



Department : Computer Science and Information Technology

Programme Name : B.Sc(CS)

Academic Year : 2019-20

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
	SSCICR0101(L+P)	Programming Fundamentals using C++
	SSCIGE0101(L+P)	Introduction to Programming using C
	SSCICR0203(L+P)	Programming in JAVA
	(SSCIGE0202L)	Introduction to Internet Technologies
	(SSCICR0305L)	Internet Technologies
	SSCICR0306L	Database Management Systems
	SSCICR0307L	Computer Networks
	SSCISC0301(L+P)-A	HTML and XML Programming
	SSCISC0301(L+P)-B	UNIX / LINUX programming
	MS/CS/C-409L (SSCICR0409L)	Software Engineering
	SSCIGE0404(L+P)	Multimedia and Applications
	SSCISC0402(L+P)-A	PHP Programming
	SSCISC0402(L+P)-B	MATLAB
	PCSC-501	Introduction to Oops(++)
	PCSC-503	Internet Applications
	PCSC-505	Minor Project
	PCSC-601	Programming in Visual Basic
	PCSC-602	Introduction to JAVA



	PCSC-603	Linux Operating System and Shell Programming
	PCSC-605	Major Project

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School of Mathematical and Computational Sciences:

B.Sc. Honours Computer Science, Department of CSIT, GGV, Bilaspur

Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
I	Core-1	(SSCICR0101L)	Programming Fundamentals using C++	4	4
	Core -1 Practical	(SSCICR0101P)	Lab Based on Programming Fundamentals using C++	2	4
	Core -2	(SSCICR0102L)	Data Structures	5	5
	Core -2 Tutorial	(SSCICR0102T)	Tutorials Based on Data Structures	1	1
	Generic Elective -1 (GE- IA)	(SSCIGE0101L)	Introduction to Programming using C	4	4
	Generic Elective - Practical	(SSCIGE0101P)	Lab Based on Introduction to Programming using C	2	4
	Ability Enhancement Compulsory Course (AECC)	(SSCICC0101L)	English Communication / MIL (Hindi Communication)	4*	4
	ECA	(SSCIEC0101)	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
			TOTAL	24	28



Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
II	Core-3	MS/CS /C-203L (SSCICR0203L)	Programming in JAVA	4	4
	Core -3 Practical	MS/CS /C-203P (SSCICR0203P)	Lab Based on Programming in JAVA	2	4
	Core -4	MS/CS /C-204L (SSCICR0204L)	Discrete Structures	5	5
	Core -4 Tutorial	MS/CS /C-204T (SSCICR0204T)	Tutorial on Discrete Structures	1	1
	Generic Elective -2 (GE-IB)	MS/CS /GE-202L (SSCIGE0202L)	Introduction to Internet Technologies	4	4
	Generic Elective - Practical	MS/CS /GE-202P (SSCIGE0202P)	Lab Based on Internet Technologies	2	4
	Ability Enhancement Compulsory Course (AECC)	MS/CS /AE-201/ES (SSCICC0202L)	Environmental Science	4*	4
	ECA	(SSCIEC0202)	ECA-Extracurricular activity/ Tour, Field visit/ Industrial training/ NSS/ Swachhta/ vocational Training/ Sports/ others	2	(2)
		Total	24	28	
SUMMER Internship: 15 days			Swayam Swachhta / NSS / Industrial/ others	2	100



Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
III	Core-5	(SSCICR0305L)	Internet Technologies	5	5
	Core -5 Tutorials	(SSCICR0305T)	Tutorials on Internet Technologies	1	1
	Core -6	(SSCICR0306L)	Database Management Systems	4	4
	Core -6 Practical	(SSCICR0306P)	Lab based on Database Management System	2	4
	Core - 7	(SSCICR0307L)	Computer Networks	5	5
	Core - 7 Tutorial	(SSCICR0307T)	Tutorial on Computer Networks	1	1
	Generic Elective -3 (GEII-A)	(SSCIGE0303L)	Introduction to Database Systems	4	4
	Generic Elective - Practical	(SSCIGE0303P)	Lab Based on Database System	2	4
	Skill Enhancement Course (SEC - 1)	(SSCISC0301L)	A.HTML and XML Programming B. UNIX/LINUX Programming	2	2
			Total	26	30



Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
IV	Core-8	MS/CS /C-408L (SSICR0408L)	Computer System Architecture	5	5
	Core -8 Tutorials	MS/CS /C-408T (SSICR0408T)	Tutorials on Computer System Architecture	1	1
	Core -9	MS/CS/C-409L (SSICR0409L)	Software Engineering	4	4
	Core -9 Practical	MS/CS /C-409P (SSICR0409P)	Lab Based on Software Engineering	2	4
	Core - 10	MS/CS /C-410L (SSICR0410L)	Design and Analysis of Algorithms	5	5
	Core -10 Tutorials	MS/CS/C-410T (SSICR0410L)	Tutorials on Design and Analysis of Algorithms	1	1
	Generic Elective -4 (GEII-B)	MS/CS/GE-404L (SSIGE0404L)	Multimedia and Applications	4	4
	Generic Elective - Practical	MS/CS /GE-404P (SSIGE0404P)	Lab Based on Multimedia and Applications	2	4
	Skill Enhancement Course (SEC - 2)	MS/CS/SEC-402 (SSCISC0402L+P)	A.PHP Programming B.MATLAB	2	2
				TOTAL	26
SUMMER Internship: 15 days			Swayam Swachhta / NSS / Industrial/ others	2	100



Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
V	Core-11	MS/CS /C-511L (SSCICR0511L)	Operating System	5	5
	Core -11 Tutorials	MS/CS /C-511T (SSCICR0511T)	Tutorials based on Operating system	1	1
	Core -12	MS/CS /C-512L (SSCICR0512L)	Theory of Computation	5	5
	Core -12 Tutorials	MS/CS /C-512T (SSCICR0512T)	Tutorials on Theory of Computation	1	1
	Discipline Specific Elective (DSE-1)	MS/CS/DSE-501L(A) MS/CS/DSE-501L(B) (SSCIDS0501L)	A Information Security B Operation Research	5(A) 5(B)	5(A) 5(B)
	DSE-1 - Tutorials	MS/CS/DSEP-501T(A) MS/CS/DSET-501T(B) (SSCIDS0501T)	A Tutorials on Information Security B Tutorials on Operation Research	1(A) 1(B)	1(A) 1(B)
	Discipline Specific Elective (DSE-2)	MS/CS/DSE-502L(A) MS/CS/DSE-502L(B) (SSCIDS0502L)	A Image Processing B Soft Computing	4(A) 4(B)	4(A) 4(B)
	DSE-2 - Practical	MS/CS/DSET-502P(A) MS/CS/DSEP-502P(B) (SSCIDS0502P)	A Lab Based on Image Processing B Lab Based on Soft Computing	2(A) 2(B)	4(A) 4(B)
				TOTAL	24



Semester	Course Opted	Course Code	Name of the course	Credit	Hour / week
VI	Core-13	MS/CS /C-613L (SSCICR0613L)	Artificial Intelligence	5	5
	Core -13 Tutorials	MS/CS /C-613T (SSCICR0613T)	Tutorials on Artificial Intelligence	1	1
	Core -14	MS/CS/C-614L (SSCICR0614L)	Computer Graphics	4	4
	Core -14 Practical	MS/CS /C-614P (SSCICR0614T)	Lab based on Computer Graphics	2	4
	Discipline Specific Elective (DSE-3)	MS/CS/DSE-601L(A) MS/CS/DSE-601L(B) (SSCIDS0603L)	A Big Data Analytics B Data Mining	5(A) 5(B)	5(A) 5(B)
	DSE-3 - Tutorials	MS/CS/DSET-601T(A) MS/CS/DSET-601T(B) (SSCIDS0603T)	A Tutorials on Big Data Analytics B Tutorials on Data Mining	1(A) 1(B)	1(A) 1(B)
	Discipline Specific Elective (DSE-4) + DSE-4 – Practical Or Dissertation/ Project work followed by seminar	MS/CS/PW (SSCIDS0604)	Project work followed by seminar	4+2=6 Or 5 +1=6	8
			TOTAL	24	28
			TOTAL CREDITS	152 + 4 (SI)	

As per UGC CBCS guidelines, University / departments have liberty to offer GE and SEC courses offered by any department to students of other departments. The No. of GE course is four. One GE course is compulsory in first 4 semesters each. In present scheme it is proposed to have minimum two GE courses (from one subject) in first two semester after which student shall change two GE for another subject in IIIrd and IVth semester, so that the entire student can have exposure of one additional subject. **(Subject to approval by the competent authority)**



COMPUTER SCIENCE (CORE-I): Programming Fundamentals using C/C++ (SSICR0101L)

Theory: 60 Lectures

1. Introduction to C and C++ (3 Lectures)

History of C and C++, Overview of Procedural Programming and Object-Oriented Programming, Using main() function, Compiling and Executing Simple Programs in C++.

2. Data Types, Variables, Constants, Operators and Basic I/O (5 Lectures)

Declaring, Defining and Initializing Variables, Scope of Variables, Using Named Constants, Keywords, Data Types, Casting of Data Types, Operators (Arithmetic, Logical and Bitwise), Using Comments in programs, Character I/O (getc, getchar, putc, putchar), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.h etc).

3. Expressions, Conditional Statements and Iterative Statements (5 Lectures)

Simple Expressions in C++ (including Unary Operator Expressions, Binary Operator Expressions), Understanding Operators Precedence in Expressions, Conditional Statements (if construct, switch-case construct), Understanding syntax and utility of Iterative Statements (while, do-while, and for loops), Use of break and continue in Loops, Using Nested Statements (Conditional as well as Iterative)

4. Functions and Arrays (10 Lectures)

Utility of functions, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Return data type of functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/Parameters in Functions, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays (Declaring and Defining an Array, Initializing an Array, Accessing individual elements in an Array, Manipulating array elements using loops), Use Various types of arrays (integer, float and character arrays / Strings) Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns), Introduction to Multi-dimensional arrays

5. Derived Data Types (Structures and Unions) (3 Lectures)

Understanding utility of structures and unions, Declaring, initializing and using simple structures and unions, Manipulating individual members of structures and unions, Array of Structures, Individual data members as structures, Passing and returning structures from functions, Structure with union as members, Union with structures as members.

6. Pointers and References in C++ (7 Lectures)

Understanding a Pointer Variable, Simple use of Pointers (Declaring and Dereferencing Pointers to simple variables), Pointers to Pointers, Pointers to structures, Problems with Pointers, Passing pointers as function arguments, Returning a pointer from a function, using arrays as pointers, Passing arrays to functions. Pointers vs. References, Declaring and initializing references, Using references as function arguments and function return values

7. Memory Allocation in C++ (3 Lectures)



Differentiating between static and dynamic memory allocation, use of malloc, calloc and free functions, use of new and delete operators, storage of variables in static and dynamic memory allocation

8. File I/O, Preprocessor Directives

(4 Lectures)

Opening and closing a file (use of fstream header file, ifstream, ofstream and fstream classes), Reading and writing Text Files, Using put(), get(), read() and write() functions, Random access in files, Understanding the Preprocessor Directives (#include, #define, #error, #if, #else, #elif, #endif, #ifndef, #ifnndef and #undef), Macros

9. Using Classes in C++

(7 Lectures)

Principles of Object-Oriented Programming, Defining & Using Classes, Class Constructors, Constructor Overloading, Function overloading in classes, Class Variables & Functions, Objects as parameters, Specifying the Protected and Private Access, Copy Constructors, Overview of Template classes and their use.

10. Overview of Function Overloading and Operator Overloading

(5 Lectures)

Need of Overloading functions and operators, Overloading functions by number and type of arguments, Looking at an operator as a function call, Overloading Operators (including assignment operators, unary operators)

11. Inheritance, Polymorphism and Exception Handling

(8 Lectures)

Introduction to Inheritance (Multi-Level Inheritance, Multiple Inheritance), Polymorphism (Virtual Functions, Pure Virtual Functions), Basics Exceptional Handling (using catch and throw, multiple catch statements), Catching all exceptions, Restricting exceptions, Rethrowing exceptions.

Reference Books

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill.2003th
2. BjarneStroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley, 2013.
3. BjarneStroustrup, "Programming -- Principles and Practice using C++", 2nd Edition, Addison-Wesley 2014.
4. E Balaguruswamy, "Object Oriented Programming with C++", Tata McGraw-HillEducation, 2008.
5. Paul Deitel, Harvey Deitel, "C++ How to Program", 8th Edition, Prentice Hall, 2011.
5. John R. Hubbard, "Programming with C++", Schaum's Series, 2nd Edition, 2000.
6. Andrew Koeni, Barbara, E. Moo, "Accelerated C++", Published by Addison-Wesley, 2000.
7. Scott Meyers, "Effective C++", 3rd Edition, Published by Addison-Wesley, 2005.
8. Harry, H. Chaudhary, "Head First C++ Programming: The Definitive Beginner's Guide", First Create space Inc, O-D Publishing, LLC USA.2014
9. Walter Savitch, "Problem Solving with C++", Pearson Education, 2007.
10. Stanley B. Lippman, JoseeLajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012



COMPUTER SCIENCE LAB (CORE-II): Programming Fundamentals using C/C++ Lab (SSCICR0101P)

Practical: 15 Lectures

1. WAP to print the sum and product of digits of an integer.
2. WAP to reverse a number.
3. WAP to compute the sum of the first n terms of the following series $S = 1 + 1/2 + 1/3 + 1/4 + \dots$
4. WAP to compute the sum of the first n terms of the following series $S = 1 - 2 + 3 - 4 + 5 - \dots$
5. Write a function that checks whether a given string is Palindrome or not. Use this function to find whether the string entered by user is Palindrome or not.
6. Write a function to find whether a given no. is prime or not. Use the same to generate the prime numbers less than 100.
7. WAP to compute the factors of a given number.
8. Write a macro that swaps two numbers. WAP to use it.
9. WAP to print a triangle of stars as follows (take number of lines from user):

```
*  
***  
*****  
*****  
*****
```

10. WAP to perform following actions on an array entered by the user:
 - i) Print the even-valued elements
 - ii) Print the odd-valued elements
 - iii) Calculate and print the sum and average of the elements of array
 - iv) Print the maximum and minimum element of array
 - v) Remove the duplicates from the array
 - vi) Print the array in reverse order

The program should present a menu to the user and ask for one of the options.
The menu should also include options to re-enter array and to quit the program.

11. WAP that prints a table indicating the number of occurrences of each alphabet in the text entered as command line arguments.
12. Write a program that swaps two numbers using pointers.
13. Write a program in which a function is passed address of two variables and then alter its contents.
14. Write a program which takes the radius of a circle as input from the user, passes it to another function that computes the area and the circumference of the circle and displays the value of area and circumference from the main() function.
15. Write a program to find sum of n elements entered by the user. To write this



program, allocate memory dynamically using malloc() / calloc() functions or new operator.

16. Write a menu driven program to perform following operations on strings:

- a) Show address of each character in string
- b) Concatenate two strings without using strcat function.



- c) Concatenate two strings using strcat function.
 - d) Compare two strings
 - e) Calculate length of the string (use pointers)
 - f) Convert all lowercase characters to uppercase
 - g) Convert all uppercase characters to lowercase
 - h) Calculate number of vowels
 - i) Reverse the string
17. Given two ordered arrays of integers, write a program to merge the two-arrays to get an ordered array.
 18. WAP to display Fibonacci series (i) using recursion, (ii) using iteration
 19. WAP to calculate Factorial of a number (i) using recursion, (ii) using iteration
 20. WAP to calculate GCD of two numbers (i) with recursion (ii) without recursion.
 21. Create Matrix class using templates. Write a menu-driven program to perform following Matrix operations (2-D array implementation):
 - a) Sum
 - b) Difference
 - c) Product
 - d) Transpose
 22. Create the Person class. Create some objects of this class (by taking information from the user). Inherit the class Person to create two classes Teacher and Student class. Maintain the respective information in the classes and create, display and delete objects of these two classes (Use Runtime Polymorphism).
 23. Create a class Triangle. Include overloaded functions for calculating area. Overload assignment operator and equality operator.
 24. Create a class Box containing length, breath and height. Include following methods in it:
 - a) Calculate surface Area
 - b) Calculate Volume
 - c) Increment, Overload ++ operator (both prefix & postfix)
 - d) Decrement, Overload -- operator (both prefix & postfix)
 - e) Overload operator == (to check equality of two boxes), as a friend function
 - f) Overload Assignment operator
 - g) Check if it is a Cube or cuboidWrite a program which takes input from the user for length, breath and height to test the above class.
 25. Create a structure Student containing fields for Roll No., Name, Class, Year and Total Marks. Create 10 students and store them in a file.
 26. Write a program to retrieve the student information from file created in previous question and print it in following format:
Roll No. Name Marks
 27. Copy the contents of one text file to another file, after removing all whitespaces.
 28. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void.
 29. Write a program that will read 10 integers from user and store them in an array. Implement array using pointers. The program will print the array elements in ascending and descending order.



Generic Elective (GE-1)

**Subject – Introduction to Programming using C
(SSCIGE0101L)**

Origin & Introduction to C : About C, Evolution of C, Structure of a C program, Compiling a C program, Simple C program, Character set in C, Keywords in C, Basic data types, Qualifiers used with basic data types, Variables in C, Type declaration, Input function, Output function and format specifiers.

Operators: Arithmetic operators, Unary operators, Relational and logical operators, address operator, conditional operator, Hierarchy of operators.

Decision Making, looping & Branching: Control statements, if statement, if else statement, for statement, while loop, do while loop, switch statement, break statement, continue statement, goto statement.

Arrays: Introduction to arrays, advantages of arrays, single dimensional arrays, multidimensional arrays, array declaration, array initialization, accessing data from array. Two-dimensional Arrays (Declaring, Defining and Initializing Two Dimensional Array, Working with Rows and Columns)

Introduction to pointers, function, structure and union.

Reference Books:

1. Y. Kanetkar, Let Us C, BPB Publication.
2. B.S. Gottfried, Schaum's outline of Theory and Problems of Programming with C, McGraw-Hill.
3. *Programming in ANSI C - Balaguruswami, TMH 2.*
4. *The 'C' programming language - B.W.Kernighan, D.M.Ritchie, PHI*
5. A.K. Saxena, Programming Language C : Anamaya Publishers, New Delhi.
6. *C The Complete Reference - H.Sohldt, TMH 3.*
7. *Computer fundamentals and programming in C – Pradip Dey & Manas Ghosh, OXFORD*



Generic Elective -1 LAB (GE- IA) : **Introduction to Programming using C Lab**

Practical : 15 Lectures (SSCIGE0101P)

1. Write a program to find greatest of three numbers.
2. Write a program to find gross salary of a person
3. Write a program to find grade of a student given his marks.
4. Write a program to find LCM of two numbers.
5. Write a program to find divisor or factorial of a given number.
6. Write a program to find Fibonacci sequence.
7. Write a program to print first ten natural numbers.
8. Write a program to print first ten even and odd numbers.
9. Write a program to find grade of a list of students given their marks.
10. Create Matrix class. Write a menu-driven program to perform following Matrix operations (2-D array implementation):
 - a) Sum
 - b) Difference
 - c) Product
 - d) Transpose
11. Write a program to add first ten natural numbers using function.
12. Write a program to display prime numbers using function.
13. Write a program to store information of students using structure.

COMPUTER SCIENCE (CORE-III): Programming in Java (SSCICR0203L)

Theory: 60 Lectures

1. Introduction to Java

(4 Lectures)

Java Architecture and Features, Understanding the semantic and syntax differences between C++ and Java, Compiling and Executing a Java Program, Variables, Constants, Keywords Data Types, Operators (Arithmetic, Logical and Bitwise) and Expressions, Comments, Doing Basic Program Output, Decision Making Constructs (conditional statements and loops) and Nesting, Java Methods (Defining, Scope, Passing and Returning Arguments, Type Conversion and Type and Checking, Built-in Java Class Methods),

2. Arrays, Strings and I/O

(8 Lectures)

Creating & Using Arrays (One Dimension and Multi-dimensional), Referencing Arrays Dynamically, Java Strings: The Java String class, Creating & Using String Objects, Manipulating Strings, String Immutability & Equality, Passing Strings To & From Methods, String Buffer Classes. Simple I/O using System.out and the Scanner class, Byte and Character streams, Reading/Writing from console and files.

3. Object-Oriented Programming Overview

(4 Lectures)

Principles of Object-Oriented Programming, Defining & Using Classes, Controlling Access to Class Members, Class Constructors, Method Overloading, Class Variables & Methods, Objects as parameters, final classes, Object class, Garbage Collection.



3. Inheritance, Interfaces, Packages, Enumerations, Autoboxing and Metadata (14 lectures)

Inheritance: (Single Level and Multilevel, Method Overriding, Dynamic Method Dispatch, Abstract Classes), Interfaces and Packages, Extending interfaces and packages, Package and Class Visibility, Using Standard Java Packages (util, lang, io, net), Wrapper Classes, Autoboxing/Unboxing, Enumerations and Metadata.

4. Exception Handling, Threading, Networking and Database Connectivity (15 Lectures)

Exception types, uncaught exceptions, throw, built-in exceptions, Creating your own exceptions; Multi-threading: The Thread class and Runnable interface, creating single and multiple threads, Thread prioritization, synchronization and communication, suspending/resuming threads. Using java.net package, Overview of TCP/IP and Datagram programming. Accessing and manipulating databases using JDBC.

5. Applets and Event Handling (15 Lectures)

Java Applets: Introduction to Applets, Writing Java Applets, Working with Graphics, Incorporating Images & Sounds. Event Handling Mechanisms, Listener Interfaces, Adapter and Inner Classes. The design and Implementation of GUIs using the AWT controls, Swing components of Java Foundation Classes such as labels, buttons, textfields, layout managers, menus, events and listeners; Graphic objects for drawing figures such as lines, rectangles, ovals, using different fonts. Overview of servlets.

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Reference Books

1. Ken Arnold, James Gosling, David Homes, "The Java Programming Language", 4th Edition, 2005.
2. James Gosling, Bill Joy, Guy L Steele Jr, Gilad Bracha, Alex Buckley "The Java Language Specification, Java SE 8 Edition (Java Series)", Published by Addison Wesley, 2014.
3. Joshua Bloch, "Effective Java" 2nd Edition, Publisher: Addison-Wesley, 2008.
4. Cay S. Horstmann, Gary Cornell, "Core Java 2 Volume 1, 9th Edition, Prentice Hall. 2012
5. Cay S. Horstmann, Gary Cornell, "Core Java 2 Volume 2 - Advanced Features", 9th Edition, Prentice Hall. 2013
6. Bruce Eckel, "Thinking in Java", 3rd Edition, PHI, 2002.
7. E. Balaguruswamy, "Programming with Java", 4th Edition, McGraw Hill. 2009.
8. Paul Deitel, Harvey Deitel, "Java: How to Program", 10th Edition, Prentice Hall, 2011.
9. "Head First Java", O'Reilly Media Inc. 2nd Edition, 2005.
10. David J. Eck, "Introduction to Programming Using Java", Published by CreateSpace Independent Publishing Platform, 2009.
11. John R. Hubbard, "Programming with JAVA", Schaum's Series, 2nd Edition, 2004.

COMPUTER SCIENCE LAB (CORE-III): Programming in Java Lab (SSCICR0203P)

Practical: 15 Lectures

1. To find the sum of any number of integers entered as command line arguments
2. To find the factorial of a given number



3. To learn use of single dimensional array by defining the array dynamically.
4. To learn use of .length in case of a two dimensional array
5. To convert a decimal to binary number
6. To check if a number is prime or not, by taking the number as input from the keyboard
7. To find the sum of any number of integers interactively, i.e., entering every number from the keyboard, whereas the total number of integers is given as a command line argument
8. Write a program that show working of different functions of String and StringBuffer class like setCharAt(), setLength(), append(), insert(), concat() and equals().
9. Write a program to create a `—distance` class with methods where distance is computed in terms of feet and inches, how to create objects of a class and to see the use of this pointer
10. Modify the `—distance` class by creating constructor for assigning values (feet and inches) to the distance object. Create another object and assign second object as reference variable to another object reference variable. Further create a third object which is a clone of the first object.
11. Write a program to show that during function overloading, if no matching argument is found, then java will apply automatic type conversions (from lower to higher data type)
12. Write a program to show the difference between public and private access specifiers. The program should also show that primitive data types are passed by value and objects are passed by reference and to learn use of final keyword
13. Write a program to show the use of static functions and to pass variable length arguments in a function.
14. Write a program to demonstrate the concept of boxing and unboxing.
15. Create a multi-file program where in one file a string message is taken as input from the user

and the function to display the message on the screen is given in another file (make use of Scanner package in this program).

16. Write a program to create a multilevel package and also creates a reusable class to generate Fibonacci series, where the function to generate fibonacci series is given in a different file belonging to the same package.
17. Write a program that creates illustrates different levels of protection in classes/subclasses belonging to same package or different packages
18. Write a program —DivideByZero|| that takes two numbers a and b as input, computes a/b, and invokes Arithmetic Exception to generate a message when the denominator is zero.
19. Write a program to show the use of nested try statements that emphasizes the sequence of checking for catch handler statements.
20. Write a program to create your own exception types to handle situation specific to your application (Hint: Define a subclass of Exception which itself is a subclass of Throwable).
21. Write a program to demonstrate priorities among multiple threads.
22. Write a program to demonstrate multithread communication by implementing synchronization among threads (Hint: you can implement a simple producer and consumer problem).
23. Write a program to create URL object, create a URLConnection using the openConnection() method and then use it to examine the different components of the URL and content.
24. Write a program to implement a simple datagram client and server in which a message that is typed into the server window is sent to the client side where it is displayed.
25. Write a program that creates a Banner and then creates a thread to scroll the message in the banner from left to right across the applet_s window.
26. Write a program to get the URL/location of code (i.e. java code) and document (i.e. html file).
27. Write a program to demonstrate different mouse handling events like mouseClicked(), mouseEntered(), mouseExited(), mousePressed, mouseReleased() and mouseDragged().
28. Write a program to demonstrate different keyboard handling events.
29. Write a program to generate a window without an applet window using main() function.
30. Write a program to demonstrate the use of push buttons.

Generic Elective (GE-2)

Subject – Introduction to Internet Technologies (SSCIGE0202L)

Theory: 60 lectures

Introduction to computer network: LAN, MAN, WAN, wireless LAN, internet, intranet, extranet, LAN topologies, Network devices: NIC, repeaters, hub, bridge, switch, gateway and router.

Internet Terms: Web page, Home page, website, internet browsers, URL, Hypertext, ISP, Web server, download and upload, online and offline.

Internet Applications: www, telnet, ftp, e-mail, social networks, search engines, Video Conferencing, e-Commerce, m-Commerce, VOIP, blogs.



Introduction to Web Design: Introduction to hypertext markup language (html)
Document type definition, creating web pages, lists, hyperlinks, tables, web forms,
inserting images, frames, hosting options and domain name registration.
Customized

Features: Cascading style sheet (css) for text formatting and other manipulations.

JavaScript Fundamentals: Data types and variables, functions, methods and events,
controlling program flow, JavaScript object model, built-in objects and operators.

Reference Books:

1. Andrew S. Tanenbaum, David J. Wetherall Computer Networks (5th Edition), PHI, 2010
2. B. A. Forouzan, Data Communication and Networking, TMH, 2003.
3. D.R. Brooks, An Introduction to HTML and Javascript for Scientists and Engineers, Springer W. Willard, 2009
4. HTML A Beginner's Guide, Tata McGraw-Hill Education, 2009.
5. J. A. Ramalho, Learn Advanced HTML 4.0 with DHTML, BPB Publications, 2007

*Internet Technologies Lab Practical: 15 lectures
(SSCIGE0202P)*

Practical exercises based on concepts listed in theory using HTML.

1. Create HTML document with following formatting – Bold, Italics, Underline, Colors, Headings, Title, Font and Font Width, Background, Paragraph, Line Brakes, Horizontal Line, Blinking text as well as marquee text.
2. Create HTML document with Ordered and Unordered lists, Inserting Images, Internal and External linking
3. Create HTML document with Table:



Some image here

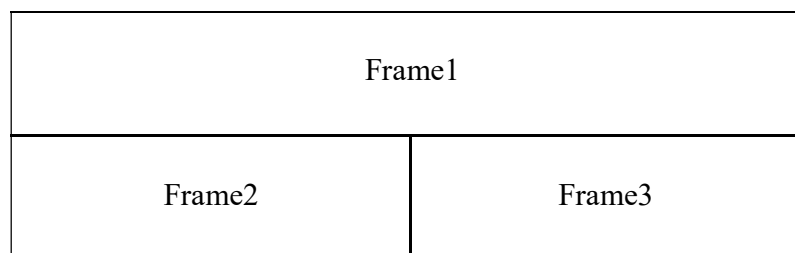
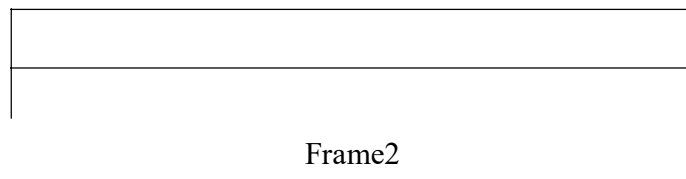
4. Create Form with Input Type, Select and Text Area in HTML.
5. Create an HTML containing Roll No., student_s name and Grades in a tabular form.
6. Create an HTML document (having two frames) which will appear as follows:

About Department 1 Department 2 Department 3	This frame would show the contents according to the link clicked by the user on the left frame.
---	---

7. Create an HTML document containing horizontal frames as follows:

Department Names (could be along with Logos)
Contents according to the Link clicked

8. Create a website of 6 – 7 pages with different effects as mentioned in above problems.
9. Create HTML documents (having multiple frames) in the following three formats:





10. Create a form using HTML which has the following types of controls:

- V. Text Box
- VI. Option/radio buttons
- VII. Check boxes
- VIII. Reset and Submit buttons

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Last Name:

Business:

We must have a correct e-mail address to send you the news letter:

Email:

How did you hear about XYZ News Magazine and Emails?

Here on the Web In a magazine Television Other

Would you like to be on our regular mailing list?

Yes, we love junk emails

List of Practicals using Javascript :

Create event driven program for following:

1. Print a table of numbers from 5 to 15 and their squares and cubes using alert.
2. Print the largest of three numbers.
3. Find the factorial of a number n.
4. Enter a list of positive numbers terminated by Zero. Find the sum and average of these numbers.
5. A person deposits Rs 1000 in a fixed account yielding 5% interest. Compute the amount in the account at the end of each year for n years.
6. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

COMPUTER SCIENCE (C-V): **Internet Technologies Theory: 60 Lectures**

Java

(5 lectures)

Use of Objects, Array and ArrayList class



JavaScript

(15 lectures)

Data types, operators, functions, control structures, events and event handling.

JDBC

(10 lectures)

JDBC Fundamentals, Establishing Connectivity and working with connection interface, Working with statements, Creating and Executing SQL Statements, Working with Result Set Objects.

JSP

(20 lectures)

Introduction to JavaServer Pages, HTTP and Servlet Basics, The Problem with Servlets, The Anatomy of a JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment, Implicit JSP Objects, Conditional Processing, Displaying Values, Using an expression to Set an Attribute, Declaring Variables and Methods, Error Handling and Debugging, Sharing Data Between JSP Pages, Requests, and Users, Database Access.

Java Beans

(10 Lectures)

Java Beans Fundamentals, JAR files, Introspection, Developing a simple Bean, Connecting to DB

Recommended Books:

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl Cgi , BPB Publications, 2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition., 2009
3. Herbert Schildt , Java 7, The Complete Reference, , 8th Edition, 2009.
4. Jim Keogh ,The Complete Reference J2EE, TMH, , 2002.
5. O'Reilly , Java Server Pages, Hans Bergsten, Third Edition, 2003.

COMPUTER SCIENCE (CORE -V): Internet Technologies Tutorial lectures

Tutorial : 15

COMPUTER SCIENCE (C-VI): Database Management Systems

Theory: 60 Lectures

Lectures

1. Introduction

(6)

Characteristics of database approach, data models, database system architecture and data Independence.

2. Entity Relationship(ER) Modelling

(8 Lectures)

Entity types, relationships, constraints.

3. Relation data model

(20 Lectures)

Relational model concepts, relational constraints, relational algebra, SQLqueries

4. Database design

(15 Lectures)



Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms (upto BCNF).

5. Transaction Processing (3 Lectures)
ACID properties, concurrency control

6. File Structure and Indexing (8 Lectures)
Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files (Primary index, secondary index, clustering index), Multilevel
+

indexing using B and B+ trees.

Books Recommended:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
 2. R. Ramakrishnan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
 3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
 4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.
-



COMPUTER SCIENCE LAB (C-VI): Database Management SystemsLab

Practical: 60 Lectures

Create and use the following database schema to answer the given queries.

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EMPLOYEE Schema

Field	Type	NULL	KEY	DEFAULT
Eno	Char(3)	NO	PRI	NIL
Ename	Varchar(50)	NO		NIL
Job_type	Varchar(50)	NO		NIL
Manager	Char(3)	Yes	FK	NIL
Hire_date	Date	NO		NIL
Dno	Integer	YES	FK	NIL
Commission	Decimal(10,2)	YES		NIL
Salary	Decimal(7,2)	NO		NIL

DEPARTMENT Schema

Field	Type	NULL	KEY	DEFAULT
Dno	Integer	No	PRI	NULL
Dname	Varchar(50)	Yes		NULL
Location	Varchar(50)	Yes		New Delhi

Query List

1. Query to display Employee Name, Job, Hire Date, Employee Number; for each employee with the Employee Number appearing first.
2. Query to display unique Jobs from the Employee Table.
3. Query to display the Employee Name concatenated by a Job separated by a comma.
4. Query to display all the data from the Employee Table. Separate each Column by a comma and name the said column as THE_OUTPUT.
5. Query to display the Employee Name and Salary of all the employees earning more than \$2850.
6. Query to display Employee Name and Department Number for the Employee No= 7900.
7. Query to display Employee Name and Salary for all employees whose salary is not in the range of \$1500 and \$2850.
8. Query to display Employee Name and Department No. of all the employees in Dept 10

andDept 30 in the alphabetical order by name.

9. Query to display Name and Hire Date of every Employee who was hired in 1981.
10. Query to display Name and Job of all employees who don't have a current Manager.
11. Query to display the Name, Salary and Commission for all the employees who earn commission.
12. Sort the data in descending order of Salary and Commission.
13. Query to display Name of all the employees where the third letter of their name is A.
14. Query to display Name of all employees either have two Rs or have two As in their name and are either in Dept No = 30 or their Manger_s Employee No = 7788.
15. Query to display Name, Salary and Commission for all employees whose Commission Amount is 14 greater than their Salary increased by 5%.
16. Query to display the Current Date.
17. Query to display Name, Hire Date and Salary Review Date which is the 1st Monday after six months of employment.
18. Query to display Name and calculate the number of months between today and the date each employee was hired.
19. Query to display the following for each employee <E-Name> earns < Salary> monthly but wants < 3 * Current Salary >. Label the Column as Dream Salary.
20. Query to display Name with the 1st letter capitalized and all other letter lower case and length of their name of all the employees whose name starts with J, A and M.
21. Query to display Name, Hire Date and Day of the week on which the employee started.
22. Query to display Name, Department Name and Department No for all the employees.
23. Query to display Unique Listing of all Jobs that are in Department # 30.
24. Query to display Name, Dept Name of all employees who have an A in their name.
25. Query to display Name, Job, Department No. And Department Name for all the employees working at the Dallas location.
26. Query to display Name and Employee no. Along with their Manger_s Name and the Manager_s employee no; along with the Employees_s Name who do not have a Manager.
27. Query to display Name, Dept No. And Salary of any employee whose department No. and salary matches both the department no. And the salary of any employee who earns a commission.



28. Query to display Name and Salaries represented by asterisks, where each asterisk (*) signifies \$100.
 29. Query to display the Highest, Lowest, Sum and Average Salaries of all the employees
 30. Query to display the number of employees performing the same Job type functions.
 31. Query to display the no. of managers without listing their names.
 32. Query to display the Department Name, Location Name, No. of Employees and the average salary for all employees in that department.
 33. Query to display Name and Hire Date for all employees in the same dept. as Blake.
 34. Query to display the Employee No. And Name for all employees who earn more than the average salary.
 35. Query to display Employee Number and Name for all employees who work in a department with any employee whose name contains a T.
 36. Query to display the names and salaries of all employees who report to King.
 37. Query to display the department no, name and job for all employees in the Sales department.
-

COMPUTER SCIENCE (C-VII): Computer Networks Theory: 60 Lectures

1. Introduction to Computer Networks (8 Lectures)

Network definition; network topologies; network classifications; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

2. Data Communication Fundamentals and Techniques (10 Lectures)

Analog and digital signal; data-rate limits; digital to digital line encoding schemes; pulse code modulation; parallel and serial transmission; digital to analog modulation-; multiplexing techniques- FDM, TDM; transmission media.

3. Networks Switching Techniques and Access mechanisms (10 Lectures)

Circuit switching; packet switching- connectionless datagram switching, connection-oriented virtual circuit switching; dial-up modems; digital subscriber line; cable TV for data transfer.

4. Data Link Layer Functions and Protocol (10 Lectures)

Error detection and error correction techniques; data-link control- framing and flow control; error recovery protocols- stop and wait ARQ, go-back-n ARQ; Point to Point Protocol on Internet.

5. Multiple Access Protocol and Networks (5 Lectures)

CSMA/CD protocols; Ethernet LANS; connecting LAN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways; Routing; routing algorithms; network layer protocol of Internet –IP protocol, Internet control protocol. Transport services-error and flow control, Connection establishment and release- three way handshake.

8. Overview of Application layer protocol (5 Lectures)

Overview of DNS protocol; Overview of WWW &HTTP protocol.

Reference Books

1. B. A. Forouzan: Data Communications and Networking, Fourth edition, THM ,2007.
2. A. S. Tanenbaum: Computer Networks, Fourth edition, PHI , 2002

COMPUTER SCIENCE (C-VII): Computer Networks Tutorial

Tutorial : 15 lectures

Generic Elective -3 (GE- 3A)

Subject – Introduction to Database System

Theory: 60 lectures

Database: Introduction to database, relational data model, DBMS architecture, data independence, DBA, database users, end users, front end tools

E-R Modeling: Entity types, entity set, attribute and key, relationships, relation types, E- R diagrams, database design using ER diagrams

Relational Data Model: Relational model concepts, relational constraints, primary and foreign key, normalization: 1NF, 2NF, 3NF

Structured Query Language: SQL queries, create a database table, create relationships between database tables, modify and manage tables, queries, forms, reports,

modify, filter and view data.

Reference Books :

1. P. Rob, C. Coronel, Database System Concepts by, Cengage Learning India, 2008
2. R. Elmsasri, S. Navathe Fundamentals of Database Systems, Pearson Education, Fifth Edition, 2007
3. MySQL : Reference Manual

Generic Elective (GE- 3) LAB : Database System Practical

Practical : 15 Lectures

Introduction to Database System Lab

Practical: 15 lectures

1) Create a database having two tables with the specified fields, to computerize a library system of a Delhi University College.

LibraryBooks (Accession number, Title, Author, Department, PurchaseDate, Price)

IssuedBooks (Accession number, Borrower)

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) Delete the record of book titled —Database System Concepts||.
 - c) Change the Department of the book titled —Discrete Maths|| to —CS||.
 - d) List all books that belong to —CS|| department.
 - e) List all books that belong to —CS|| department and are written by author —Navathe||.
 - f) List all computer (Department=||CS||) that have been issued.
 - g) List all books which have a price less than 500 or purchased between —01/01/1999||and —01/01/2004||.
- 2) Create a database having three tables to store the details of students of Computer Department

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in your college.

Personal information about Student (College roll number, Name of student, Date of birth, Address, Marks(rounded off to whole number) in percentage at 10 + 2, Phonenumner) Paper Details (Paper code, Name of the Paper)

Student's Academic and Attendance details (College roll number, Paper code, Attendance, Marks in home examination).

- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) Design a query that will return the records (from the second table) along with the name of student from the first table, related to students who have more than 75% attendance and more than 60% marks in paper 2.
 - c) List all students who live in —Delhi|| and have marks greater than 60 in paper 1.
 - d) Find the total attendance and total marks obtained by each student.
 - e) List the name of student who has got the highest marks in paper 2.
- 3) Create the following tables and answer the queries given below:**Customer (CustID, email, Name, Phone, ReferrerID)**
Bicycle (BicycleID, DatePurchased, Color, CustID, ModelNo)



**BicycleModel (ModelNo, Manufacturer, Style) Service
(StartDate, BicycleID, EndDate)**

- Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - List all the customers who have the bicycles manufactured by manufacturer —Honda||.
 - List the bicycles purchased by the customers who have been referred by customer —C1||.
 - List the manufacturer of red colored bicycles.
 - List the models of the bicycles given for service.
- 4) Create the following tables, enter at least 5 records in each table and answer the queries given below.

EMPLOYEE (Person_Name, Street, City) WORKS (Person_Name, Company_Name, Salary) COMPANY (Company_Name, City)

MANAGES (Person_Name, Manager_Name)

- Identify primary and foreign keys.
- Alter table employee, add a column —email|| of type varchar(20).
- Find the name of all managers who work for both Samba Bank and NCB Bank.
- Find the names, street address and cities of residence and salary of all employees who work for —Samba Bank|| and earn more than \$10,000.
- Find the names of all employees who live in the same city as the company for which they work.
- Find the highest salary, lowest salary and average salary paid by each company.
- Find the sum of salary and number of employees in each company.
- Find the name of the company that pays highest salary.

*Suppliers (SNo, Sname, Status, SCity) Parts
(PNo, Pname, Colour, Weight, City) Project
(JNo, Jname, Jcity) Shipment (Sno, Pno, Jno,
Qunatity)*

- Identify primary and foreign keys.
- Get supplier numbers for suppliers in Paris with status>20.
- Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
- Get suppliers names for suppliers who do not supply part P2.
- For each shipment get full shipment details, including total shipment weights.
- Get all the shipments where the quantity is in the range 300 to 750 inclusive.
- Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
- Get the names of cities that store more than five red parts.
- Get full details of parts supplied by a supplier in London.
- Get part numbers for part supplied by a supplier in London to a project in London.
- Get the total number of project supplied by a supplier (say, S1).
- Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).



SKILL ENHANCEMENT COURSE (SEC-1) **A HTML and XML programming**

Tutorials:60

HTML Programming

- *Unit-I: Introduction* (1L)
- **Unit-II: The Basics** (2L)
 - o The Head, the Body
 - o Colors, Attributes
 - o Lists, ordered and unordered
- *Links* *Unit-III:*
(3L)
 - o Introduction
 - o Relative Links, Absolute Links
 - o Link Attributes
 - o Using the ID Attribute to Link Within a Document
- *Images* *Unit-IV:*
(2L)
 - o Putting an Image on a Page
 - o Using Images as Links
 - o Putting an Image in the Background
- *Unit V: - Tables* (4L)
 - o Creating a Table
 - o Table Headers
 - o Captions
 - o Spanning Multiple Columns
 - o Styling Table
- *Unit VI - Forms* (3L)
 - o Basic Input and Attributes
 - o Other Kinds of Inputs
 - o Styling forms with CSS
 - o Where To Go From Here

Book Recommended:

1. Virginia DeBolt , Integrated HTML and CSS A Smarter, Faster Way to Learn
Wiley / Sybex , 2006
2. Cassidy Williams, Camryn Williams Introduction to **HTML** and CSS, O'Reilly, 2015

Software Lab Based on HTML:


Q.1 Create an HTML document with the following formatting options:

- I. Bold
- II. Italics
- V. Font (Type, Size and Color)
- X. Pre tag

Q.2 Create an HTML document which consists of:

- I. Ordered List
- II. Unordered List
- III. Nested List
- IV. Image

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XYZ Ltd's Update

1. Introduction
2. Company Financial Update
 - o First Quarter
 - o Second Quarter
 - o Third Quarter
 - o Fourth Quarter
3. Advertising Update
 - o Result of Newspaper Campaign
 - o Additions to staff
 - o New Thoughts on Television
4. Human Resources Update

- A. Safety Considerations
 1. Body substance isolation
 2. Sense safety
 3. Initial size-up
- B. Initial Patient Assessment
 1. General Impression
 2. Unresponsiveness
 - i. Alert to person, place and time
 - ii. Verbal response to audible stimuli
 - iii. Pain evokes verbal or physical response
 - iv. Unresponsive to all stimuli
- C. Patient Critical Needs
 1. Airway
 2. Breathing
 - i. Use oxygen if indicated
 - ii. Consider use of assisting with bag value mask
 3. Circulation
 4. Bleeding

Q.3 Create an HTML document which implements Internal linking as well as External linking. Q.4 Q4 Create a table using HTML which consists of columns for Roll No., Student_s name and grade.

Result		
Roll No.	Name	Grade



Q.5 Create a Table with the following view:

Q.6

Place an image here

Create a form using HTML which has the following types of controls:

- I. Text Box
- II. Option/radio buttons
- III. Check boxes
- IV. Reset and Submit buttons

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Interested in receiving daily small updates of all latest News? Well, now you can. And best of all, it is free! Just fill out this form and submit it by clicking the "send it In" button. We will put you on our mailing list and you will receive your first email in 3-5 days.

Please fill the following boxes to help us send the emails and our news letter:

First Name:

Last Name:

Business:

We must have a correct e-mail address to send you the news letter:

Email:

How did you hear about XYZ News Magazine and Emails?

Here on the Web In a magazine Television Other

Would you like to be on our regular mailing list?

Yes, we love junk emails

Q.7 Create HTML documents (having multiple frames) in the following three formats:

Frame1
Frame2

Frame1	
Frame2	Frame3

4. XML Programming

Introduction: Understanding Mark-up Languages, Introduction to XML and its Goals. (3L)

XML Basics: XML Structure and Syntax, Document classes and Rules. (5L)

Other XML Concepts: Scripting XML, XML as Data, Linking with XML. (4L)

XML with Style: XSL –Style Sheet Basics, XSL basics, XSL style sheets. (3L)

Books Recommended

1. XML in action web technology by William J. Pardi
2. Step by Step XML by Michael J. Young

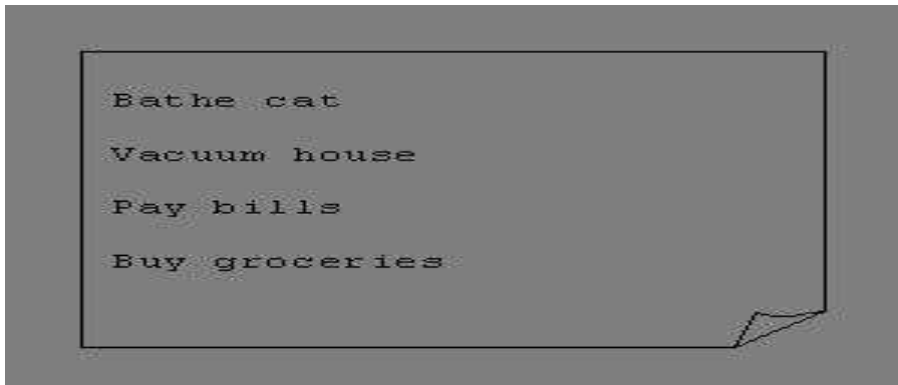
Software Lab Based on XML:

Exercise #1 – Information Structure

In this exercise, student will practice identifying the structure of an information object. For the sample document provided below:

Label the information structures you see, including containing structures.

1. Draw a tree representation of the structure.



Exercise 2# Deconstructing an XML Document

In this exercise, student will practice identifying the explicit structure within an XML document. In a sense, this is the reverse of what you did in Exercise #1. For the sample XML markup below, create a document-like representation (or a simple drawing) for the content contained within the XML tags:

```
<book>
```

```
<coverInfo>
```

```
<title>The XML Handbook</title>
```

```
<author>Charles F. Goldfarb</author>
```

```
<author>Paul Prescod</author>
```

```
<edition>Second</edition>
```

```
<description>The definitive XML resource: applications, products, and technologies. Revised and expanded—over 600 new pages.</description>
```



</coverInfo>

</book>

Exercise #3 – Creating XML Markup

In this exercise, create some XML markup based on the tree representation from Exercise #1 above, and the content from the original sample document.

Exercise #4 – Well-Formedness

This exercise checks your understanding of the constraints for well-formedness. Are the following document instances well-formed? Explain any NO answers.

```
<list><title>The first list</title><item>An item</list>
```

```
<item>An item</item><item>Another item</item>
```

```
<para>Bathing a cat is a <emph>relatively</emph> easy task as long as the cat is willing.</para>
```

```
<bibl><title>How to Bathe a Cat<author></title>Merlin Bauer<author></bibl>
```

Exercise #5-Well Formedness

This exercise is a bit more challenging than the previous example. Here is a fragment of an XML document instance. Identify all the places where it fails to match the constraints for well-formedness.

```
<PROCEDURE><TITLE>How to Bathe a Cat</TITLE>
```

```
<OVERVIEW>
```

```
This procedure tells you how to bathe a cat. <WARNING></OVERVIEW>Cats don't like to take baths. You could get hurt doing this. Be sure to obtain all the required protective gear before you start. </WARNING><EQUIPEMENT><ITEM>Hockey Mask <ITEM>Padded Full-body Kevlar Armor</ITEM><ITEM>Tub full of warm water</ITEM><ITEM>Towels </ITEM><ITEM>First Aid kit</ITEM><ITEM>Cat Shampoo</ITEM> <EQUIPEMENT><INSTRUCTIONS> <STEP> Locate the cat, who by now is hiding under the bed.</STEP><STEP>Place the cat in the tub of water.</STEP> <ITEM>Using the First Aid kit, repair the damage to your head and arms.</STEP> <STEP>Place the cat back in the tub and hold it down.</STEP> <STEP>Wash it really fast, then make an effort to dry it with the towels.</STEP> <STEP>Decide not to do this again. </STEP> </INSTRUCTIONS>
```

Note: Cover more exercises based on XML Programming theory concepts.



Skill Enhancement Course (SEC - 1) B

Linux / Unix Programming Syllabus

What is linux/unix Operating systems (5L) Difference between linux/unix and other operating systems Features and Architecture Various Distributions available in the market Installation, Booting and shutdown process

System processes (an overview) External and internal commands Creation of partitions in OS Processes and its creation phases – Fork, Exec, wait *User Management and the File System* (5L) Types of Users, Creating users, Granting rights User management commands File quota and various file systems available File System Management and Layout, File permissions Login process, Managing Disk Quotas Links (hard links, symbolic links)

Shell introduction and Shell Scripting (6L)
What is shell and various type of shell, Various editors present in linux Different modes of operation in vi editor What is shell script, Writing and executing the shell script Shell variable (user defined and system variables) System calls, Using system calls Pipes and Filters Decision making in Shell Scripts (If else, switch), Loops in shell Functions Utility programs (cut, paste, join, tr , uniq utilities) Pattern matching utility (grep) Reference Books:

1. Sumitabha, Das, Unix Concepts And Applications, Tata McGraw-Hill Education, 2006
2. Michael Jang RHCSA/ RHCE Red Hat Linux Certification: Exams (Ex200 & Ex300)(Certification Press), 2011
3. Nemeth Synder & Hein, Linux Administration Handbook, Pearson Education, 2nd Edition ,2010
4. W. Richard Stevens, Bill Fenner, Andrew M. Rudoff, Unix Network Programming, The sockets Networking API, Vol. 1, 3rd Edition, 2014

Software Lab Based on Linux:

1. Write a shell script to check if the number entered at the command line is prime or not.
2. Write a shell script to modify —call| command to display calendars of the specified months.
3. Write a shell script to modify —call| command to display calendars of the specified range of months.
4. Write a shell script to accept a login name. If not a valid login name display message – —Entered login name is invalid|.
5. Write a shell script to display date in the mm/dd/yy format.



6. Write a shell script to display on the screen sorted output of `—who||` command along with the total number of users .
7. Write a shell script to display the multiplication table any number,
8. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
9. Write a shell script to find the sum of digits of a given number.
10. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
11. Write a shell script to find the LCD (least common divisor) of two numbers.
12. Write a shell script to perform the tasks of basic calculator.
13. Write a shell script to find the power of a given number.
14. Write a shell script to find the binomial coefficient $C(n, x)$.
15. Write a shell script to find the permutation $P(n, x)$.
16. Write a shell script to find the greatest number among the three numbers.
17. Write a shell script to find the factorial of a given number.
18. Write a shell script to check whether the number is Armstrong or not.
19. Write a shell script to check whether the file have all the permissions or not.
20. Write a program to show the pyramid of special character `—*`.

Department of Computer Science & Information technology
Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.
SYLLABUS FOR UG/PG INTEGRATED (CS) COURSE UNDER CHOICE BASED CREDIT SYSTEM (CBCS)

Semester 1

Session 2017-18 (On and after)

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-101	Fundamentals of Computers and Programming Methodology	2		20	30	2
2	PCSC-102	Introduction to Logics of Computer	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-103	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22

Semester 2

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	



1	PCSC-201	Introduction to Data Structures	2		20	30	2
2	PCSC-202	Computer Programming using C	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-203	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22

Semester 3

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-301	Computer Based Numerical Methods	2		20	30	2
2	PCSC-302	Database Management Systems	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Environment - I	3		40	60	3
8	PCSC-303	Lab based on Computer Science		2	20	30	2
9		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21



Semester 4

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-401	System Analysis and Design	2		20	30	2
2	PCSC-402	Introduction to Computer Networks	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics – I	2		20	30	2
6		Physics/Electronics – II	2		20	30	2
7		Environment – I	3		40	60	3
9	PCSC-403	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21

Semester 5

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -501	Introduction to OOPS (C++)	4		20	30	4
2	PCSC-502	Introduction to Operating Systems	4		20	30	4
3	PCSC-503	Internet Applications	4		20	30	4
4	PCSC-504	Introduction to Software Engineering	4		20	30	4
5	PCSC-505	Minor Project		4		100	4
		Total	16	4	80	220	20

Semester 6

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -601	Programming in Visual Basic	4		20	30	4
2	PCSC-602	Introduction to JAVA	4		20	30	4
3	PCSC-603	Linux Operating System and Shell Programming	4		20	30	4
4	PCSC-604	Introduction to Artificial Intelligence	4		20	30	4
5	PCSC-605	Major Project		4		100	4
		Total	16	4	80	220	20

Total Course Credits – 126

* The syllabus is subjected to change as per the requirement.



Syllabus for Integrated UG/PG(Computer Science) [on and after 2017]

Subject – Introduction to OOPs(C++)
Paper code – PCSC- 501

Overview of Object Oriented: Need of Object Oriented, Procedural Vs Object Oriented approach, Benefits, C++ and other languages.

Features of Object Oriented: Class, Objects, Polymorphism, Inheritance, Message Passing, Abstraction, Encapsulation.

Class and Object: Definition, Construction of class, Creation of objects, Pointer to Object, Array of Object, Comparison of Class with Union & Structure.

Polymorphism: Type of Polymorphism, Methods Overloading, Operator overloading.

Inheritance: Types of Inheritance, Single Level, Multi Level, Multiple & Hybrid Inheritance, Advantage of Inheritance, Base Class & Derived Class, C++ & VB: Introduction, Basic Data Type, Writing Simple Program.

Readings:

- 1 Object Oriented Programming: E. Balaguru Swamy, Tata Mc. Graw Hill
- 2 Object Oriented Programming & C++: By R. Raja Raman
- 3 Visual C++ Programming: Yeshwant P. Kanitkar



Subject – Internet Applications
Paper code – PCSC-503

Basic of Internet: Basic concept, History, Hardware & software requirement, Client server architecture model, IP Address and Domain Name System, Use of Web Browsers, Customizing the browser, Finding information on the Internet, Search Engines, and Basic Protocols: HTTP, FTP, Telnet etc.

Working with Internet: Uploading and Downloading Text and Images, Web Pages and Web sites, Downloading softwares with the Browser, Installing, Downloading software , Advanced Software Downloading.

Services of Internet: E-mail, Outlook express, Eudora and Netscape Messenger, Advanced E-mail.

Facilities, Newsgroups: Use and Advantages, Online and e-mail Gaming, Chatting, Videoconferencing, World Wide Web (WWW).

HTML: Benefit and drawbacks, Tables, Frames, Image and Form, Introduction to CGI scripting.

Web Pages: Developing Web page with HTML.

Readings:

1. How to do Everything with the Internet: Dennis Jones.
2. The Internet: Douglas E. Coiner, Prenlicc- Hall, India.
3. Internet & Intranet Engineering : Daniel Minoli, TataMcGraw-Hill.
4. Introduction to Data Communication & Networking : Forouzan.



Subject – Programming with Visual Basic
Paper code – PCSC-601

Introduction to visual Basic: Event Driven Programming, Features of VB, Introduction to IDE, Introduction to VB Controls and their properties, methods, events, forms, MDI forms, modules. Overview of variables, Constants, data types, Declaring Scope, Operators. Interacting with the user: MsgBox function, Inputbox function, If...Then statements, Select case, Looping statements: do..While, for.. next, for each, exiting a loop, goto statement Array, Working with control array

Procedure and Functions: types of function, library function, string handling functions, date and time function, creating user defined function & procedure, call by value and call by reference, concept of recursion.

Working with Controls: Types of control, ComboBox and ListBox, Option Button Status Bar, menu editor.

Error Handling and File Handling: Types of errors, error trapping tools: watch window, local window, immediate window, tracing program flow with call stack. type of file handling, Sequential file handling: reading, writing. Random access file: reading, writing.

Data Access Using the ADO Data Control: Basic concepts of relational database concepts, connection using the ADO Data control to RDBMS, visual data manager, introduction to SQL, Cursor locations and types of Recordset and different lock types.

Readings:

1. Introduction to VB Programming : By V. K Jain
2. Database Programming VB6 : By B.P.B. Publication
3. Gary Cornell - Visual Basic 6 from the Ground up - Tata McGraw Hill
4. Noel Jerke - Visual Basic 6 (The Complete Reference) - Tata McGraw Hill



Subject- Introduction to JAVA
Paper code – PCSC - 602

Introduction: Genesis of java, importance to the Internet, overview and features. **Language Basics:** Constants, Variables and Primitive Data types, Operators and Expression, Decision Making and Branching statement, Decision Making and Looping, Classes, Objects and Methods, Arrays, Strings and Vectors.

Inheritance: Definition, Types, Method overloading and Method Overriding, super and this keywords.
Interfaces: Defining Interface, Extending Interfaces Implementing Interface.

Packages: Defining Packages, Java API Packages, Naming Conventions, Creating Packages, Accessing Packages, Adding class to Package, CLASS PATH. **Exception handling:** Exception Types, Try, Catch & finally Blocks, Throw and Throws keywords. Creating user defined Exception.

Multithreaded Programming: Thread Model, Creating Threads, Thread Priority , Thread Exception, Synchronization. **Input/output:** Basic Streams, Byte and Character Stream, predefined streams, reading and writing from console and files.

Java Collection: Introduction, Overview of Interfaces, Overview of Classes. **Introduction to AWT:** Window fundamentals, creating windowed programs working with graphics, Using AWT controls, Delegation event model, handling mouse and keyboard event

Readings:

1. Naughton P and schildt H. Java: The complete reference, Osborne Mcgra-Hill, Berkeley, USA, 1997.
2. Rodgers Cadenhead, Laura Lemay, Sams Teach Yourself Java 2 in 21 Days, Sams Publishing.
3. E. Balagurusamy, Programming with Java, Tata McGraw Hill.
4. Bruce Eckel, Thinking in Java, Pearson Education.
5. Peter Van Der Linden, Just Java 2, Sun Microsystems/Prentice Hall.
6. Simply JAVA :An Introduction to JAVA programming By James R. Levenick ,Firewall Media New,Delhi
7. Java Programming - Khalid Mughal.
8. Core JAVA An Integrated Approach By Dr. R. Nageswara Rao dremtech Publication.



Subject – Linux Operating System and Shell Programming
Paper code – PCSC-603

Introduction to Linux: History, various distributions, File System and architecture of the Linux, features and advantages of Linux. Basic commands: PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip

Utilities: Vi editor, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, Text processing utilities and backup utilities, Security commands.

Introduction to Shell: Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, FILTERS: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.

GREP: Operation, grep Family, Searching for File Content. **SED:** Scripts, Operation, Addresses, commands, Applications, grep and sed. **AWK:** Execution, Fields and Records, Scripts, Operations, Patterns, Actions.

Shell and Shell Programming: Types of Shell, Linux variables, Iteration, control and if statement, conditional executions, tests, Array, case statement, Strings and substrings, functions, local and global shell variable (export command).

Readings:

1. Unix and shell Programming, Behrouz A. Forouzan, Richard F. Gilberg. Thomson
2. Your Unix the ultimate guide, Sumitabha Das, TMH. 2nd Edition.
3. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson education.
4. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
5. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.
6. Unix Shell programming, Yashwanth Kanitkar, 1st Edition, BPB Publisher



MAJOR PROJECT

Department of Computer Science & Information technology
Guru Ghasidas Vishwavidyalaya, Bilaspur, C.G.

SYLLABUS FOR UG/PG INTEGRATED (CS) COURSE UNDER CHOICE BASED CREDIT SYSTEM (CBCS)

Semester 1

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-101	Computer Science - I	2		20	30	2
2	PCSC-102	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-103	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22

Semester 2

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-201	Computer Science - I	2		20	30	2
2	PCSC-202	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Hindi	2		40	60	2
8		English	2		40	60	2
9	PCSC-203	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			18	4	260	390	22



Semester 3

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-301	Computer Science - I	2		20	30	2
2	PCSC-302	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Environment - I	3		40	60	3
8	PCSC-303	Lab based on Computer Science		2	20	30	2
9		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21



Semester 4

Sno	Subject Code	Title	Credit		Marks		Total Credits
			L	P	Internal	External	
1	PCSC-401	Computer Science - I	2		20	30	2
2	PCSC-402	Computer Science - II	2		20	30	2
3		Maths-I	3		30	45	3
4		Maths-II	3		30	45	3
5		Physics/Electronics - I	2		20	30	2
6		Physics/Electronics - II	2		20	30	2
7		Environment - I	3		40	60	3
9	PCSC-403	Lab based on Computer Science		2	20	30	2
10		Lab based on Physics/Electronics		2	20	30	2
			17	4	220	330	21

Semester 5

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -501	Programming with Visual Basic	4		20	30	4
2	PCSC-502	Object Oriented Concepts	4		20	30	4
3	PCSC-503	Linux Operating System and Shell Programming	4		20	30	4
4	PCSC-504	Introduction to Artificial Neural Network	4		20	30	4
5	PCSC-505	Web Based Mini Project		4		100	4
		Total	16	4	80	220	20

Semester 6

Sno	Subject Code	Title	Credit		Marks		Remarks
			L	P	Internal	External	
1	PCSC -601	Introduction to JAVA	4		20	30	4
2	PCSC-602	Software Testing	4		20	30	4
3	PCSC-603	Introduction to Data Structure	4		20	30	4
4	PCSC-604	Management Information System	4		20	30	4
5	PCSC-605	Major Project		4		100	4
		Total	16	4	80	220	20

Total Course Credits – 126



Subject – Programming with Visual Basic

Paper code – PCSC-501

Introduction to visual Basic: Hardware requirements, features of VB, Editions of Visual Basic, and Event Driven Programming vs procedure oriented programming. Introduction to Integrated Development Environment. Basic concepts of Visual Basic programming: Controls, properties, methods, events, forms, projects. Creating Executable files. Variables, constants, data types, data conversion function. Scope of variables Operators Control Structure: Conditional / branching statements: If...else..endif, Select case Looping statements: do.. while, for.. next, for each, exiting a loop, goto statement, msgbox and input box functions.

Arrays & Functions: types of arrays, array manipulation, working with standard controls. Working with control array, various key and mouse events, using drag and drop concepts. Procedure and Functions: types of function, library function, date and time function, format function, and string related function, validation function. Creating user defined function & procedure, call by value and call by reference, concept of recursion.

Working with Advanced Controls: toolbar, status bar, tabbed dialog controls, progress bar, animation controls, dtpicker, calendar, common dialog control. SDI & MDI Application: creating MDI application, menu editor: defining menu & popup menu, sub main, startup objects.

Error Handling: Types of errors, error trapping tools: watch window, local window, immediate window, debug menu, tracing program flow with call stack, the err object, error function, error handling routines: on error goto statements. File Handling: type of file handling, Sequential file handling: reading, writing and appending in file, understanding user defined data type, Random access file: reading, writing and appending in file.

Data Access Using the ADO Data Control: Basic concepts of relational database, visual data manager, introduction to SQL, concept of ODBC, Overview of DAO and RDO, Using DAO and RDO to access data. Data Environment: accessing data using data environment, Report Generation: Overview of Data Report, creating Data report, adding groups, using data report functions.

Readings:

1. Mastering Visual Basic 6 Fundamentals - By Microsoft
2. Mastering in Visual Basic - Bv BPB Publications.
3. Introduction to VB Programming – By V. K Jain
4. Visual Basic 6 Programming Black Book ByHolznerDreamtech



Subject – Object Oriented Concepts

Paper code – PCSC- 502

Overview of Object Oriented: Need of Object Oriented, Procedural Vs Object Oriented approach, Benefits, C++ and other languages.

Features of Object Oriented: Class, Objects, Polymorphism, Inheritance, Message Passing, Abstraction, Encapsulation.

Class and Object: Definition, Construction of class, Creation of objects, Pointer to Object, Array of Object, Comparison of Class with Union & Structure.

Polymorphism : Type of Polymorphism, Methods Overloading, Operator overloading.

Inheritance : Types of Inheritance, Single Level, Multi Level, Multiple & Hybrid Inheritance, Advantage of Inheritance, Base Class & Derived Class, C++ & VB: Introduction, Basic Data Type, Writing Simple Program.

Readings:

- 1 Object Oriented Programming: E. Balaguru Swamy, Tata Mc. Graw Hill
- 2 Object Oriented Programming & C++: By R. Raja Raman
- 3 Visual C++ Programming: Yeshwant P. Kanitkar



Subject – **Linux Operating System and Shell Programming**

Paper code – PCSC-503

Introduction to Linux: Introduction to Linux system, History and Emergence, Features of Linux system, Different Linux distributions, Hardware Requirements for the different versions of Linux, Architecture of the Linux, Features of the Kernel and Kernel Shell relationship. Linux File System Features of Linux file system, File types and permissions, Getting started, Logging in /out with the concept of home directory. File operations and links, Commonly used commands like GREP, Find, who, ls, pwd, mv, ls, cd, df, cat, head, tail, rm, sort, grip, ps, whoami, chmod, chonn, gunzip, date, bc, tar.

Text Processing: Introduction to Text Processing, Vi editor, Vi Features, Vi Commands, Yanking, Running shell commands, from within Vi, Command macros, Set showmode, Set Auto Indent, Set number, Introduction to Exrcfile. Emacs editor, Emacs feature, Emacs commands, Using cut, paste and copy in Emacs, Saving buffer in Emacs.

Introduction to Shell & Shell Programming: Features of a Shell, Different types of a Shell, Why use more shell, Shell treatment to the command line, the environment, set, set env, path, home, ifs, mail, ps1, ps2, term, log name, profile, sty, profile file, login/ logout file, setting environment, simple shell programs, for... do, case, do while construct

X-windows : what is X-windows, Microsoft windows verses x-windows, windows manager, FVWM and FVWM95, twm, the client server model of x-windows, starting and stopping an X-window session. GNOME & KDE Using the GNOME & KDE desktop environment : starting the GNOME desktop environment, the GNOME panel, using the main system menu, the Gnome file manager, getting help in GNOME, using the Gnome control. A history of KDE project, starting the KDE desktop environment, exploring the Kde desktop, KDE main system menu, using file manager window, setting wallpaper, screen savers in KDE

System Administration of Linux: Installation & system Administration of Linux: responsibilities of a system administrator, startup and shutdown process, inittub and profile file importance, security file access permission, user and group related jobs, managing disk space, managing file system, backup and restart process.

Readings:

1. Mastering Linux by Paul S. Wang
2. BPB publication Complete Reference Linux by Richard Petersen.



Subject- **Introduction to JAVA**

PCSC - 601

Introduction: Genesis of java, importance to the Internet, overview and features. **Language Basics:** Constants, Variables and Primitive Data types, Operators and Expression, Decision Making and Branching statement, Decision Making and Looping, Classes, Objects and Methods, Arrays, Strings and Vectors.

Inheritance: Definition, Types, Method overloading and Method Overriding, super and this keywords. **Interfaces:** Defining Interface, Extending Interfaces Implementing Interface.

Packages: Defining Packages, Java API Packages, Naming Conventions, Creating Packages, Accessing Packages, Adding class to Package, CLASS PATH. **Exception handling:** Exception Types, Try, Catch & finally Blocks, Throw and Throws keywords. Creating user defined Exception.

Multithreaded Programming: Thread Model, Creating Threads, Thread Priority, Thread Exception, Synchronization. **Input/output:** Basic Streams, Byte and Character Stream, predefined streams, reading and writing from console and files.

Java Collection: Introduction, Overview of Interfaces, Overview of Classes. **Introduction to AWT:** Window fundamentals, creating windowed programs working with graphics, Using AWT controls, Delegation event model, handling mouse and keyboard event

Aravind
**HEAD
DEPT OF CSIT
G.G.V. BILASPUR (C.G.)**



Department : **Computer Science and Information Technology**

Programme Name : **M.Sc(CS)**

Academic Year : **2019-20**

List of Courses Focus on Employability/ Entrepreneurship/Skill Development

Sr. No.	Course Code	Name of the Course
	MSC-202	Object Oriented Programming with C++
	MSC-204 (Elective-I(1))	Computer Networks
	MSC-205 (Elective-II(1))	Object oriented Software Engineering
	MSC-205 (Elective-II(2))	Multimedia
	MSC-205 (Elective-II(3))	Linux Operating System and Shell Programming
	MSC-302	Artificial Intelligence and Expert System II
	MSC-303	Relational Database Management System
	MSC-304 (Elective-III(1))	Advanced Java Programming
	MSC-305(Elective_IV(1))	Web Technology
	MSC-305 (Elective-IV(2))	Pattern Recognition
	MSC-306	LAB1
	MSC-307	LAB2
	MSC-401	Major Project

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DEPT OF CSIT
G.G.V. BILASPUR (C.G.)**



Department of Computer Science & Information Technology
Ghasidas Vishwavidyalaya, Bilaspur (C.G.)
SYLLABUS FOR MSC COURSE UNDER CHOICE BASED CREDIT SYSTEM (CBCS) *

Session 2017-18(on and after)
M.Sc(CS)

Note: The decision of the GG Vishwavidyalaya for implementing CBCS system on this course shall be final, rest will remain the same.

Semester 1

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-101	Introduction to Information Technology	4		40	60	4
2	MSC-102	Computer programming & Numerical Methods	4		40	60	4
3	MSC-103	Discrete Mathematical Structures	4		40	60	4
4	MSC-104	Data Structures using C	4		40	60	4
5	MSC-105	Computer Organization	4		40	60	4
6	MSC-106	LAB-I: Data Structure using C		1		100	1
7	MSC-107	LAB-II: Computer Hardware and Digital Electronics		1		100	1
		Total	20	02	200	500	22

Semester 2

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-201	Principles of Operating system	4		40	60	4
2	MSC-202	Object Oriented Programming with C++	4		40	60	4
3	MSC-203	Theory of Computation	4		40	60	4
4	MSC-204	Elective I	4		40	60	4
5	MSC-205	Elective II	4		40	60	4
6	MSC-206	OOP Lab (C++)		1		100	1
7	MSC-207	LAB based on Elective-II		1		100	1
		Total	20	02	200	500	22

Syllabus for MSC [on and after 2017]
Syllabus for Integrated UG/PG(Computer Science) [on and after 2015] NEW

Semester 3

Sno	Subject Code	Title	Credit		Marks		Credits
			L	P	Internal	External	
1	MSC-301	Probability and Statistics	4		40	60	4
2	MSC-302	Artificial Intelligence	4		40	60	4
3	MSC-303	Relational Data Base Management System	4		40	60	4
4	MSC-304	Elective III	4		40	60	4
5	MSC-305	Elective IV	4		40	60	4
6	MSC-306	RDBMS LAB		1		100	1
7	MSC-307	LAB based on Elective III / IV		1		100	1
		Total	20	02	200	500	22

Semester 4

M.Sc. (CS)IV th Semester			
S.No.	Subject Code	Subject	Total Marks
1.	M.Sc. (CS)401	Major Project (Viva Voce)	500
Total			500

ELECTIVES

Sl.No	Paper Code	(1)	(2)	(3)
1	MSC-204 (Eletive-I)	Computer Networks	System Analysis and Design	Introduction to Micro Processor
2	MSC-205 (Elective-II)	Object Oriented Software Engineering	Multimedia	Linux Operating System and Shell Programming
3	MSC-304 (Elective-III)	Advanced JAVA Programming	System Software	Neural Network
4	MSC-305 (Elective-IV)	Web Technology	Pattern Recognition	Compiler Design

*** The syllabus is subjected to change as per the requirement.**



MSC-202

Object Oriented Programming with C++

- 1. Principles of OOP:** Procedure oriented Vs Object oriented, OOP paradigm, Features of OOP ,Basic Data types Tokens, Keywords, Constant ,Variables, Operator I/O statements , Structure of C++ program, Arrays, pointers, Object modeling technique (OMT).
- 2. Function, Object and Class:** Defining class, Abstract class ,Function prototype, Function with parameter ,Passing object as a parameter, Constructor function ,Types of constructor, Destructor Friend function , Friend class, Dynamic allocation operator new and delete.
- 3. Polymorphism and Inheritance:** Types of polymorphism, Constructor overloading ,Operator overloading, Template function Template class, Types of inheritance ,Private ,protected and public derivation of class ,Resolving ambiguity Pointer to object, This pointer ,Virtual class , virtual function.
- 4. Input - output and File handling:** I/O classes ,File and stream classes ,Opening and closing file Detecting end of file, String I/O, Char I/O, Object I/O, I/O with multiple object ,File pointer, Disk I/O.
- 5. Exception handling, Name spaces and Standard Template library (STL):** Need of Exception handling ,try ,catch and throws keywords , defining namespace ,benefit of namespace, Component of STL.

Readings:

1. Object oriented programming with C++ by E.Balagurusamy II nd edition Tata Mc-Graw Hill.
2. Object Oriented Programmin By McGregor and Sykes S A, 1992 Van Nostrand.
3. The C++ Programming Language By Strustrp B,Addision Wasley.
4. Object Oriented Programming in C++ By Lafore R, Galgotia Publications.
5. Introduction to Object Oriented Programming By Witt KV, Galgotia Publications.
6. Object Oriented Programming By Blaschek G, Springer Verlag



MSC-204 ELECTIVE-I (1)

Computer Networks

- 1. Introduction and Physical Layer :****Introduction:** Goal and application Network Hardware and Software, Protocol Hierarchies, Design Issue of the layers, Interfaces and services, Connection oriented and connection less services, Service Primitives, Reference Models – The OSI Reference model, The TCP/IP Model ,Types of computer Network :LAN,MAN,WAN, Topologies, Transmission mode .
Physical Layer :Data and signal, Analog and digital Communication, Transmission Media ,Concept of data transmission, Switching Techniques ,Communication Satellites – Geosynchronous Satellite – VSAT, Low Orbit Satellites, ISDN and ATM.
- 2. Data Link Layer :** Data Link Layer design issues Data link control:Framing, Flow control. ErrorDetection and Correction. DLC protocol :Stop and Wait Protocol, Sliding window protocol, A Simplex protocol for noisy channel, Medium access sublayer: Channel allocation :static and dynamic ,Multiple access protocol FDDI, Data Link Layer in the Internet : SLIP,PPP. Wired and Wireless LAN protocol.
- 3. Network Layer :** The Network Layer Design Issue, IP addressing, Address mapping, Error reporting ,Multicasting ,Delivery, Forwarding and Routing. The Network Layer in the Internet : The IP Protocol. subnets, Internet control protocols ,internet multicasting.
- 4. Transport Layer :**The Transport layer services, The concept of client and server in terms of socket addressing Quality of service, Transport service primitives and buffering, Multiplexing, Crash Recovery. The Internet Transport Protocols (TCP/IP) – The TCP Service Model, The TCP protocol, The TCP segment header, TCP connection management, TCP transmission policy, TCP congestion control, TCP timer management, UDP.
- 5. Presentation and Application Layer :** Network Security, Traditional Cryptography, Private key cryptography and public key cryptography, Authentication protocols, DNS ,SNMP,E-mail, application layer protocols.

Readings:

1. Data Communications and Networking By Forouzan, Tata McGraw Hill Company.
2. Computer Networks By A.S. Tanenbaum
3. Computer Network By S.S.Shinde ,New Age International Publisher.
4. Data and computer Communication by Shashi banzal ,Firewall media
5. Internetworking with TCP/IP :Principles,protocols,and Architecture Vol 1 5th Edition ,PHI publication
6. Data Communications and Computer Network by Prakash C Gupta, PHI Publication.



MSC-205 ELECTIVE-II (1)

Object Oriented Software Engineering

1. **Software Engineering Paradigms:** Software Development process models. **Project & Process:** Project management, Process & Project metrics. **Fundamental concepts of object oriented programming:** Introduction to the principles of object-oriented programming (classes, objects, messages, encapsulation, inheritance, polymorphism, exception handling, and object-oriented containers). **Object Oriented Analysis:** Object Oriented Analysis, **Analysis Techniques:** Object Modeling, Dynamic Modeling, and Functional Modeling. Adding Operations, Analysis Iteration.
2. **Using UML:** UML Introduction. **Object Modeling Notations:** Basic Concepts. **Structural Diagram:** Class Diagram, Object Diagram, Component Diagram, Deployment Diagram. **Behavioral Diagrams:** Use Case Diagram, Interaction Diagram, Activity Diagram, Statechart Diagram. **Modeling with Objects. System Design, Object Design.**
3. **Object Modeling:** Objectives. **Advanced Modeling Concepts:** Aggregation, Abstract Class, Multiple Inheritance, Generalization and Specialisation, Meta Data and Keys, Integrity Constraints, **Dynamic Model:** Objectives, Events, State and State Diagram, Elements of a State Diagram, Advanced Concepts in Dynamic Modeling, **Functional modeling.**
4. **Patterns:** Benefits of patterns, using patterns during Analysis, using Pattern during Design.
5. **Object mapping with Database:** Objectives, Relational Database Schema for Object Modes, Object Classes to Database Tables, Mapping Associations to Tables, Mapping Generalizations to Tables, Interfacing to Databases.

Readings:

1. Bernd Bruegge & Allen H. Dutoit, "Object-Oriented Software Engineering", 2009.
2. Bertrand Meyer, Object Oriented Software Construction, Prentice-Hall.
3. Grady Booch, James Rumbaugh and Ivar Jacobson, Unified Modeling Language Guide, Addison-Wesley.
4. Ivar Jacobson, "Object-Oriented Software Engineering", Pearson Education, 2009.
5. Stephen R. Schach, "Object-Oriented Classical Software Engineering", Mc Graw Hill, 2010.



MSC-205 ELECTIVE-II (2)

Multimedia

1. Introduction to Multimedia System Multimedia elements, Multimedia applications, Global structure, Technologies for Multimedia system. Multimedia: Media & Data Streams Multimedia: media & data streams, Properties, Traditional data stream characteristics, Data stream characteristics for continuous media, Information units.
2. Sound / Audio Sound Concepts, Music: MIDI Concepts, MIDI devices, MIDI messages, MIDI software, Speech: Speech generation, Speech Analysis, Speech Transmission. Image And Graphics Digital Image Representation, Image Formats, Graphics Formats, Image Processing: Image Synthesis, Image Analysis, Image Transmission.
3. Video & Animation Basic concepts, Television (Conventional systems, Enhanced definition systems, High Definition system), Computer based Animation.
4. Data Compression Storage space, Coding requirements, Source Entropy & Hybrid coding, Basic compression techniques, Introduction to following compression techniques: JPEG, H.261 (PX64), MPEG ,DVI
5. Optical Storage Media & Retrieval Technologies Basic Technology, Video Disk & other WORMS, CD ROM, CD ROM Extended Architecture, Compact Disk Magneto optical.

Readings:

1. Multimedia System Design By P. K. Andleigh, Kiran Thakrar.
2. Multimedia Computing Communication & Application. By Ralf Steinmetz, & Klaranashtedt. (Pearson Education).



MSC-205 ELECTIVE-II (3)

Linux operating System and Shell Programming

- 1. INTRODUCTION TO LINUX:** History, The Linux Architecture, Features of Linux, Internal and External Commands, Command Structure, difference between Linux and Unix, various Linux distributions, basic commands. **UTILITIES:** file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, Text processing utilities and backup utilities, Security commands. The vi editor, security by file Permissions.
- 2. INTRODUCTION TO SHELLS:** Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell Edition Environment Customization. Filters. **GREP:** Operation, grep Family, Searching for File Content. **SED:** Scripts, Operation, Addresses, commands, Applications. **AWK:** Execution, Fields and Records, Scripts, Operations, Patterns, Actions, Associative Arrays, String Functions, String Functions, Mathematical Functions, User – Defined Functions, Using System commands in awk, Applications.
- 3. INTERACTIVE KORN SHELL:** Korn Shell Features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, Options, Startup Scripts, Command History, Command Execution Process. **KORN SHELL PROGRAMMING:** Basic Script concepts, Expressions, Decisions Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.
- 4. INTERACTIVE C SHELL:** C shell features, Two Special Files, Variables, Output, Input, Exit Status of a Command, eval Command, Environmental Variables, On-Off Variables, Startup and Shutdown Scripts, Command History, Command Execution Scripts. **C SHELL PROGRAMMING:** Basic Script concepts, Expressions, Decisions: Making Selections, Repetition, special Parameters and Variables, changing Positional Parameters, Argument Validation, Debugging Scripts, Script Examples.
- 5. FILE MANAGEMENT:** File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask.

Readings:

1. Sumitabha Das, “Unix Concepts and Applications”, 4th Edition. TMH, 2006. (1, 2 units)
2. Behrouz A. Forouzan, Richard F. Gilbery, “Unix and shell Programming”, 1st Edition, Cengage Learning India, 2003.



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3. Beginning Linux Programming, 4th Edition, N.Matthew, R.Stones, Wrox, Wiley India Edition.
 4. Graham Glass, King Ables, "Unix for programmers and users", 3rd Edition, Pearson Education, 2009.
 5. N.B Venkateswarlu, "Advanced Unix programming", 2ndEdition, BS Publications, 2010.
 6. Yashwanth Kanitkar," Unix Shell programming", 1stEdition, BPB Publisher, 2010.
 - 7.Linux: Complete Reference, 6th Edition, Richard Petersen, Tata McGraw-Hill



MSC -302

Artificial Intelligence

- 1. Introduction:** Definitions and approaches, Foundation of A.I. , Challenges in AI, Area and Applications of A.I., Intelligent Agents: meaning, types, environments, examples.
- 2. Problem Solving:** Problem solving as state space search, production system, writing production system and solution for a Water jug problem; some AI classical problems (statements only) cannibal missionaries, tower of Hanoi, tic tac toe, 8-puzzle, Search techniques: Breadth First, and Depth-first, Best-First Search, Hill-climbing, Heuristics, A* algorithm, local and global maxima(minima),
- 3. Knowledge Representation and Reasoning:** Predicate and propositional logic, conversion of sentences to wffs of predicate logic, Resolution, clause form, Skolem functions, Unification, Resolution in Propositional and predicate logic, Semantic Nets.
- 4. Pattern Recognition:** Meaning of pattern, Pattern Recognition, Classification, Supervised & Unsupervised Learning of classifiers, K-NN, K-MEANS algorithms.
- 5. Expert Systems:** Introduction, Advantages, components and participants in an expert system, Application

Readings:

1. Artificial Intelligence: E. Rich and K. Knight, Tata McGraw Hill.
2. Artificial Intelligence: A New Synthesis By Nilsson, Morgan Kaufmann.
3. Pattern Classification 2nd Edition By R.O. Duda, Hart, Stork (2001) ,John wiley, New York.
4. Pattern Recognition : Technique and Applications By Shinghal (2006) ,Oxford University Press,NewDelhi.

MSC - 303

Relational Data Base Management System

- 1. Overview of Database Management :**Data, Information and knowledge, Increasing use of data as a corporate resource, data processing verses data management, file oriented approach verses database oriented approach to data management; data independence, database administration roles, DBMS architecture, different kinds of DBMS users, importance of data dictionary, contents of data dictionary, types of database languages. Data models: network, hierarchical, relational. Introduction to distributed databases.
- 2. Relational Model :** Entity - Relationship model as a tool for conceptual design-entities attributes and relationships. ER diagrams; Concept of keys: candidate key, primary key, alternate key, foreign key; Strong and weak entities, Case studies of ER modeling Generalization; specialization and aggregation. Converting an ER model into relational Schema. Extended ER features.
- 3. Structured Query Language :**Relational Algebra: select, project, cross product different types of joins (inner join, outer joins, self join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages, Introduction to SQL constructs (SELECT...FROM, WHERE... GROUP BY... HAVING... ORDERBY...), INSERT, DELETE, UPDATE, VIEW definition and use, Temporary tables, Nested queries, and correlated nested queries, Integrity constraints: Not null, unique, check, primary key, foreign key, references, Triggers. Embedded SQL and Application Programming Interfaces.
- 4. Relational Database Design :**Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms (1NF, 2NF, 3NF). Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF. Issues in physical design; Concepts of indexes, File organization for relational tables, De-normalization.
- 5. Introduction to Query Processing and Protecting the Database & Data Organizations :** Parsing, translation, optimization, evaluation and overview of Query Processing. Protecting the Data Base - Integrity, Security and Recovery. Domain Constraints, Referential Integrity, Assertion, Triggers, Security & Authorization in SQL.

Readings:

1. Database system concept By H. Korth and A. Silberschatz, TMH.
2. Data Base Management System By Alexies & Mathews , Vikas publication.
3. Data Base Management System By C. J. Date ,Narosha Pub.
4. Data Base Management System By James Matin .
5. Principles of Database System By Ullman.
6. An Introduction to database systems By Bipin Desai, 2011 ed.,Galgotia Publication.
7. Database Management System By A. K. Majumdar & P.Bhattacharya, TMH



MSC-304 ELECTIVE-III (1)

Advanced Java Programming

1. **Basics of Core JAVA:** class, interface, exception handling. **Collections** : Collection Interfaces, Concrete Collections, The Collections Framework **Multithreading** : Creating thread and running it, Multiple Thread acting on single object, Synchronization, Thread communication, Thread group, Thread priorities, Daemon Thread, Life Cycle of Thread.
2. **Networking:** Internet Addressing, InetAddress, Factory Methods, Instance Methods, TCP/IP Client Sockets, URL, URL Connection, TCP/IP Server Sockets, Datagrams. **Java Database Connectivity (JDBC):** Merging Data from Multiple Tables: Joining, Manipulating, Databases with JDBC, Prepared Statements, Transaction Processing, Stored Procedures.
3. **Servlets:** Servlet Overview and Architecture, Interface Servlet and the Servlet Life Cycle, Handling HTTP get Requests, Handling HTTP post Requests, Redirecting Requests to Other Resources, Session Tracking, Cookies, Session Tracking with HttpSession
4. **Java Server Pages (JSP):** Introduction, JavaServer Pages Overview, A First JavaServer Page Example, Implicit Objects, Scripting, Standard Actions, Directives, Custom Tag Libraries, **Enterprise Java Bean:** Preparing a Class to be a JavaBean, Creating a JavaBean, JavaBean Properties, Types of beans, Stateful Session bean, Stateless Session bean, Entity bean
5. **Remote Method Invocation:** Defining the Remote Interface, Implementing the Remote Interface, Compiling and Executing the Server and the Client, **Struts:** Basics of Struts, Struts : What and Why? ,Model1 vs Model2 ,Struts2 Features, Steps to create Struts application ,Understanding Action class ,Understanding struts.xml file

Readings:

1. "Advanced Java 2 Platform HOW TO PROGRAM" by H. M. Deitel, P. J. Deitel, S. E. Santry – Prentice Hall
2. "Beginning Java™ EE 6 Platform with GlassFish 3 From Novice to Professional" by Antonio Goncalves – Apress publication



MSC-305

ELECTIVE-IV (1)

Web Technology

- 1 Internet Concept:** Fundamental of Web ,History of Web, Web development overview, Domain Name System (DNS),DHCP,and SMTP and other servers ,Internet service provider (ISP), Concept of IP Address, Internet Protocol, TCP/IP Architecture ,Web Browser and Web Server.
- 2. HTML and DHTML:-** HTML Tag, Rules of HTML, Text Formatting and Style, List, Adding Graphics to Html Document, Tables and Layout , Linking Documents, Frame, Forms, Project in HTML, Introduction to DHTML, CSS, Class and DIV, External Style Sheet.
- 3. Scripting Languages:** Java Script (JS) in Web Page, Advantage of Java Script, JS object model and hierarchy ,Handling event, Operators and syntax of JS, JS Function, Client side JS Vs Server side JS ,JS security, Introduction to VB Script, Operator and Syntax of VB Script, Dialog Boxes, Control and Loop, Function in VBS.
- 4. XML:**Introduction to XML, XML in Action, Commercial Benefits of XML, Gaining Competitive advantage with XML, Programming in XML, XML Schema ,XSLT ,DOM structure model ,XML quires and transformation.
- 5. Active Server Page (ASP):** Introduction ,Internet Information System (IIS),ASP object ,Server object, File system object, session ,Accessing data base with an ASP page ,ODBC – ADO connection object, common methods and properties, ADO record set object .Introduction to ASP.Net.

Readings:

1. The complete Reference By Thomos A. Powell ,TMH publication
2. Web Technology :A Developers Perspective ,N.P.Gopalan ,J.Akilandeswani,PHI Publication.
3. Java Script :The definite Guide By Flangam , O"Reilly
4. Java Script :Developers Resource by Kamran Husain and Jason Levitt PTR-PHI publication.
- 5."Mastering VB Script" BPB Publication.
6. World Wide Web design with HTML by Xavier Tata McGraw Hill Publication .



MSC -305 ELECTIVE –IV (2)

Pattern Recognition

1. **Pattern Concept:** Meaning of pattern, examples of patterns, importance of study of patterns in machine learning, meaning of labels, attributes, features, dimensions in patterns with examples, pattern recognition and classification, meaning of machine learning
2. **Pattern Recognition and classification:** Meaning and importance in machine learning, supervised and unsupervised learning with meaning and examples, classifiers, k-nn classification and k-means clustering, implementation and applications
3. **Decision Trees:** Meaning of tree and hence decision tree, building a decision tree, decision tree induction, classification using a decision tree, classification using ID3
4. **Evolutionary Computing:** Meaning of evolutionary computing, various operators used in evolutionary computing, genetic algorithms and their applications, Particle Swarm Optimization and their applications, Multi-objective Genetic Algorithms with examples
5. **Ensemble of classifiers:** Meaning and importance of ensembles, boosting and AdaBoost algorithm, bagging and random forest, weak and strong learning, ensembles of classifiers with voting



Readings:

1. Pattern Classification: Duda, R.O, Peter Hart, David Stork, 2010, Wiley India
2. Data Mining: Concept and Techniques, Morgan and Kaufmann, 2001
3. Pattern Recognition: Rajjan Shinghal, Oxford University Press New Delhi, 2006
4. Ensemble Methods, Foundations and Algorithms, Zhi-Hua Zhou, A CRC Press, Chapman and Hall Book, 2010
5. Pattern Recognition, Robi Polikar, Wiley Encyclopedia of Biomedical Engineering, 2006 John Wiley &

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