



Jamshedpur Women's College

A CONSTITUENT AUTONOMOUS COLLEGE OF KOLHAN UNIVERSITY

"A" Grade College by NAAC, Bangalore

College with Potential for Excellence by University Grants Commission

JAMSHEDPUR - 831 001

Syllabus (Choice Based Credit System)

B.SC. Hons. in Information Technology

Session 2016-2018 onwards

Course Structure (Information Technology-Major)

Details of course under B.Sc. (Honors)

Course	*Credits	
	Theory+Practical	Theory+Tutorial
=====		
I.Core Course		
(14 Papers)	14X4=56	14X5=70
Paper Practical/Tutorial*		
(14 Papers)	14X2=28	14X1=14
II.Elective Course		
(8 Papers)		
A.1.Discipline Specific Elective (4 Papers)	4X4=16	4X5=20
A.2.Discipline Specific Elective Practical/Tutorial*	4X2=8	4X1=4
(4 Papers)		
B.1.Generic Elective/ Interdisciplinary	4X4=16	4X5=20
(4 Papers)		
B.2.Generic Elective Practical/Tutorial*	4X2=8	4X1=4
(4 Papers)		
<ul style="list-style-type: none"> • Optional Dissertation or project work in place of one Discipline Specific Elective paper (6 credits) in 6th Semester 		
III.Ability Enhancement Courses		
1.Ability Enhancement Compulsory		
(2 Papers of 2 credit each)	2X2=4	2X2=4
Environmental Science		
English/MIL Communication		
2.Ability Enhancement Elective (Skill Based)		
(Minimum 2)	2X2=4	2X2=4
(2 Papers of 2 credit each)		
Total credit	140	140

Proposed Scheme for Choice based credit system in (B.Sc. Honors in Information Technology)					
Semester	Core Course(14)	Ability Enhancement Compulsory course(AECC)(2)	Skill Enhancement Course(SEC)(2)	Elective Discipline Specific DSE(4)	Elective: Generic (GE)(4)
I	1.Programming in C/C++ 2.Computer System Architecture	English/MIL/Evs			GE-1
II	1.Data Structure using C 2. Operating System	Evs/English /MIL			GE-2
III	1.Programming in Java 2. Discrete Mathematics 3.Data Base Management System		SEC-1		GE-3
IV	1.Design and Analysis of Algorithm 2.Software Engineering 3.Computer Networks		SEC-2		GE-4
V	1.Internet Technology 2.Theory of computation.			DSE-1 DSE-2	
VI	1.Artificial Intelligence 2.Computer Graphics			DSE-3 DSE-4	

Marks Distribution of Papers

Semester I

Paper_Code	Paper_Name	Credit	MSE	ESE/PE	Total
Paper-1	Programming in C/C++	4	25	50	75 100
Paper-1(B)	Programming in C/C++ (practical)	3	00	25	25
Paper-2	Computer System Architecture	4	25	50	75 100
Paper-2(B)	Computer System Architecture	3	00	25	25

Semester II

Paper_Code	Paper_Name	Credit	MSE	ESE/PE	Total
Paper-3	Data Structure using C	4	25	50	75 100
Paper-3(B)	Data Structure using C practical	3	00	25	25
Paper-4	Operating System	4	25	50	75 100
Paper-4(B)	Operating System Lab	3	00	25	25

Semester III

Paper_Code	Paper_Name	Credit	MSE	ESE/PE	Total
Paper-5	Programming in JAVA	4	25	50	75 100
Paper-5(B)	Programming in JAVA (practical)	3	00	25	25
Paper-6	Discrete Mathematics	6	25	75	100
Paper-7	Computer Networks	4	25	50	
Paper-7(B)	Computer Networks Lab	3	00	25	75 100 25

Semester IV

Paper_Code	Paper_Name	Credit	MSE	ESE/PE	Total
Paper-8	Design and analysis of algorithms	4	25	50	75 100 25
Paper-8(B)	Design and analysis of algorithms Lab	3	00	25	
Paper-9	Software Engineering	4	25	50	75 100
Paper-9(B)	Software Engineering Lab	3	00	25	25
Paper-10	Data Base Management System	4	25	50	75 100 25
Paper-10(B)	Data Base Management System Lab	3	00	25	

Semester V

Paper_Code	Paper_Name	Credit	MSE	ESE/PE	Total
Paper-11	Internet Technologies	4	25	50	75 100
Paper-11(B)	Internet Technologies Lab	3	00	25	
Paper-12	Theory of computation	6	25	75	100
DSE-01	DSE-1	6	00	50	50
DSE-02	DSE-2	6	00	50	50

Semester VI

Paper_Code	Paper_Name	Credit	MSE	ESE/PE	Total
Paper-13	Artificial Intelligence	6	25	50	75
Paper-14	Computer Graphics	6	25	50	75
DSE-03	DSE-3	2	50	50	100
DSE_04	DSE-4	0	00	50	50

**Generic Elective Papers (GE) (Minor –) (any four) for other
Departments/Disciplines: (Credit: 06 each)**

Paper-Code	Paper-Name	Credit	MSE	ESE/PE	Total
M-01	Foundation of Information Technology	4	25	50	75 100
M-01(B)	Foundation of Information Technology Lab	3	00	25	
M-02	Introduction to programming	4	25	50	75 100
M-02(B)	Introduction to programming Lab	3	00	25	
M-03	Web Technologies	4	25	50	75 100
M-03(B)	Web Technologies Lab	3	00	25	
M-04	E-Commerce	6	25	75	100

Discipline Specific Elective Papers

Paper_Code	Paper-Name	Credit	MSE	ESE/PE	Total
DSE-01	Information Security + Tutorial	6	00	50	50
DSE-02	Cloud Computing + Tutorial	6	00	50	50
DSE-03	Mini Project(s/w Development)	2	50	50	100
DSE-04	Industrial Training	00	00	50	50

SEMESTER	COURSE OPTED	COURSE NAME	Credits
I	Ability Enhancement Compulsory Course-I	English/MIL communications/ Environmental Science	2
	Paper-I	Programming using C/C++	4
	Paper-I(B) Practical	Programming using C/C++ Lab	3
	Paper-II	Computer System Architecture	4
	Paper-II(B) Practical	MicroSoft Office Lab	3
	Generic Elective-1	GE-1	4/5
	Generic Elective-1 Practical/Tutorial		2/1
II	Ability Enhancement Compulsory Course-II	English/MIL communications/ Environmental Science	2
	Paper-III	Data structure using C/C++	4
	Paper-III(B) Practical	Data Structure using C/C++ Lab	3
	Paper-IV	Operating System	4
	Paper-IV(B) Practical	Operating System Lab	3
	Generic Elective-2	GE-2	4/5
	Generic Elective-2 Practical/Tutorial		2/1
III	Paper-V	Programming in JAVA	4
	Paper-V(B) Practical	Programming in JAVA Lab	3
	Paper-VI	Discrete Mathematics	5
	Paper-VI(B) Tutorial	Discrete Mathematics Tutorials	1
	Paper-VII	Database Management System	4
	Paper –VII(B) Practical	Database Management System Lab	3
	Skill Enhancement Course-1	SEC-1	2
	Generic Elective-3	GE-3	4/5
	Generic Elective-3 Practical/Tutorial		2/1
IV	Paper-VIII	Design and Analysis of Algorithms	4
	Paper-VIII(B) Practical	Design and Analysis of Algorithms Lab	3
	Paper-IX	Software Engineering	4

	Paper-IX (B)Practical	Software Engineering Lab	3
	Paper-X	Computer Networks	4
	Paper-X(B) Practical	XML Lab	3
	SkillEnhancementCourse-2	SEC-2	2
	GenericElective-4	GE-4	4/5
	GenericElective-4Practical		2/1
V	Paper-XI	Internet Technologies	4
	Paper-XI(B) Practical	Internet Technologies Lab	3
	Paper-XII	Theory of Computation	5
	Paper-XII Tutorial	Theory of Computation Tutorial	1
	DisciplineSpecificElective-1	DSE-1	4/5
	DisciplineSpecificElective-1 Practical/Tutorial	DSE-1Lab/Tutorial	3/1
	DisciplineSpecificElective-2	DSE-2	4/5
	DisciplineSpecificElective-2 Practical/Tutorial	DSE-2 Lab/Tutorial	3/1
VI	Paper-XIII	Artificial Intelligence	5
	Paper-XIII Tutorial	Artificial Intelligence Tutorial	1
	Paper-XIV	Computer Graphics	5
	Paper-XIV Tutorial	Computer Graphics Tutorial	1
	DisciplineSpecificElective-3	DSE-3	0
	DisciplineSpecificElective-3 Practical/Tutorial	DSE-3Lab	2
	DisciplineSpecificElective-4	DSE-4	0
	DisciplineSpecificElective-4 Practical/Tutorial	DSE-4 (Training)	0
Total Credits			140

Core Papers(C): (Credit: 06 each)(1 period / week for tutorials or 4 periods / week of practical)

- | | |
|--------------------------------------|------------------|
| 1. Programming using C/C++ | (4 + 2 Lab) |
| 2. Computer System Architecture | (4 + 2 Lab) |
| 3. Data Structure using C/C++ | (4+2 Lab) |
| 4. Operating System | (4+2 Lab) |
| 5. Programming in JAVA | (4 + 2 Lab) |
| 6. Discrete Structure | (5 + 1Lab) |
| 7. Database Management System | (4+2 Lab) |
| 8. Design and Analysis of Algorithms | (4 + 2 Lab) |
| 9. Software Engineering | (4 + 2 Lab) |
| 10. Computer Network | (4 + 2 Lab) |
| 12. Internet Technologies | (4 + 2 Lab) |
| 12. Theory of Computation | (5 + 1 Tutorial) |
| 13. Artificial Intelligence | (5 + 1 Lab) |
| 14. Computer Graphics | (5 + 1 Lab) |

Discipline Specific Elective Papers: (Credit: 06 each) (4 papers to be selected) – DSE 1 – 4

1. Information Security (5) + Tutorial(1)
2. Cloud Computing (5) + Tutorial (1)
3. Mini Project (Software Development)
4. Industrial Training (4) + Lab (4)

Other Discipline (Four papers of anyone discipline) – GE 1 to GE 4

1. Mathematics
2. Physics

Skill Enhancement Courses (02 to 04 papers) (Credit: 02 each) – SEC1 to SEC4

1. Programming in MATLAB (1) + Lab (2)
2. HTML Programming (1) + Lab (2)
3. XML Programming (1) + Lab (2)
4. Oracle (SQL/PL-SQL) (1) + Lab (2)
5. PHP Programming (1) + Lab (2)
6. Software Testing (1) + Lab (2)
7. Other Latest Development

Generic Elective Papers (GE) (Minor –) (any four) for other Departments/Disciplines: (Credit: 06 each)

1. Foundation of Information Technology (4) +Lab (2)
2. Introduction to Programming (4) + Lab (2)
3. Web Technologies (4) + Lab (2)
4. E-Commerce (5) +Tutorial(2)

CORE COURSES (HONOURS PAPERS IN IT)

(PAPER-I): Programming using C/C++

Theory: 60 Lectures

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

History of C or C++, Overview of Procedural Programming and Object-Oriented Programming, Algorithm, Flow chart 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), Expression, Understanding Operators Precedence in Expressions, Using Comments in programs, Character I/O (getc, getchar, putc, putchar etc), Formatted and Console I/O (printf(), scanf(), cin, cout), Using Basic Header Files (stdio.h, iostream.h, conio.h etc).

3. Conditional Statements and Iterative Statements (5 Lectures)

Conditional Statements (if construct, if else, nested if, 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)

Definition and Utility of functions, Types of function, Call by Value, Call by Reference, Functions returning value, Void functions, Inline Functions, Functions parameters, Differentiating between Declaration and Definition of Functions, Command Line Arguments/, Functions with variable number of Arguments.

Creating and Using One Dimensional Arrays, 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)

5. User defined 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.

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

Understanding a Pointer Variable, Simple use of Pointers (Declaring and Dereferencing Pointers to simple variables), Passing pointers as function arguments, Returning a pointer from a function.

7. Memory Allocation in C++ (5 Lectures)

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

8. File I/O, Preprocessor Directives (5 Lectures)

Opening and closing a file, Reading and writing Text Files, Using put(), get(), read() and write() functions.

9. Using Classes in C++ (4 Lectures)

Principles of Object-Oriented Programming, Defining ,Concept of Class ,Object, Abstraction, Encapsulation, Inheritance, polymorphism, Static and Dynamic Binding ,Overloading and Overriding, Message passing.

10. Overview of constructor destructor and dynamic allocation (5 Lectures)

Definition and need of constructor and destructor, Constructor with parameter, without parameter, copy constructor, Constructor overloading, Dynamic Allocation and deallocation of memory using new and delete operator.

11. Inheritance and Polymorphism (8 Lectures)

Introduction to Inheritance and its type (Single, Multi-Level Inheritance, Multiple Inheritance, Hierarchical, Hybrid), Polymorphism, Compile time polymorphism and run time polymorphism, Need of Overloading functions and operators, Overloading functions by number and type of arguments, Overloading Operators (including Binary, unary operators), Virtual function, pure virtual function.

Reference Books

1. HerbtzSchildt, "C++: The Complete Reference", Fourth Edition, McGraw Hill. 2003
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-Hill Education, 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. Rema Theraja, "Programing in C/C++", Published by Oxford, 2th Edition

LAB (PAPER-I(B)): Programming using C/C++ Lab Practical: 60 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 $S = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \dots$
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 cuboid

Write 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.
 29. Write a function that reverses the elements of an array in place. The function must accept only one pointer value and return void. 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.

(PAPER 2): Computer System Architecture

Theory: 60 Lectures

1. Data Representation and Basic Computer Arithmetic

(13 lectures)

Number systems(Binary, Octal, Decimal, Hexadecimal), conversion, Gray Code, Excess-3 code complements(1s and 2's), fixed and floating point representation, character representation, addition, subtraction.

2. Logic Design

(12 lectures)

Logic gates: (AND, OR, NOT, NAND, NOR), Truth Table, Design of Logic Gates.

Boolean algebra: Boolean Postulates, Boolean variable, Boolean expression, SOP(Sum of product), POS(Product of sum), K-Map of 2, 3 and 4 variable, minimization of Boolean expression using Boolean postulates and karnaugh Map(K-Map).

3. Combinational and Sequential circuit

(15 Lecture)

Half Adder, Full adder, Multiplexer, Encoder, Decoder

Flip flop and its type(RS, D, JK, T), Master slave flip flop, Register, counters(synchronous, asynchronous counter, up and down counter).

4. Basic Computer Organization and CPU

(25 lectures)

Computer registers, bus system, instruction set, instruction cycle, input-output and interrupt.

Register organization, Instruction formats, addressing modes.

Recommended Books:

1. M. Mano, Computer System Architecture, Pearson Education 1992
 2. B Ram, Computer Fundamentals Architecture and organization, New Age International Publisher, 5th Edition
 3. A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004th
 4. W. Stallings, Computer Organization and Architecture Designing for Performance, 8 Edition, Prentice Hall of India, 2009
 4. M.M. Mano, Digital Design, Pearson Education Asia, 2013
 5. Carl Hamacher, Computer Organization, Fifth edition, McGrawHill, 2012.
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LAB (PAPER-11(B)): Microsoft Office Lab**Lab Practical: 60 Lectures**

Ms -Office of latest version (Microsoft office word, Excel, Power Point)

(PAPER-III): Data Structures using C/C++**Theory: 60 Lectures****1. Linked Lists (10 Lectures)**

Definition of list and linked list. Types of linked list (Singly, Doubly and Circular representation of Stack in Lists; Self Organizing Lists; Skip Lists
Limitations of Array representation of stack

2. Stack (10 Lectures)

Implementing stack using Array and Linked list Prefix, postfix and infix notation, Application of stack.

3. Queues (10 Lectures)

Definition of Queue. Array and Linked representation of Queue. Types of Queue (De-queue, Priority Queues), Application of Queue.

4. Trees and Graph (15 Lectures)

Introduction to Tree as a data structure; Binary Trees and its type, Binary search Tree (Insertion, Deletion, and Traversals on Binary Search Trees). Introduction to graph, Representation of Graph as adjacency matrix and Adjacency list.

5. Searching and Sorting (15 Lectures)

Linear Search, Binary Search, Comparison of Linear and Binary Search, Selection Sort, Insertion Sort, Insertion Sort, Shell Sort, Comparison of Sorting Techniques
unctionion

Reference Books:

1. Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning, 2012.
2. Sartaj Sahni, Data Structures, "Algorithms and applications in C++", Second Edition, Universities Press, 2011.
3. Aaron M. Tenenbaum, Moshe J. Augenstein, Yedidyah Langsam, "Data Structures Using C and C++", Second edition, PHI, 2009.
4. Robert L. Kruse, "Data Structures and Program Design in C++", Pearson, 1999.
5. D.S Malik, Data Structure using C++, Second edition, Cengage Learning, 2010.
6. Mark Allen Weiss, "Data Structures and Algorithms Analysis in Java", Pearson Education, 3rd edition, 2011
7. Aaron M. Tenenbaum, Moshe J. Augenstein, Yedidyah Langsam, "Data Structures Using Java, 2003.

8. Robert Lafore, "Data Structures and Algorithms in Java, 2/E", Pearson/ Macmillan Computer Pub,2003
 9. John Hubbard, "Data Structures with JAVA", McGraw Hill Education (India) Private Limited; 2 edition, 2009
 10. Goodrich, M. and Tamassia, R. "Data Structures and Algorithms Analysis in Java", 4th Edition, Wiley,2013
 11. Herbert Schildt, "Java The Complete Reference (English) 9th Edition Paperback", Tata McGraw Hill, 2014.
 12. D. S. Malik, P.S. Nair, "Data Structures Using Java", Course Technology, 2003.
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LAB (PAPER-III(B)): Data Structures using C/C++ Lab

Practical: 60 Lectures

1. Write a program to search an element from a list. Give user the option to perform Linear or Binary search. Use Template functions.
2. WAP using templates to sort a list of elements. Give user the option to perform sorting using Insertion sort, Bubble sort or Selection sort.
3. Implement Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list and concatenate two linked lists (include a function and also overload operator +).
4. Implement Doubly Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
5. Implement Circular Linked List using templates. Include functions for insertion, deletion and search of a number, reverse the list.
6. Perform Stack operations using Linked List implementation.
7. Perform Stack operations using Array implementation. Use Templates.
8. Perform Queues operations using Circular Array implementation. Use Templates.
9. Create and perform different operations on Double-ended Queues using Linked List implementation.
10. WAP to scan a polynomial using linked list and add two polynomial.
11. WAP to calculate factorial and to compute the factors of a given no. (i)using recursion, (ii) using iteration
12. (ii) WAP to display fibonacci series (i)using recursion, (ii) using iteration
13. WAP to calculate GCD of 2 number (i) with recursion (ii) without recursion
14. WAP to create a Binary Search Tree and include following operations in tree:
 - (a) Insertion (Recursive and Iterative Implementation)
 - (b) Deletion by copying
 - (c) Deletion by Merging
 - (d) Search a no. in BST
 - (e) Display its preorder, postorder and inorder traversals Recursively
 - (f) Display its preorder, postorder and inorder traversals Iteratively
 - (g) Display its level-by-level traversals
 - (h) Count the non-leaf nodes and leaf nodes
 - (i) Display height of tree
 - (j) Create a mirror image of tree
 - (k) Check whether two BSTs are equal or not
15. WAP to convert the Sparse Matrix into non-zero form and vice-versa.
16. WAP to reverse the order of the elements in the stack using additional stack.
17. WAP to reverse the order of the elements in the stack using additional Queue.
18. WAP to implement Diagonal Matrix using one-dimensional array.
19. WAP to implement Lower Triangular Matrix using one-dimensional array.
20. WAP to implement Upper Triangular Matrix using one-dimensional array.

(PAPER-IV): Operating Systems

Theory: 60 Lectures

1.Introduction

(10 Lectures)

Basic function of Operating System, types of operating systems–multiprogramming systems, batch systems , time sharing systems; operating systems for personal computers & workstations, process control & real time systems.

2.Operating System Organization

(6 Lectures)

Processor and user modes, kernels, system calls.

3.Process Management

(14 Lectures)

System view of the process and resources, process abstraction, process hierarchy, threads, threading issues, Process Scheduling, non-pre-emptive and pre-emptive scheduling algorithms; deadlocks.

- 4.Memory Management** (10 Lectures)
Physical and virtual address space; memory allocation strategies –fixed and variable partitions, paging, segmentation, virtual memory
- 5.File and I/O Management** (10 Lectures)
Directory structure, file operations, file allocation methods, device management.
- 6.Disc Management** (10 Lecture)
Disc structure,Disc scheduling algorithm(FCFS,SSTF,SCAN),Formatting boot block, Bad block,swap space management.

Recommended Books:

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education 2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education 1997.
4. W. Stallings, Operating Systems, Internals & Design Principles, 5th Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.

LAB (PAPER-IV(B)): Operating Systems Lab

Practical: 60 Lectures

Linux commands and shell programming

(PAPER-V): Programming in Java

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), Java Strings: The Java String class, Creating & Using String Objects,Manipulating Strings, 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,Access specifier (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.

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.

5. Applets (15 Lectures)

Java Applets:Introduction to Applets, Writing Java Applets,Applet class,life cycle of an Applet,passing parameter to applet.

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, GiladBracha, 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, GaryCornell, "Core Java 2 Volume 1 ,9th Edition,Printice Hall.2012
5. Cay S. Horstmann, Gary Cornell, "Core Java 2 Volume 2 - Advanced Features)", 9th Edition, Printice 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", Orielly 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.

LAB (PAPER-V(B)): Programming in Java Lab Practical: 60 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 classes 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.
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(PAPER-VI): Discrete Structures Theory: 60 Lectures

1.Introduction:Sets - finite and Infinite sets, uncountably Infinite Sets; functions, relations, Properties of Binary Relations, Closure, Partial Ordering Relations; counting - Pigeonhole Principle, Permutation and Combination, Mathematical Induction, Principle of Inclusion and Exclusion. (15 Lectures)

2.Recurrences:) Recurrence Relations, generating functions, Linear Recurrence Relations with constant coefficients and their solution, Substitution Method, Recurrence Trees, Master Theorem (15 Lectures)³

.Graph Theory Basic Terminology, Models and Types, multigraphs and weighted graphs, Graph Representation, Graph Isomorphism, Connectivity, Euler and Hamiltonian Paths and Circuits. (15 Lectures)

Trees

4.Propositional Logic (15 Lectures)
Logical Connectives, Well-formed Formulas, Tautologies, Equivalences.

Recommended Books:

1. C.L. Liu , D.P. Mahopatra, Elements of Discrete mathematics, 2nd Edition , Tata McGraw Hill, 1985,
2. Kenneth Rosen, Discrete Mathematics and Its Applications, Sixth Edition ,McGraw Hill 2006
3. T.H. Cormen, C.E. Leiserson, R. L. Rivest, Introduction to algorithms, 3rd edition Prentice Hall on India, 2009
4. M. O. Albertson and J. P. Hutchinson, Discrete Mathematics with Algorithms , John Wiley Publication, 1988
5. J. L. Hein, Discrete Structures, Logic, and Computability, 3rd Edition, Jones and Bartlett Publishers, 2009
6. D.J. Hunter, Essentials of Discrete Mathematics, Jones and Bartlett Publishers, 2008

Discrete Structures Tutorial

Tutorial: 15 lectures

(PAPER-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 AN and back-bone networks- repeaters, hubs, switches, bridges, router and gateways;

6. Transport Layer Functions and Protocols (10 Lectures)

Transport services- error and flow control, Connection establishment and release- three way handshake;

7. Overview of Application layer protocol (7 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

LAB (PAPER-VII(B)): XML Lab

Practical: 60 Lectures

(PAPER-VIII): Design and Analysis of Algorithms

Theory: 60 Lectures

1.Introduction

(6 Lectures)

Basic Design and Analysis techniques of Algorithms, Correctness of Algorithm.

2.Algorithm Design Techniques

(10 Lectures)

Iterative techniques, Divide and Conquer, Dynamic Programming, Greedy Algorithms.

3.Sorting and Searching Techniques

(20 Lectures)

Elementary sorting techniques–Bubble Sort, Insertion Sort, Merge Sort, Advanced Sorting techniques - Heap Sort, Quick Sort, Sorting in Linear Time , Searching Techniques, complexity analysis;

4.Lower Bounding Techniques

(7 Lectures)

Decision Trees

5.Balanced Trees

(10 Lectures)

AVL tree,Red-Black Trees

6.Graphs

(7 Lectures)

Graph Algorithms–Breadth First Search, Depth First Search and its Applications,Minimum Spanning Trees.

Recommended Books:

1. T.H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein Introduction to Algorithms, PHI, 3rd Edition 2009
2. Sarabasse& A.V. Gelder Computer Algorithm – Introduction to Design and Analysis, **Publisher – Pearson** 3rd Edition 1999

LAB (PAPER-VIII(B)): Design and Analysis of Algorithms Lab Practical: 60 Lectures

1. i. Implement Insertion Sort (The program should report the number of comparisons)
ii. Implement Merge Sort(The program should report the number of comparisons)
 2. Implement Heap Sort(The program should report the number of comparisons)
 3. Implement Randomized Quick sort (The program should report the number of comparisons)
 4. Create a Red-Black Tree and perform following operations on it:
 - i. Insert a node
 - ii. Delete a node
 - iii. Search for a number & also report the color of the node containing this number.
 - 5.Implement Breadth-First Search in a graph
 - 6.Implement Depth-First Search in a graph
-

(PAPER-IX): Software Engineering Theory: 60 Lectures

1.Introduction

(8 Lectures)

The Evolving Role of Software, Software Characteristics, Changing Nature ofSoftware, Software Engineering as a Layered Technology, Software Process Framework, Framework and Umbrella Activities, Process Models, Capability Maturity Model Integration (CMMI).

2.Requirement Analysis

(10 Lectures)

Software Requirement Analysis, Initiating Requirement Engineering Process, Requirement Analysis and Modeling Techniques, Flow Oriented Modeling, Need for SRS, Characteristics and Components of SRS.

3.Software Project Management

(8Lectures)

Estimation in Project Planning Process, Project Scheduling.

4.Risk Management

(8 Lectures)

Software Risks, Risk Identification, Risk Projection and Risk Refinement,RMMM Plan.

5.Quality Management

(8 Lectures)

Quality Concepts, Software Quality Assurance, Software Reviews, Metrics for Process and Projects.

6.Design Engineering

(10 Lectures)

Design Concepts, Architectural Design Elements, Software Architecture, Data Design at the Architectural Level and Component Level, Mapping of Data Flow into Software Architecture, Modeling Component Level Design.

7.Testing Strategies & Tactics (8 Lectures) Software Testing Fundamentals, Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System testing, Black-Box Testing, White-Box Testing and their type, Basis Path Testing.

Recommended Books:

1. R.S. Pressman, Software Engineering: A Practitioner's Approach (7th Edition), McGraw-Hill, 2009.
2. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Narosa Publishing House, 2003.
3. K.K. Aggarwal and Y. Singh, Software Engineering (2nd Edition), New Age International Publishers, 2008.
4. I. Sommerville, Software Engineering (8th edition), Addison Wesley, 2006.
5. D. Bell, Software Engineering for Students (4th Edition), Addison-Wesley, 2005.
6. R. Mall, Fundamentals of Software Engineering (2nd Edition), Prentice-Hall of India, 2004.

LAB (PAPER-IX(B)): Software Engineering Lab Practical: 60 Lectures

S. No	Practical Title
1.	<ul style="list-style-type: none">• Problem Statement,• Process Model
2.	Requirement Analysis: <ul style="list-style-type: none">• Creating a Data Flow• Data Dictionary, Use Cases
3.	Project Management:
	<ul style="list-style-type: none">• Computing FP
	<ul style="list-style-type: none">• Effort• Schedule, Risk Table, Timeline chart
4.	Design Engineering: <ul style="list-style-type: none">• Architectural Design• Data Design, Component Level Design
5.	Testing: <ul style="list-style-type: none">• Basis Path Testing

Sample Projects:

1. **Criminal Record Management:** Implement a criminal record management system for jailers, police officers and CBI officers
2. **DTC Route Information:** Online information about the bus routes and their frequency and fares
3. **Car Pooling:** To maintain a web based intranet application that enables the corporate employees within an organization to avail the facility of carpooling effectively.
4. Patient Appointment and Prescription Management System
5. Organized Retail Shopping Management Software
6. Online Hotel Reservation Service System
7. Examination and Result computation system

8. Automatic Internal Assessment System
 9. Parking Allocation System
 10. Wholesale Management System
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(PAPER-X): Database Management Systems Theory: 60

Lectures

1.Introduction

(6 Lectures)

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

2.Entity Relationship(ER) Modeling

(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.Query Optimization

(8 Lectures)

Introduction to query optimization, transformation of relational equation, estimating statistics of expression results, choice of evaluation plan

Books Recommended:

1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
 2. R. Ramakrishanan, 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.
-

LAB (PAPER-X(B)): Database Management Systems Lab Practical: 60 Lectures

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

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 and Dept 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 _R's or have two _A's 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' 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.

(PAPER-XI): Internet Technologies Theory: 40 Lectures

Java

Use of Objects, Array and ArrayList class.

(5 lectures)

JavaScript

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

(15 lectures)

JDBC

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

(10 lectures)

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.

LAB (PAPER-XI(B)): Internet Technologies Lab

Practical: 60 Lectures

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.

Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

(PAPER-XII):

Theory of Computation

Theory: 60 Lectures

1. Languages (8 Lectures)

Alphabets, string, language, Basic Operations on language, Concatenation, KleeneStar.

2. Finite Automata and Regular Languages (20 Lectures)

Regular Expressions, Transition Graphs, Deterministic and non-deterministic finite automata, NFA to DFA Conversion.

3. Context free languages (17 Lectures)

Context free grammars, parse trees, ambiguities in grammars and languages, introduction to Pushdown automata (Deterministic and Non-deterministic).

4.Turing Macines (15 Lectures)

Introduction to turing machine,check acceptance of language

Recommended Books:

1. Daniel I.A.Cohen, Introduction to computer theory, John Wiley,1996
2. Lewis & Papadimitriou, Elements of the theory of computation , PHI 1997.
3. Hopcroft, Aho, Ullman, Introduction to Automata theory, Language & Computation –3rd Edition, Pearson Education. 2006
4. P. Linz, An Introduction to Formal Language and Automata 4th edition Publication Jones Bartlett, 2006

Theory of Computation

Tutorial: 15 Lectures

(PAPER-XIII): Artificial Intelligence

Theory: 60 Lectures

1.Introduction (06 Lectures)

Introduction to Artificial Intelligence, Background and Applications.

2.Problem Solving and Searching Techniques (20 Lectures)

Problem Characteristics, Production Systems, Control Strategies, Breadth First Search, Depth First Search, Hill climbing and its Variations, Heuristics Search Techniques: Best First Search, A* algorithm.

3.Knowledge Representation (20 Lectures)

Introduction to First Order Predicate Logic, Resolution Principle, Unification, Semantic Nets, Conceptual Dependencies, Frames and Scripts.

4.Understanding Natural Languages (06 Lectures)

Parsing Techniques, Context-Free and Transformational Grammars, Recursive and Augmented Transition Network.

BOOKS RECOMMENDED:

1. DAN.W. Patterson, Introduction to A.I and Expert Systems – PHI, 2007.
2. Russell & Norvig, Artificial Intelligence-A Modern Approach, LPE, Pearson Prentice Hall, 2nd edition, 2005.
3. Rich & Knight, Artificial Intelligence – Tata McGraw Hill, 2nd edition, 1991.
4. W.F. Clocksin and Mellish, Programming in PROLOG, Narosa Publishing House, 3rd edition, 2001.
5. Ivan Bratko, Prolog Programming for Artificial Intelligence, Addison-Wesley, Pearson Education, 3rd edition, 2000.

Artificial Intelligence Tutorial

Practical: 15 Lectures

(PAPER-XIV): Computer Graphics

Theory: 60 Lectures

1.Introduction (5 Lectures)

Basic elements of Computer graphics, Applications of Computer Graphics.

2.Graphics Hardware (8 Lectures)

Architecture of Raster and Random scan display devices, input/output devices.

3.Fundamental Techniques in Graphics (22Lectures)

CRT ,Random scan,,Raster scan line, circle and ellipse drawing, thick primitives, Polygon filling, line and polygon clipping algorithms, 2D and 3D Geometric Transformations, 2D and 3D Viewing Transformations (Projections- Parallel and Perspective), Vanishing points.

4.Geometric Modeling (10Lectures)

Representing curves & Surfaces.

Books Recommended:

1. J.D.Foley, A.Van Dan, Feiner, Hughes Computer Graphics Principles & Practice 2nd edition Publication Addison Wesley 1990.
2. D.Hearn, Baker: Computer Graphics, Prentice Hall of India 2008.
3. D.F.Rogers Procedural Elements for Computer Graphics, McGraw Hill 1997.
4. D.F.Rogers, Adams Mathematical Elements for Computer Graphics, McGraw Hill 2nd edition 1989.

Computer Graphics Tutorial

Practical: 15 Lectures

Discipline Specific Elective Papers : (Credit: 06 each) (4 papers to be selected) – DSE 1 - 4

I. Information Security

Theory: 60 Lectures

1. Introduction

Security, Attacks, Computer Criminals, Security Services, Security Mechanisms.

2. Cryptography

Substitution ciphers, Transpositions Cipher, Confusion, diffusion, Symmetric, Asymmetric Encryption. DES Modes of DES, Uses of Encryption, Hash function, key exchange, Digital Signatures, Digital Certificates.

4. Threats.

Protection in OS: Memory and Address Protection, Access control, File Protection, User Authentication.

5. Database Security

Requirements, Reliability, Integrity, Sensitive data, Inference, Multilevel Security.

6. Security in Networks

Threats in Networks, Security Controls, firewalls, Intrusion detection systems, Secure e-mails

Recommended Books:

1. C. P. Pfleeger, S. L. Pfleeger; Security in Computing, Prentice Hall of India, 2006
2. W. Stallings; Network Security Essentials: Applications and Standards, 4/E, 2010

Information Security Tutorial

III. Cloud Computing

Overview of Computing Paradigm

(8 lectures)

Recent trends in Computing : Grid Computing, Cluster Computing, Distributed Computing,
Utility Computing, Cloud Computing,

Introduction to Cloud Computing

(7 lectures)

Introduction to Cloud Computing, History of Cloud Computing, Cloud service providers,
Benefits and limitations of Cloud Computing,

Cloud Computing Architecture (20 lectures) Comparison with traditional computing architecture (client/server), Services provided at various levels, Service Models- Infrastructure as a Service(IaaS), Platform as a Service(PaaS), Software as a Service(SaaS), How Cloud Computing Works, Deployment Models- Public cloud, Private cloud, Hybrid cloud, Community cloud, Case study of NIST architecture.

Case Studies

(13

lectures)

Case study of Service model using Google App Engine, Microsoft Azure, Amazon EC2 ,
Eucalyptus.

Service Management in Cloud Computing

(7 lectures)

Service Level Agreements(SLAs), Billing & Accounting, Comparing Scaling Hardware:

Traditional vs. Cloud, Economics of scaling.

Cloud Security

(5 lectures)

Infrastructure Security- Network level security, Host level security, Application level security, Data security and Storage- Data privacy and security Issues, Jurisdictional issues raised by Data location, Authentication in cloud computing.

Reference Books

1. *Cloud Computing Bible*, Barrie Sosinsky, Wiley-India, 2010

2. *Cloud Computing: Principles and Paradigms*, Editors: Rajkumar Buyya, James Broberg, Andrzej M. Goscinski, Wiley, 2011
3. *Cloud Computing: Principles, Systems and Applications*, Editors: Nikos Antonopoulos, Lee Gillam, Springer, 2012
4. *Cloud Security: A Comprehensive Guide to Secure Cloud Computing*, Ronald L. Krutz, Russell Dean Vines, Wiley- India, 2010
5. Gautam Shroff, *Enterprise Cloud Computing Technology Architecture Applications*, Adobe Reader ebooks available from eBooks.com, 2010
6. Toby Velte, Anthony Velte, Robert Elsenpeter, *Cloud Computing, A Practical Approach*, McGraw Hills, 2010.
7. Dimitris N. Chorafas, *Cloud Computing Strategies*, CRC Press, 2010

Cloud Computing Tutorial

Skill Enhancement Courses (any two) (Credit: 02 each) – SEC 1 to SEC2 Theory: 01, Labs: 02

2. Programming in MATLAB (1+2Labs)

Unit I- Introduction to Programming: Components of a computer, working with numbers, Machine code, Software hierarchy. (2L)

Unit I- Programming Environment: MATLAB Windows, A First Program, Expressions, Constants, Variables and assignment statement, Arrays. (3L)

Unit III- Graph Plots: Basic plotting, Built in functions, Generating waveforms, Sound replay, load and save. (2L)

Unit IV- Procedures and Functions: Arguments and return values, M-files, Formatted console input-output, String handling. (3L)

Unit V- Control Statements: Conditional statements: If, Else, Else-if, Repetition statements: While, for loop. (2L)

Unit VI- Manipulating Text: Writing to a text file, Reading from a text file, Randomising and sorting a list, searching a list. (2L)

Unit VII- GUI Interface: Attaching buttons to actions, Getting Input, Setting Output. (2L)

Recommended Books:

1. MATLAB: An Introduction with Applications, by Amos Gilat, 2nd edition, Wiley, 2004,
2. C.B. Moler, Numerical Computing with MATLAB, SIAM, 2004.

Software Lab Based on MatLab:

1. Write a program to assign the following expressions to a variable A and then to print out the value of A.
 - a. $(3+4)/(5+6)$
 - b. $2\pi^2$
 - c. $\sqrt{5}$
 - d. $(0.000123 + 5.67 \times 10^{-3}) \times 0.4567 \times 10^{-4}$
2. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.
3. Set up a vector called N with five elements having the values: 1, 2, 3, 4, 5. Using N, create assignment statements for a vector X which will result in X having these values:
 - a. 2, 4, 6, 8, 10
 - b. $1/2, 1, 3/2, 2, 5/2$
 - c. $1, 1/2, 1/3, 1/4, 1/5$
 - d. $1, 1/4, 1/9, 1/16, 1/25$
4. A supermarket conveyor belt holds an array of groceries. The price of each product (in pounds) is [0.6, 1.2, 0.5, 1.3] ; while the numbers of each product are [3, 2, 1, 5]. Use MATLAB to calculate the total bill.
5. The sortrows(x) function will sort a vector or matrix X into increasing row order. Use this function to sort a list of names into alphabetical order.
6. The `—identity` matrix is a square matrix that has ones on the diagonal and zeros elsewhere. You can generate one with the `eye()` function in MATLAB. Use MATLAB to find a matrix B, such that when multiplied by matrix A=[1 2; -1 0] the identity matrix I=[1 0; 0 1] is generated. That is $A*B=I$.
7. Create an array of N numbers. Now find a single MATLAB statement that picks out from that array the 1,4,9,16,...,Nth entries, i.e. those numbers which have indices that are square numbers.
8. Draw a graph that joins the points (0,1), (4,3), (2,0) and (5,-2).
9. The seeds on a sunflower are distributed according to the formula below. Plot a small circle at each of the first 1000 co-ordinates :

$$\theta_n = \frac{137.51}{180} \pi n$$

10. Calculate 10 approximate points from the function $y=2x$ by using the formulae:
 - i. $x_n = n$
 - ii. $y_n = 2n + \text{rand} - 0.5$
 Fit a line of best fit to these points using the function `polyfit()` with `degree=1`, and generate co-ordinates from the line of best fit using `polyval()`. Use the on-line help to find out how to use these functions. Plot the raw data and the line of best fit.
11. Calculate and replay 1 second of a sinewave at 500Hz with a sampling rate of 11025Hz. Save the sound to a file called "ex35.wav". Plot the first 100 samples.
12. Calculate and replay a 2 second chirp. That is, a sinusoid that steadily increases in frequency with time, from say 250Hz at the start to 1000Hz at the end.
13. Build a square wave by adding together 10 odd harmonics: 1f, 3f, 5f, etc. The amplitude of the nth harmonic should be $1/n$. Display a graph of one cycle of the result superimposed on the individual harmonics.
14. Write a function called `FtoC` (`ftoc.m`) to convert Fahrenheit temperatures into Celsius. Make sure the program has a title comment and a help page. Test from the command window with:
 - i. `FtoC(96)`
 - ii. `lookfor Fahrenheit`
 - iii. `help FtoC`
15. Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:
 - i. Enter string 1: Mark
 - ii. Enter string 2: Huckvale
 - iii. Mark Huckvale
 - iv. *****
 - v. elavkcuH kraM

. HTML Programming

- **Unit-I: Introduction** (1L)
- **Unit-II: The Basics** (2L)

- The Head, the Body
- Colors, Attributes
- Lists, ordered and unordered
- **Unit-III: Links** (3L)
 - Introduction
 - Relative Links, Absolute Links
 - Link Attributes
 - Using the ID Attribute to Link Within a Document
- **Unit-IV: Images** (2L)
 - Putting an Image on a Page
 - Using Images as Links
 - Putting an Image in the Background
- **Unit V: – Tables** (4L)
 - Creating a Table
 - Table Headers
 - Captions
 - Spanning Multiple Columns
 - Styling Table
- **Unit VI – Forms** (3L)
 - Basic Input and Attributes
 - Other Kinds of Inputs ○
 - Styling forms with CSS
 - 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
- III. Underline
- IV. Headings (Using H1 to H6 heading styles)
- V. Font (Type, Size and Color)
- VI. Background (Colored background/Image in background)
- VII. Paragraph
- VIII. Line Break
- IX. Horizontal Rule
- X. Pre tag

Q.2 Create an HTML document which consists of:

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



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

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

Subscribe to XYZ News Magazine and Emails

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

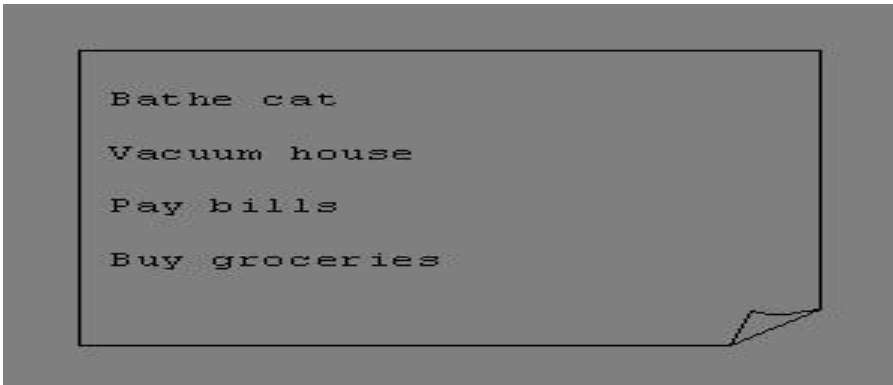
1. XML in action web technology by William J. Pardi
2. Step by Step XML by Michael J. Young

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> <EQUIPMENT><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>

Oracle (SQL/PL-SQL)

(1+2 Lab)

Introduction to Oracle as RDBMS

SQL Vs. SQL * Plus:

SQL Commands and Data types, Operators and Expressions, Introduction to SQL * Plus. (2L)

Managing Tables and Data:

- Creating and Altering Tables (Including constraints)
- Data Manipulation Command like Insert, update, delete
- SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL BETWEEN, EXISTS, LIKE
- Join, Built in functions (4L)

Other Database Objects

- View
- Synonyms, Index (2L)

Transaction Control Statements

- Commit, Rollback, Savepoint (2L)

Introduction to PL/SQL

- SQL v/s PL/SQL
- PL/SQL Block Structure
- Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.)
- % TYPE and % ROWTYPE
- Using Cursor (Implicit, Explicit) (5L)

Books Recommended:

1. Ivan Bayross, "SQL, PL/SQL the Programming Language of Oracle Paperback", BPB Publications, 2010.
2. Steven Feuerstein, Bill Pribyl, "Oracle PL/SQL Programming", 6th Edition, O'Reilly Media, 2014.
3. Rajeeb C. Chatterjee, "Learning Oracle SQL and PL/SQL: A simplified Guide", PHI, 2012.
4. Ron Hardman, Michael McLaughlin, "Expert Oracle PL/SQL", Oracle Press, 2005.
5. Michael McLaughlin, "Oracle Database 11g PL/SQL Programming", Oracle Press, 2008.
6. John Watson, Roopesh Ramklass, "OCA Oracle Database 11g SQL Fundamentals I Exam Guide", Oracle Press, 2008.

Software Lab Based on SQL/PL-SQL:

[SQL COMMANDS]

- 1) SQL* formatting commands
- 2) To create a table, alter and drop table.
- 3) To perform select, update, insert and delete operation in a table.
- 4) To make use of different clauses viz where, group by, having, order by, union and intersection,
- 5) To study different constraints.

[SQL FUNCTION]

- 6) To use oracle function viz aggregate, numeric, conversion, string function.
- 7) To understand use and working with joins.
- 8) To make use of transaction control statement viz rollback, commit and save point.
- 9) To make views of a table.
- 10) To make indexes of a table.

[PL/SQL]

- 11) To understand working with PL/SQL

- 12) To implement Cursor on a table.
- 13) To implement trigger on a table

7. PHP Programming

(1 +2 Lab)

Introduction to PHP:

(3L)

- PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.)
- PHP with other technologies, scope of PHP
- Basic Syntax, PHP variables and constants
- Types of data in PHP , Expressions, scopes of a variable (local, global)
- PHP Operators : Arithmetic, Assignment, Relational , Logical operators, Bitwise , ternary and MOD operator.
- PHP operator Precedence and associativity

Handling HTML form with

PHP: (2L)

- Capturing Form Data
- GET and POST form methods
- Dealing with multi value fields
- Redirecting a form after submission

PHP conditional events and**Loops: (3L)**

- PHP IF Else conditional statements (Nested IF and Else)
- Switch case, while ,For and Do While Loop
- Goto , Break ,Continue and exit

PHP Functions:**(3L)**

- Function, Need of Function , declaration and calling of a function
- PHP Function with arguments, Default Arguments in Function
- Function argument with call by value, call by reference

- Scope of Function Global and Local

String Manipulation and Regular**Expression: (3L)**

- Creating and accessing String , Searching & Replacing String
- Formatting, joining and splitting String , String Related Library functions
- Use and advantage of regular expression over inbuilt function
- Use of preg_match(), preg_replace(), preg_split() functions in regular expression

Array:**(3L)**

- Anatomy of an Array ,Creating index based and Associative array ,Accessing array
- Looping with Index based array, with associative array using each() and foreach()
- Some useful Library function

Reference Books:

1. Steven Holzner, "PHP: The Complete Reference Paperback", McGraw Hill Education (India), 2007.
2. Timothy Boronczyk, Martin E. Psinas, "PHP and MYSQL (Create-Modify-Reuse)", Wiley India Private Limited, 2008.
3. Robin Nixon, "Learning PHP, MySQL, JavaScript, CSS & HTML5", 3rd Edition Paperback, O'reilly, 2014.
4. Luke Welling, Laura Thompson, "PHP and MySQL Web Development", 4th Edition, Addition Paperback, Addison-Wesley Professional, 2008.
5. David Sklar, Adam Trachtenberg, "PHP Cookbook: Solutions & Examples for PHP Programmers", 2014.

Software Lab Based on PHP:

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lower case.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string.
Sample string : 'The quick " " brown fox'
Expected Output : Thequick""brownfox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birth day.
13. Create a script to construct the following pattern, using nested for loop.

*

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

14. Write a simple PHP program to check that emails are valid.
15. WAP to print first n even numbers.
16. \$color = array('white', 'green', 'red')
Write a PHP script which will display the colors in the following way : Output :
white, green, red,
 -
 - green
 - red
 - white
17. Using switch case and dropdown list display a —Hello! message depending on the language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.

Sample : 'the quick brown fox jumps over the lazy dog.'

Expected Result : That quick brown fox jumps over the lazy dog.

10. Software Testing

(1+2 Labs)

Introduction

(4L)

Strategic Approach to Software Testing, Test Strategies for Conventional Software, Validation Testing, System Testing, Basic Terminologies, V Shaped Software Lifecycle Model

Functional Testing\ Black-box Testing

(5L)

Boundary Value Analysis, Equivalence Class Testing, Decision Table Based Testing

Structural Testing\ White-box Testing

(6L)

Basis Path Testing: Program Graph, DD Path graph, Cyclomatic Complexity, Graph Matrices, Control Flow Testing: Statement Coverage, Branch Coverage, Condition Coverage, Path Coverage

Books Recommended:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, Seventh Edition, Mc Graw Hill Education.2009
2. Yogesh Singh, Software Testing, Cambridge University Press.2011.

Computer Lab Based on Software Testing:

1. Write a program that take three inputs (a,b &c) that represent the sides of a triangle, and the output is one of the below four:
 - a. Not a triangle
 - b. Scalene triangle
 - c. Isosceles triangle
 - d. Equilateral triangle
 - 1.1 Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
 - 1.2 Generate test cases using Basis path testing.
 - 1.3 Run code coverage tool.
2. Write a program that determines the nature of roots of a quadratic equation. Output should be one of the following:-
 - Not a quadratic equation.
 - Complex roots
 - Real roots
 - Single roots
 - I. Generate test cases using Boundary Value Analysis, Equivalence Class Partitioning and Decision Table Testing.
 - II. Generate test cases using Basis path testing.
 - III. Run code coverage tool
3. Write a program that checks whether the number is even or odd. Run code coverage tool and find the amount of code being covered.
4. Write a program that dynamically allocates memory to 10 integers using malloc() or calloc() and
 - donot free memory leading to memory leaks. Verify the same using Valgrind.
 - Now, free memory using free() at the end of the program to avoid memory leaks. Verify the same using Valgrind.
5. Use LoadUI load testing tool to test the web application performance.

General Elective Papers (GE) (Minor –) (any four) for other Departments/Disciplines: (Credit: 06 each)

Fundamental of Computer

Theory: 60 lectures

Introduction: Introduction to Information Technology, uses of IT	6L
Data Representation: Number systems and character representation, binary arithmetic	12L
Human Computer Interface: Types of software, Operating system as user interface, utility programs	6L
Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter	10L
Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks	6L
Computer Organisation and Architecture: C.P.U., registers, system bus, main memory unit, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.	12L
Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.	8L

Reference Books:

1. A. Goel, Computer Fundamentals, Pearson Education, 2010.
2. P. Aksoy, L. DeNardis, Introduction to Information Technology, Cengage Learning, 2006
3. P. K.Sinha, P. Sinha, Fundamentals of Computers, BPB Publishers, 2007

Fundamentals of Computer Lab

Practical: 60 lectures

Practical exercises based on MS Office/ Open Office tools using document preparation and spreadsheet handling packages.

MS Word

1. Prepare a **grocery list** having four columns (Serial number, The name of the product, quantity and price) for the month of April, 06.
 - Font specifications for Title (Grocery List): 14-point Arial font in bold and italics.
 - The headings of the columns should be in 12-point and bold.
 - The rest of the document should be in 10-point Times New Roman.
 - Leave a gap of 12-points after the title.
2. Create a **telephone directory**.
 - The heading should be 16-point Arial Font in bold
 - The rest of the document should use 10-point font size
 - Other headings should use 10-point Courier New Font.
 - The footer should show the page number as well as the date last updated.
3. Design a **time-table form** for your college.
 - The first line should mention the name of the college in 16-point Arial Font and should be bold.
 - The second line should give the course name/teacher's name and the department in 14-point Arial.
 - Leave a gap of 12-points.
 - The rest of the document should use 10-point Times New Roman font.
 - The footer should contain your specifications as the designer and date of creation.
4. BPB Publications plans to release a new book designed as per your syllabus. Design the **first page of the book** as per the given specifications.
 - The title of the book should appear in bold using 20-point Arial font.
 - The name of the author and his qualifications should be in the center of the page in 16-point Arial font.
 - At the bottom of the document should be the name of the publisher and address in 16-point Times New Roman.
 - The details of the offices of the publisher (only location) should appear in the footer.
5. Create the following one page documents.
 - a. Compose a note inviting friends to a get-together at your house, Including a list of things to bring with them.

- b. Design a certificate in landscape orientation with a border around the document.
 - c. Design a Garage Sale sign.
 - d. Make a sign outlining your rules for your bedroom at home, using a numbered list.
6. Create the following documents:
 - (a) A newsletter with a headline and 2 columns in portrait orientation, including at least one image surrounded by text.
 - (b) Use a newsletter format to promote upcoming projects or events in your classroom or college.
7. Convert following text to a table, using comma as delimiter
 Type the following as shown (do not bold).
Color, Style, Item
Blue, A980, Van
Red, X023, Car
Green, YL724, Truck
Name, Age, Sex
Bob, 23, M
Linda, 46, F
Tom, 29, M

9. Enter the following data into a table given on the next page.

Salesperson	Dolls	Trucks	Puzzles
Kennedy, Sally	1327	1423	1193
White, Pete	1421	3863	2934
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067
Pillar, James	5214	3247	5467
York, George	2190	1278	1928
Banks, Jennifer	1201	2528	1203
Atwater, Kelly	4098	3079	2067

Add a column Region (values: S, N, N,S,S,S) between the Salesperson and Dolls columns to the given table Sort your table data by Region and within Region by Salesperson in ascending order:

In this exercise, you will add a new row to your table, place the word "Total" at the bottom of the Salesperson column, and sum the Dolls, Trucks, and Puzzles columns.

10. Wrapping of text around the image.
11. Following features of menu option must be covered

FILE	Complete menu
EDIT	Complete menu
VIEW	Complete menu
INSERT	Complete menu
FORMAT	Complete menu
TABLE	Complete menu
WINDOW	Complete menu
HELP	Complete menu

MS Excel

1. Enter the Following data in Excel Sheet

REGIONAL SALES PROJECTION

State	Qtr1	Qtr2	Qtr3	QTR4	Qtr Total	Rate Amount
Delhi	2020	2400	2100	3000	15	
Punjab	1100	1300	1500	1400	20	
U.P.	3000	3200	2600	2800	17	
Haryana	1800	2000	2200	2700	15	
Rajasthan	2100	2000	1800	2200	20	

**TOTAL
AVERAGE**

- (a) Apply Formatting as follow:

- i. Title in TIMES NEW ROMAN
- ii. Font Size - 14
- iii. Remaining text - ARIAL, Font Size -10
- iv. State names and Qtr. Heading Bold, Italic with Gray Fill Color.
- v. Numbers in two decimal places.
- vi. Qtr. Heading in center Alignment.
- vii. Apply Border to whole data.

- (b) Calculate State and Qtr. Total

- (c) Calculate Average for each quarter

- (d) Calculate Amount = Rate * Total.

2. Given the following worksheet

	A	B	C	D
1	Roll No.	Name	Marks	Grade
2	1001	Sachin	99	
3	1002	Sehwag	65	
4	1003	Rahul	41	
5	1004	Sourav	89	
6	1005	Har Bhajan	56	

Calculate the grade of these students on the basis of following guidelines:

If Marks	Then Grade
>= 80	A+
>= 60 < 80	A
>= 50 < 60	B
< 50	F

3. Given the following worksheet

	A	B	C	D	E	F	G
1	Salesman			Sales in (Rs.)			
2	No.	Qtr1	Qtr2	Qtr3	Qtr4	Total	Commission
3	S001	5000	8500	12000	9000		

4	S002	7000	4000	7500	11000
5	S003	4000	9000	6500	8200
6	S004	5500	6900	4500	10500
7	S005	7400	8500	9200	8300
8	S006	5300	7600	9800	6100

Calculate the commission earned by the salesmen on the basis of following Candidates:

If Total Sales	Commission
< 20000	0% of sales
> 20000 and < 25000	4% of sales
> 25000 and < 30000	5.5% of sales
> 30000 and < 35000	8% of sales
>= 35000	11% of sales

The total sales is sum of sales of all the four quarters.

4. A company XYZ Ltd. pays a monthly salary to its employees which consists of basic salary, allowances & deductions. The details of allowances and deductions are as follows:

Allowances

- HRA Dependent on Basic
 - 30% of Basic if Basic <=1000
 - 25% of Basic if Basic >1000 & Basic <=3000
 - 20% of Basic if Basic >3000
- DA Fixed for all employees, 30% of Basic
- Conveyance Allowance Rs. 50/- if Basic is <=1000 Rs. 75/- if Basic >1000 & Basic <=2000
Rs. 100 if Basic >2000
- Entertainment Allowance NIL if Basic is <=1000 Rs.
100/- if Basic > 1000

Deductions

- Provident Fund 6% of Basic
- Group Insurance Premium Rs. 40/- if Basic is <=1500
Rs. 60/- if Basic > 1500 & Basic <=3000
Rs. 80/- if Basic >3000

Calculate the following:

Gross Salary = Basic + HRA + DA + Conveyance + Entertainment

Total deduction = Provident Fund + Group Insurance Premium

Net Salary = Gross Salary – Total Deduction

5. Create Payment Table for a fixed Principal amount, variable rate of interests and time in the format below:

No. of Instalments	5%	6%	7%	8%	9%
3	XX	XX	XX	XX	XX
4	XX	XX	XX	XX	XX
5	XX	XX	XX	XX	XX
6	XX	XX	XX	XX	XX

6. Use an array formula to calculate Simple Interest for given principal amounts given the rate of Interest and time

Rate of Interest	8%
Time	5 Years
Principal	Simple Interest
1000	?
18000	?
5200	?

7. The following table gives year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

- (a) Calculate total sale year wise.
 (b) Calculate the net sale made by each salesman
 (c) Calculate the maximum sale made by the salesman
 (d) Calculate the commission for each salesman under the condition.
 (i) If total sales >4,00,000 give 5% commission on total sale made by the salesman.
 (ii) Otherwise give 2% commission.
 (e) Draw a bar graph representing the sale made by each salesman. (f) Draw a pie graph representing the sale made by salesman in 2000.

8. Enter the following data in Excel Sheet

PERSONAL BUDGET FOR FIRST QUARTER

Monthly Income (Net): 1,475

EXPENSES	JAN	FEB	MARCH	QUARTER TOTAL	QUARTER AVERAGE
Rent600.00	600.00	600.00			
Telephone	48.25	43.50	60.00		
Utilities	67.27	110.00	70.00		
Credit Card	200.00	110.00	70.00		
Oil	100.00	150.00	90.00		
AV to Insurance	150.00				
Cable TV	40.75	40.75	40.75		

Monthly Total

Calculate Quarter total and Quarter average.

- (a) Calculate Monthly total.
 (b) Surplus = Monthly income - Monthly total.
 (c) What would be total surplus if monthly income is 1500.
 (d) How much does telephone expense for March differ from quarter average.
 (e) Create a 3D column graph for telephone and utilities.

- (f) Create a pie chart for monthly expenses.
9. Enter the following data in Excel Sheet

TOTAL REVENUE EARNED FOR SAM'S BOOKSTALL

Publisher name	1997	1998	1999	2000	total
A	Rs. 1,000.00	Rs. 1100.00	Rs. 1,300.00	Rs. 800.00	
B	Rs. 1,500.00	Rs. 700.00	Rs. 1,000.00	Rs. 2,000.00	
C	Rs. 700.00	Rs. 900.00	Rs. 1,500.00	Rs. 600.00	
D	Rs. 1,200.00	Rs. 500.00	Rs. 200.00	Rs. 1,100.00	
E	Rs. 800.00	Rs. 1,000.00	Rs. 3,000.00	Rs. 560.00	

- (a) Compute the total revenue earned.
- (b) Plot the line chart to compare the revenue of all publisher for 4 years.
- (b) Chart Title should be _Total Revenue of sam's Bookstall (1997-2000)_'
- (c) Give appropriate categories and value axis title.
10. Generate 25 random numbers between 0 & 100 and find their sum, average and count. How many no. are in range 50-60

Introduction to Database System Theory:

60 lectures

Database: Introduction to database, relational data model, DBMS architecture, data **14L** independence, DBA, database users, end users, front end tools

E-R Modeling: Entity types, entity set, attribute and key, relationships,

Relational Data Model: Relational model concepts, relational constraints, primary **14L** and foreign key, normalization: 1NF, 2NF, 3NF

Structured Query Language: SQL queries, create a database table, create **18L** 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. Elmasri, S. Navathe Fundamentals of Database Systems, Pearson Education, Fifth Edition, 2007
3. MySQL : Reference Manual

Introduction to Database System Lab

Practical: 60 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 Conceptsl.
 - c) Change the Department of the book titled —Discrete Mathsl to —CSl.
 - d) List all books that belong to —CSl department.
 - e) List all books that belong to —CSl department and are written by author —Navathel.
 - f) List all computer (Department=ICSl) that have been issued.
 - g) List all books which have a price less than 500 or purchased between —01/01/1999l and —01/01/2004l.
- 2) Create a database having three tables to store the details of students of Computer Department 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, Phone number) 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 —Delhil 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)**
- a) Identify primary and foreign keys. Create the tables and insert at least 5 records in each table.
 - b) List all the customers who have the bicycles manufactured by manufacturer —Hondal.
 - c) List the bicycles purchased by the customers who have been referred by customer —C1l.

- d) List the manufacturer of red colored bicycles.
 - e) 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)
- a) Identify primary and foreign keys.
 - b) Alter table employee, add a column —email of type varchar(20).
 - c) Find the name of all managers who work for both Samba Bank and NCB Bank.
 - d) 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.
 - e) Find the names of all employees who live in the same city as the company for which they work.
 - f) Find the highest salary, lowest salary and average salary paid by each company.
 - g) Find the sum of salary and number of employees in each company.
 - h) Find the name of the company that pays highest salary.
- 5) Create the following tables, enter at least 5 records in each table and answer the queries given below.
**Suppliers (SNo, Sname, Status, SCity)
 Parts (PNo, Pname, Colour, Weight, City)
 Project (JNo, Jname, Jcity)
 Shipment (Sno, Pno, Jno, Qunatity)**
- a) Identify primary and foreign keys.
 - b) Get supplier numbers for suppliers in Paris with status>20.
 - c) Get suppliers details for suppliers who supply part P2. Display the supplier list in increasing order of supplier numbers.
 - d) Get suppliers names for suppliers who do not supply part P2.
 - e) For each shipment get full shipment details, including total shipment weights.
 - f) Get all the shipments where the quantity is in the range 300 to 750 inclusive.
 - g) Get part nos. for parts that either weigh more than 16 pounds or are supplied by suppliers S2, or both.
 - h) Get the names of cities that store more than five red parts.
 - i) Get full details of parts supplied by a supplier in London.
 - j) Get part numbers for part supplied by a supplier in London to a project in London.
 - k) Get the total number of project supplied by a supplier (say, S1).
 - l) Get the total quantity of a part (say, P1) supplied by a supplier (say, S1).

Introduction to Programming

Theory: 60 lectures

Introduction to C and C++

(5 Lectures)

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

Data Types, Variables, Constants, Operators and Basic I/O

(10 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).

Expressions, Conditional Statements and Iterative Statements

(10 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)

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

Derived Data Types (Structures and Unions)

(5 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.

File I/O, Preprocessor Directives

(8 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, #elif, #endif, #ifdef, #ifndef and #undef), Macros

Using Classes in C++

(8 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.

Inheritance and Polymorphism

Introduction to Inheritance and Polymorphism

Reference Books:

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

(4 Lectures)

Introduction to c/c++ Programming Lab

Practical: 60 lectures

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 divisor or factorial of a given number.
5. Write a program to print first ten natural numbers.
6. Write a program to print first ten even and odd numbers.
7. Write a program to find grade of a list of students given their marks.
8. 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

Internet Technologies

Theory: 60 lectures

Introduction to Web Design: Introduction to hypertext markup language (html)

16L

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,

14L

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: 60 lectures

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

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:

Frame1
Frame2

Frame1	
Frame2	Frame3

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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List of Practicals using Javascript :

Create event driven program for following:

7. Print a table of numbers from 5 to 15 and their squares and cubes using alert.
8. Print the largest of three numbers.
9. Find the factorial of a number n.
10. Enter a list of positive numbers terminated by Zero. Find the sum and average of these numbers.
11. 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.
12. Read n numbers. Count the number of negative numbers, positive numbers and zeros in the list.

Optional

Implement the followings using Flash-

1. Create an animation using the tools panel and the properties panel to draw the following – Line, pe, oval, circle, rectangle, square, pencil, brush, lasso tool
2. Create an animation using text tool to set the font, size, color etc.
3. Create an animation using **Free transform tool** that should use followings-Move Objects
Skew Objects Stretch
Objects Rotate
Objects
Stretch Objects while maintaining proportion Rotate Objects
after relocating the center dot
4. Create an animation using layers having following features-Insert layer, Delete layer, guide layer, Mask layer.
5. Modify the document (changing background color etc.) using the following tools
Eraser tool Hand
tool Ink bottle tool
Zoom tool
Paint Bucket tool
Eyedropper tool
6. Create an animation for bus car race in which both starts from the same point and car wins the race.
7. Create an animation in which text Hello gets converted into GoodBye (using motion/shape tweening).
8. Create an animation having five images having fade-in fade-out effect.
9. Create an scene to show the sunrise (using multiple layers and motion tweening)
10. Create an animation to show the ripple effect.
11. Create an animation (using Shape tweening and shape hints) for transforming one shape into another.
12. Create an animation for bouncing ball (you may use motion guide layer).

Web and E-Commerce Technologies

Theory: 60 Lectures

UNIT 1- An introduction to Electronic commerce: What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, 9 Electronic Commerce and Electronic Business(C2C)(C2G,G2G, B2G, B2P, B2A, P2P, B2A, C2A, B2B, B2C) (10L)

UNIT 2- The Internet and WWW: Evolution of Internet, Domain Names and Internet

Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website, Cost, Time, Reach, Registering a Domain Name, Web promotion, Target email, Baner, Exchange,

Shopping Bots (10L)

UNIT 3- Internet Security: Secure Transaction, Computer Monitoring, Privacy on Internet, Corporate Email privacy, Computer Crime(Laws , Types of Crimes), Threats, Attack on Computer System, Software Packages for privacy, Hacking, Computer Virus(How it spreads, Virus problem, virus protection, Encryption and Decryption, Secret key Cryptography, DES, Public Key Encryption, RSA, Authorisation and Authentication, Firewall, Digital Signature(How it Works) (10L)

UNIT 4: Electronic Data Exchange: Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model,Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System,

Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash (10L)

UNIT 5: Planning for Electronic Commerce: Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites (10L)

UNIT 6: Internet Marketing: The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet

Recommended Books :

1. G.S.V.Murthy, E-Commerce Concepts, Models, Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag , E- Commerce , 2005.
3. Gray P. Schneider , Electronic commerce, International Student Edition, 2011,
4. HENRY CHAN, RAYMOND LEE, THARAM DILLON, ELIZABETH CHANG
E-COMMERCE, FUNDAMENTALS AND APPLICATIONS, Wiely Student Edition, 2011

Web and E-Commerce Technologies Lab Practical: 60**Lectures****Web and E- Commerce Technologies LAB (based on the following topics):**

HyperText Markup Language (HTML): structural setup; page layout; text manipulation; special characters; images; links.

Intermediate: image maps; tables; frames, forms; meta tags; web forms.

Cascading Style Sheets(CSS) : embedding/linking; HTML element selectors; classes;

basics; repeating; positioning. Beginner: between; in; distinct; group by; aliases; table., nested selects; SoundEx; join; ID selectors, text manipulation; background; borders and spacing; layout;

context selectors and grouping, pseudo-classes; pseudo-elements.

VBScript :Introduction to VBScript,Programs on VBScript.

JavaScript : writing your first script; creating HTML tags; user input and output; loops and tables; payroll calculator, forms and text fields; validating an email address; radio buttons; check boxes; self-grading tests, image rollovers; slide shows; real-time clock; controllable clock; working with cookies.

SQL and regular expressions: Regular expressions: select; where; order by; insert; update; delete, like; aggregate functions; create table; alter table; drop deterministic functions; non-deterministic functions.

ASP structural setup: response.write; retrieving from forms; retrieving from querystring; variables; control constructs; subroutines and functions; session state; application variables; server variables; debugging, reading and writing cookies; server-side includes; response object methods; VBScript functions; error handling; debugging, browser details;