
2. E. Rich and K. Knight, Artificial Intelligence, Tata McGraw Hill.
3. Nilsson, Artificial Intelligence: A New Synthesis, Morgan Kaufmann.
4. Manual of Turbo PROLOG.

TITLE: Computer Graphics And Multimedia
CODE: CS8212
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Introduction to Computer Graphics, Display Technologies, Random and Raster Scan, frame buffer, bit plane, Input Devices, Graphics Standards, Graphics Hardware.
10 Hrs

Line and Circle drawing:
Line and Circle Drawing Algorithms, Scan Conversion, filling algorithms, clipping, Two and Three Dimensional transformations, Homogeneous Coordinates, Rigid Body and Affine transformations, Parallel and perspective projections, vanishing points, viewing transformation, Hidden line removal method, Curve and Surface: Cubic Spline, Bezier curve, B-Spline Curves, Parametric Surface, Surface of revolution, Sweep surface, Fractal Curves and surfaces.
30 Hrs

Introduction to Multi-media technology:
Introduction to Multi-media Technology, Audio System, Image Compression, Data Compression, Digital Motion Video, Authoring tools, Multimedia Applications, Multimedia DBMS.
20 Hrs

BOOKS:

1. R. Steinmetz and K. Nahrstedt, Multimedia: Computing, Communications and Applications, Prentice Hall P T R, 1995.
2. Computer Graphics (Principles and Practice) by Foley, van Dam, Feiner and Hughes, Addisen Wesley (Indian Edition)
3. Computer Graphics by D Hearn and P M Baker, Printice Hall of India (Indian Edition).
4. Mathematical Elements for Computer Graphics by D F Rogers

TITLE: Advanced Course in DBMS
CODE: CS8312
Hrs / Week : 4 Hrs
CREDITS: 4

Functional Dependencies:
Basic definitions, Trivial and non trivial dependencies, closure of a set of dependencies, closure of a set of attributes, irreducible set of dependencies.
Normalization techniques : Normal forms, First normal form, second normal form, third normal form, BCNF, fourth normal form, Fifth normal form.
12 Hrs

Query Optimization:
Introduction, General Optimization Strategies, Algebraic Manipulation, Optimization of Selections in System R optimizer.
12 Hrs

Database Protection and recovery:
Integrity, Constraints in Query-by-Example, Security, Security in query-by-Example, Security in Statistical Databases, Transactions, properties of transactions, recovery(System recovery, Media recovery).
12 Hrs

Concurrent Operations on the Database:
Basic Concepts, A simple Transaction Model, Model with Read- and Write-Locks, Read-only, Write-only Model, Protection against Crashes, Optimistic Concurrency Control. **12 Hrs**

Principles of Distributed Data Bases:
Framework for distribution. Query optimization and management of distributed transaction. Concurrency control and reliability in distributed databases. Administration of Distributed Data Bases.
12 Hrs

BOOKS:

1. J.D.Ullman, Principles of Database Systems, Galgotia, New Delhi.
2. Database Systems , C .J Date
3. Fundamentals of Database Management Systems, Alexis Leon and Mathews Leon
4. S.Ceri and G. Relagatti, Distributed Databases, McGraw-Hill.
5. C.Papadimitriou , The Theory of Database concurrency Control, Computer Science Press.
6. T. Ozsu and P. Valduriez, Principles of Distributed Database Systems, Prentice-Hall.

TITLE: Software Project Management
CODE: CS8412
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction to Software Project Management:
Introduction, Software project versus other types of projects, contract management and technical project management, activities covered by Software Project Management, plans methods and Methodologies, Categorizing Software Projects, setting objectives stakeholders, business case, requirement specification, Management control. **6 Hrs**

Project planning:
Introduction and various steps in project planning.
6 Hrs

Project evaluation:
Strategic assessment, technical assessment, cost-benefit analysis, cash flow forecasting, cost-benefit evaluation techniques, risk evaluation.
6 Hrs

Selection of appropriate Project approach:
Choosing technologies, technical plan contents list, choice of process models, (structure versus speed of delivery), waterfall model, V-process model, spiral model, software prototyping, other ways of categorizing prototypes, controlling changes during prototyping, incremental delivery,(dynamic systems development method, extreme programming, Managing iterative processes), selecting more appropriate process model. **6 Hrs**

Software Effort Estimation:
Estimation Techniques – COCOMO Model.
4 Hrs

Activity planning:
Objectives, When to plan, project schedules, projects and activities, sequencing and scheduling the activities, network planning models, formulating a network model, adding time dimension, forward pass, backward pass, identifying critical path, activity float, shortening project duration, identifying critical activities, activity-on-arrow networks.

Risk Management:
Nature of risk, types of risk, managing risk, hazard identification, hazard analysis, risk planning and control, evaluating risks to the schedule.
8 Hrs

Resource allocation:
Nature of resources, identifying resource requirements, scheduling resources, creating critical paths, counting the cost, publishing resource schedule.
6 Hrs

Monitoring and control:
Creating framework, collecting data, visualizing progress, cost monitoring, earned value, prioritizing monitoring, getting the project back to target, change control.
6 Hrs

Managing people and organizing teams:
Understanding behavior, organizational behavior: a background, selecting the right person for the job, instruction in the best methods, motivation, working in groups, becoming a team, decision making, leadership, organizational structures, stress, health and safety.
6 Hrs

Software quality:
Place of software quality in project planning, importance of project quality, defining software quality, ISO 9126, practical software quality measures, product versus process quality management, external standards, techniques to help enhance software quality, quality plans.
6 Hrs

BOOKS:

1. Hughes, Bob and Cotterell, Mike, *Software project Management*, 3rd OR 4th Edition, TMH, 2005
2. Kathy Schwalbe, *Information Technology Project Management,* Vikas Publishing House, 2004
3. Kieron Conway, *Software Project Management – From Concept to Deployment,* Dreamtech Press, 1st Reprint Edition, 2002
4. Kelkar S. A,*Information Technology Project Management, A concise study*, PHI, 2005
5. Royce, Walker, *Software project Management A unified Framework*, Pearson

TITLE: Artificial Intelligence Lab
CODE: MCS2P1
Hrs / Week : 6 Hrs
CREDITS: 3

1. A list of programs should be prepared by the lab in-charge and displayed at the beginning of the semester with the approval of the HOD.
2. The list should include at least 20 programs (more can be considered) covering all units equally.
3. The students should write the algorithm and the flow charts for the problems solved in the labs itself, this should be evaluated by the lab in-charge.
4. The questions can be designed with real time application in mind, the programs should not be conventional type.
5. All the students should execute the same set of problems.

TITLE: Computer Graphics Lab
CODE: MCS2P2
Hrs / Week: 6 Hrs
CREDITS: 3

1. A list of programs should be prepared by the lab in-charge and displayed at the beginning of the semester with the approval of the HOD.
2. The list should include at least 20 programs (more can be considered) covering all units equally.
3. The students should write the algorithm and the flow charts for the problems solved in the labs itself, this should be evaluated by the lab in-charge.
4. The questions can be designed with real time application in mind, the programs should not be conventional type.
5. All the students should execute the same set of problems.

THIRD SEMESTER

TITLE: Data mining and knowledge discovery
CODE: CS9112
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction:
Motivations, Data Mining Databases-Relational Data Bases, Data warehouse, Transactional Databases, Advanced Database systems and advanced Database applications. Data Mining Functionalities- Concept/Class Discrimination; characterizations and Discrimination, Association Analysis, Classification and Prediction, Cluster Analysis, Outlier Analysis and Evolution Analysis. Classifications of Data Mining Systems, Major issues in Data Mining.

Data Pre-processing:
Introduction, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation Discretization.
15 Hrs

Data Warehouse and OLAP Technology:
An Overview, Introduction to Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehousing to Data Mining.

Data Cube Computation and Data Generalization:
Data Cube Computation and Data Generalization: Efficient Method for Data Cube Computations.
15 Hrs

Mining Frequent Patterns, Associations, and Correlations:
Basic Concepts and a Road Map, Efficient and Scalable Frequent Itemset Mining Methods, Mining Various Kinds of Association Rules.

Classification and Prediction:
Introduction, Issues regarding classification and prediction, classification by decision tree Induction, Bayesian classification, Rule based Classification, Classification by back propagation and advanced classification methods, prediction, classification accuracy.

15 Hrs

Cluster Analysis:
Introduction, Types of data in cluster analysis, A categorization of major cluster Methods, Partitioning methods, Hierarchical methods, Density-Base Methods, Grid-based methods, Model based Methods, Clustering High Dimensional Data, Outlier analysis. Introduction to Advanced Data Mining and their applications.
15 Hrs

BOOKS:

1. Jaiawei Han and Micheline Kamber, Data Mining Concepts and Techniques, Morgan Kaufmann/Elsevier Science publisher, 2nd Edition. Reprint published by Harcourt (INDIA) Private Limited.
2. Ian H. Writte, Eibe Frank and Mark A. Hall, Data Mining Practical Machine Learning Tools and Techniques, Elsewher Pubication, Third Edition.
3. Arun K Pujari, Data Mining Techniques, University Press (INDIA) Pvt., 2003.
4. Krzysztof J Cios; Witold Pedrycz and Roman Swiniarski, Data Mining Methods For Knowledge Discovery, Publisher: Boston : Kluwer Academic, 1998.

TITLE: Data storage technologies
CODE: CS9212
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction to Storage Technology:
Data proliferation and the varying value of data with time & usage, sources of data and states of data creation, Data center requirements and evolution to accommodate storage needs, Overview of basic storage management skills and activities, The five pillars of technology, Overview of storage infrastructure components, Evolution of storage, Information Lifecycle Management concept, Data categorization within an enterprise, Storage and Regulations.
12 Hrs

Storage Systems Architecture:
Intelligent disk subsystems overview, Contrast of integrated vs. modular arrays, Component architecture of intelligent disk subsystems, Disk physical structure

components, properties, performance, and specifications, Logical partitioning of disks, RAID & parity algorithms, hot sparing, Physical vs. logical disk organization, protection, and back end management, Array caching properties and algorithms, Front end connectivity and queuing properties, Front end to host storage provisioning, mapping, and operation, Interaction of file systems with storage, Storage system connectivity protocols. **12 Hrs**

Introduction to Networked Storage:
JBOD, DAS, SAN, NAS, & CAS evolution, Direct Attached Storage (DAS) environments: elements, connectivity, & management, Storage Area Networks (SAN): elements & connectivity, Fiber Channel principles, standards, & network management principles, SAN management principles, Network Attached Storage (NAS): elements, connectivity options, connectivity protocols (NFS, CIFS, ftp), & management principles, IP SAN elements, standards (iSCSI, FCIP, iFCP), connectivity principles, security, and management principles, Content Addressable Storage (CAS): elements, connectivity options, standards, and management principles, Hybrid Storage solutions overview including technologies like virtualization & appliances. **12 Hrs**

Introductions to Information Availability:
Business Continuity and Disaster Recovery Basics, Local business continuity techniques, Remote business continuity techniques, Disaster Recovery principles & techniques Managing & Monitoring Management philosophies (holistic vs. system & component), Industry management standards (SNMP, SMI-S, CIM), Standard framework applications, Key management metrics (thresholds, availability, capacity, security, performance), Metric analysis methodologies & trend analysis, Reactive and proactive management best practices, Provisioning & configuration change planning, Problem reporting, prioritization, and handling techniques.
12 Hrs

Securing Storage and Storage Virtualization:
Define storage security. , List the critical security attributes for information systems, describe the elements of a shared storage model and security extensions, Define storage security domains, List and analyze the common threats in each domain, Identify different virtualization technologies, describe block-level and file level virtualization technologies and processes.
12 Hrs

BOOKS:

1. Marc Farley Osborne, "Building Storage Networks", Tata Mcgraw Hill,2006
2. Robert Spalding, "Storage Networks: The Complete Reference", Tata Mcgraw Hill,2002
3. Meeta Gupta, Storage Area Network Fundamentals, Pearson Education Limited,2006
4. Gerald J Kowalski / Mark T Maybury ,Information Storage & Retrieval Systems Theory & Implementation, , BS Publications,2006
5. Thejendra BS ,Disaster Recovery & Business Continuity -, Shroff Publishers & Distributors,2008
6. Barb Goldworm / Anne Skamarock, Blade Servers & Virtualization, Wiley India

TITLE: Network Security
CODE: CS9312
Hrs / Week : 4 Hrs

CREDITS: 4

Introduction:
Introduction to the concepts of security, the need for security, security approaches, principles of security, types of attacks.

Convention Encryption:
Conventional Encryption Model, Steganography, Classical Encryption Techniques, Simplified DES, Block Cipher Principles, The Data Encryption Standard, The Strength of DES, Differential and Linear Cryptanalysis, Block Cipher Design Principles, Block Cipher Modes of operation, Conventional Encryption algorithms.
12 Hrs

Public Key Encryption And Hash Functions:
Public Key Cryptography, Principles of Public Key Cryptosystems, The RSA Algorithm, Key Management, Diffie Hellman Key Exchange, Elliptic Curve Cryptography Message Authentication and Hash Functions Authentication Requirements, Authentication Functions, Message Authentication Codes, Hash Functions, Security of Hash Functions. **12 Hrs**

Hash and Mac Algorithms:
Introduction, Nifty things to do with a Hash, MD5 Message Digest Algorithm, Secure Hash Algorithm (SHA-I), RIPEMD, HMAC, CMAC, Digital Signatures, Authentication Protocols -Digital Signature Standard.
12 Hrs

Network Security Applications:
Authentication Applications, Kerberos, X.509 authentication service, public key Infrastructure (PKI), Electronic Mail Security, Pretty Good Privacy, S/MIME, IP Security, IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating payload, combining security association, Key Management, Web Security, Web Security Considerations, Secure Socket Layer & Transport Layer Security, Secure Electronic Transaction, Introduction to Wireless security.
12 Hrs

Intruders, Viruses and Worms:
Intruders, Intrusion detection, password management, Viruses and Related Threats, Distributed Denial of service attacks, Firewall Design Principles, Trusted Systems, virtual private network(VPN).
12 Hrs

BOOKS:
1. William Stallings, "Cryptography and Network Security", Fourth edition, Prentice Hall,
2007.
2. Atul Kahate, "Cryptography and Network Security," Tata McGraw-Hills, 2006.
3. Neal Krawetz, "Introduction to Network Security", Thomson Business Press, 2007.
4. Eric Maiwald, "Information Security Series", "Fundamental of Network security",
Dreamtech press, 2004.
5. Charlie Kaufman, Radia Perlman, Mike Speciner, "Network Security: Private Communication in public world", Prentice Hall, India, 2002.

TITLE: Advanced Computer Architecture
CODE: CS9412
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction::
Architectural Abstraction, Classification schemes, Parallelism: Pipelining, Multiprocessing. Issues in Branch performance, Synchronization in Multiprocessing, High Performance Processor Design Issues: Pipeline design, Memory system design, I/O design. **12 Hrs**

Parallelism:
Instruction level parallelism, Thread and process level parallelism, Data parallelism. **10 Hrs**

Vector Machines:
Vector machines, Dependency Analysis, Vectorization, Optimization in Vector Processing, Vector Chaining , Example systems. Associative Processors and Algorithms. **10 Hrs**

Processors:
Super-scalar and VLIW processors, Example systems and main issues in design. **10 Hrs**

Multiprocessors:
Multiprocessors: Shared Memory, Distributed Memory Architectures; Multiprocessor Interconnections.
10 Hrs

Memories:
Memory systems for Multiprocessors, Example systems; cache memory, coherence issues, protocols.

Multiprocessor Simulation and Measurement.
8 Hrs

BOOKS:

1. D. Sima, T. Fountain, P. Kacsuk, "Advanced Computer Architectures: A Design Space Approach", Addison Wesley, 1997.
2. .J. Flynn, "Computer Architecture: Pipelined and Parallel Processor Design", Narosa Publishing House/ Jones
3. K. Hwang, "Advanced Computer Architecture: Parallelism, Scalability, Programmability", McGraw-Hill, Inc
4. Hwang and Briggs, "Computer Architecture and Parallel Processing, McGraw Hill.
5. B. Barnes, Modeling and Performance Measurement of Computer Systems, MIT Press.

TITLE: Mini Project Lab

CODE: MCS3P1
Hrs / Week : 6 Hrs
CREDITS: 3

Students will be required to pursue a project work allotted to them. This work generally involves solving some practical problem, developing computer programs using the knowledge acquired in the theory and laboratory courses. They will have to submit a report of the work done by them.

TITLE: Web Designing Lab
CODE: MCS3P2
Hrs / Week : 6 Hrs
CREDITS: 3

Students will be required to pursue a project work allotted to them. This work generally involves solving some practical problem, developing computer programs using the knowledge acquired in the theory and laboratory courses. They will have to submit a report of the work done by them.

FOURTH SEMESTER

TITLE: Distributed Computing Systems
CODE: CS0112
Hrs / Week : 4 Hrs
CREDITS: 4

Introduction to Distributed Systems:
Introduction -- What is a Distributed System? – Goals – (Advantages of Distributed Systems over Centralized Systems, Advantages of Distributed System over Independent PCs, Disadvantages of Distributed Systems) – Hardware Concepts – (Bus-Based Multiprocessors, Switched Multiprocessors, Bus-Based Multicomputers, Switched Multicomputers) – Software Concepts – (Network Operating Systems, True Distributed Systems, Multiprocessor Timesharing Systems) – Design Issues – (Transparency, Flexibility, Reliability, Performance, Scalability)
12 Hrs

Communication in Distributed Systems:
Introduction Asynchronous Transfer Mode Network – (What is Asynchronous Transfer Mode? ATM Physical Layer, ATM Layer, ATN Adaptation Layer, ATM Switching) – The Client-Server Model – (Client and Servers, Addressing, Block versus Nonblocking Primitives, Buffered versus Unreliable Primitives) – Remote Procedure Call – (Basic RPC Operation, Parameter Passing, Dynamic Binding, RPC Semantics in the Presence of Failures) Distributed objects and remote invocation : Introduction, Communication between distributed objects, Java RMI case study
12 Hrs

Synchronization in Distributed Systems:
Introduction -- Clock Synchronization – (Logical Clocks, Physical Clocks, Clock Synchronization Algorithms) – Mutual Exclusion – (A Centralized Algorithm, A Distributed Algorithm, A Token Ring Algorithm) – Election Algorithms – (The Bully Algorithm, A Ring Algorithm) – Atomic Transactions – (Introduction to Atomic

Transactions, The Transaction Model. Implementation, Concurrency Control) – Deadlocks in Distributed Systems – (Distributed Deadlock Detection & Prevention) **12 Hrs**

Processes and Processors in Distributed Systems:
Introduction – Threads – (Introduction to Threads, Threads Usage, Design Issues for Threads Packages,) – System Models – (The Workstation Model, Using Idle Workstations, The Processor Pool Model, A hybrid Model) – Processor Allocation – (Allocation Models, Design Issues for Processor Allocation Algorithms, Implementation Issues for Processor Allocation Algorithms, Example Processor Allocation Algorithms) – Scheduling in Distributed Systems – Fault Tolerance – (Component Fault, System Failures, Synchronous versus Asynchronous Systems, Use of Redundancy, Fault Tolerance Using Active Replication, Agreement in Fault Systems) **12 Hrs**

Distributed File Systems:
Introduction – Distributed File System Design – (The File Service Interface, The Directory Server Interface, Semantics of File Sharing) -- Distributed File System Implementation – (File Usage, System Structure, Caching, Replication, An Example: Sun's Network File System).

Distributed Shared Memory:
Introduction, What is Shared Memory? , Consistency Models, Page-Based Distributed Shared Memory.
12 Hrs

BOOKS:

1. Tanenbaum S Andrew, Distributed Operating Systems, Pearson Eduction Asia, 2001
2. Singhal Mukesh, Shivaratri G Niranjan, Advanced Concepts In Operating Systems Distributed Data Base, And Multiprocessor Operating Systems, McGraw-Hill, Inc., 2002
3. George Colulouris , Jean Dollimore, Tim Kindberg, Distributed systems-Concepts and Design, Second edition, Addison_Wesely
2. Sinha K Pradeep, Distributed Operating Systems Concepts and Design, Eastern

TITLE: Advanced operating system
CODE: CS0212
Hrs / Week : 4 Hrs
CREDITS: 4

Distributed Operating System:
Architecture of Distributed System:
Introduction, System Architecture Types, Distributed Operating System, Issues in DOS, Communication Network and Primitives. **Theoretical Foundations-** Introduction, Inherent Limitations of DS, Lamport's Logical Clocks, Vector Clocks, Termination Detection.

Distributed Mutual Exclusion:

Classification of Mutual Exclusion Algorithm, Preliminaries, Non-Token Based Algorithm, Lamport's Clock, Token based algorithm, Performance Analysis.

Distributed Deadlock Detection:
Deadlock Handling, Issues in Deadlocks, Control organizations for Distributed Deadlock Detection, Centralized Deadlock Detection Algorithms.

Agreement Protocols:
System model, Classification of Agreement Protocols.
12 Hrs

Distributed Resource Management:
Distributed File System:
Introduction, Architecture, Mechanism for building Distributed file system, Design Issues. **Distributed Shared Memory-**Introduction, Architecture and Motivation, Algorithm for Implementing DSM, Memory Coherence.

Distributed Scheduling:
Introduction and Motivation, Issues in Load Distribution, Components of Load Distribution Algorithm, Stability, Load Distribution Algorithm.
12 Hrs

Failure Recovery and Fault Tolerance:
Recovery:
Introduction, Classifications of Failure, Backward and Forward Error Recovery, Recovery in concurrent systems, Synchronous checkpoint and recovery, Asynchronous checkpoint and recovery.

Fault Tolerance:
Introductions, Issues, Atomic actions and Commiting, Commit protocol, Voting protocols, Dynamic Voting protocol, Dynamic Vote Reassignment protocol.
12 Hrs

Protection and Security:
Resource Security and Protection:
Access and Flow Control, Preliminaries, The Access Matrix Model, Implementation of Access Matrix.
12 Hrs

Multiproccessor Operating System and Database Operating System
Multiprocessor System Architecture:
Introduction, Motivation, Basic Multiprocessor System Architecture, Interconnection Network for Multiprocessor Systems.

Multiprocessor Operating Systems:
Introduction, Structure, Operating System Design Issues, Threads.
Database Operating System
Introduction.
Concurrency Control Algorithm
Introduction, Basic Synchronization primitives.
12 Hrs

BOOKS

1. A.S. Tanenbaum, Distributed Operating System, Prentice-Hall, 1995.
2. A.S. Tanenbaum, Modern Operating Systems, Pearson Education Asia, 2001.
3. M. Singhal and N. G. Shivaratri, , Advance Concepts in Operating Systems, McGraw-Hill, 1994.
4. J. W. S. Liu, Real-Time Systems, Pearson Education, 2000.

TITLE: Wireless communication
CODE: CS0312
Hrs / Week : 4 Hrs
CREDITS: 4

Services and technical:
Types of Services, Requirements for the services, Multipath propagation, Spectrum Limitations, Noise and Interference limited systems, Principles of Cellular networks, Multiple Access Schemes.
12 Hrs

Wireless propagation:
Propagation Mechanisms (Qualitative treatment), Propagation effects with mobile radio, Channel Classification, Link calculations, Narrowband and Wideband models.
12 Hrs

Wireless transceivers:
Structure of a wireless communication link, Modulation and demodulation – Quadrature /4-Differential Quadrature Phase Shift Keying, Offset-QuadratureπPhase Shift Keying, Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels. **12 Hrs**

Signal processing in wireless systems:
Principle of Diversity, Macrodiversity, Microdiversity, Signal Combining Techniques, Transmit diversity, Equalisers- Linear and Decision Feedback equalisers, Review of Channel coding and Speech coding techniques.
12 Hrs

Advanced transceiver schemes:
Spread Spectrum Systems- Cellular Code Division Multiple Access Systems- Principle, Power control, Effects of multipath propagation on Code Division Multiple Access, Orthogonal Frequency Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation, Second Generation(GSM, IS–95) and Third Generation Wireless Networks and Standards

BOOKS:

1. Andreas.F. Molisch, "Wireless Communications", John Wiley – India, 2006.
2. Simon Haykin & Michael Moher, "Modern Wireless Communications", Pearson Education, 2007.
3. Rappaport. T.S., "Wireless communications", Pearson Education, 2003.
4. Gordon L. Stuber, "Principles of Mobile Communication", Springer International Ltd.,

TITLE: Major Project Lab
CODE: MCS4P1

Hrs / Week : 6 Hrs
CREDITS: 2

Students will be required to pursue a project work in an organization of their choice with the permission of the HOD. This work generally involves solving and implementing some problem of the organization, developing computer programs using the knowledge acquired in the theory and laboratory courses. They will have to submit a report of the work done by them. Finally a demonstration of the work with the help of a presentation has to be done.