CBCS Syllabus - BCA for 2017-2018 onwards

Corse	Title	Hours / Week		Credits	Percentage of Marks		Maximum Marks			Exam Duration	Total Marks
							IA		Exam		
		L	T/P	L+T+P	IA	Exam	C1	C2	Exam	Exam	
AECC 1.1	English			3	30%	70%	15	15	70	3 Hours	100
AECC 1.2	Kannada / MIL			3	30%	70%	15	15	70	3 Hours	100
DSC 1.1.1	Computer Fundamentals & MIS	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 1.1.2	Computer Fundamentals & MIS Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
DSC 1.2.1	Discrete Mathematics & Logic Computation	5	1	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 1.3.1	Object Oriented Programming In C++	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 1.3.2	Object Oriented Programming In C++ Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
AECC 2.1	English			3	30%	70%	15	15	70	3 Hours	100
AECC 2.2	Kannada / MIL			3	30%	70%	15	15	70	3 Hours	100
DSC 2.1.1	Data Structures and File Processing	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 2.1.2	Data Structures and File Processing Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
DSC 2.2.1	Operating Systems with Linux	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 2.2.2	Operating Systems with Linux Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
DSC 2.3.1	Programming in JAVA	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 2.3.2	Programming in JAVA Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
AECC 3.1	English			3	30%	70%	15	15	70	3 Hours	100
AECC 3.2	Kannada / MIL			3	30%	70%	15	15	70	3 Hours	100
DSC 3.1.1	Computer System Organization and Architecture	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 3.2.1	Database Management Systems	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 3.2.2	Database Management Systems Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
DSC 3.3.1	Web Technologies	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 3.3.2	Web Technologies Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
SEC 4.1	Mathematics	3	1	3+1+0	30%	70%	15	15	70	3 Hours	100
SEC 4.2	Business Mathematics	3	1	3+1+0	30%	70%	15	15	70	3 Hours	100
SEC 4.3	Accountancy & Financial Management	3	1	3+1+0	30%	70%	15	15	70	3 Hours	100
SEC 4.4	Entrepreneurship Development	3	1	3+1+0	30%	70%	15	15	70	3 Hours	100
DSC 4.1.1	Numerical Analysis And Statistics	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 4.1.2	Numerical Analysis And Statistics Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	100
DSC 4.2.1	J2EE	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 4.2.2	J2EE Lab	0	4	0+0+2	10%	20%	05	05	70	3 Hours	
DSC 4.3.1	Software Engineering & Software Testing	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSC 4.3.2	Software Engineering & Software Testing Lab	0	4	0+0+2		20%	05	05	70	3 Hours	

Corse	Title	Hours / Week		Credits	Percentage of Marks		Maximum Marks			Exam Duration	Total Marks
Corse	Title	L	T/P	L+T+P	IA	Exam	IA		Exam	Exam Duration	Total Marks
							C1	C2			
AECC 5.1	Environmental Science	2	0	2+0+0	30%	70%	15	15	70	3 Hours	100
SEC 5.1.1	Object Oriented Modeling & Design With UML	2	0	2+0+0	20%	35%	10	10	50	2 Hours	100
AECC 6.1	Indian Constitution	2	0	2+0+0	30%	70%	15	15	70	3 Hours	100
SEC 6.3.1.1	Object Oriented Modeling & Design With UML	2	0	2+0+0	20%	35%	10	10	50	2 Hours	100
SEC 6.3.1.2	PHP Programming Lab	0	4	0+0+2	10%	35%	5	5	70	3 Hours	100
SEC 6.3.2.1	Analysis and Design of Algorithms	2	0	2+0+0	20%	35%	10	10	50	2 Hours	100
SEC 6.3.2.2	Analysis and Design of Algorithms Lab	0	4	0+0+2	10%	35%	5	5	70	3 Hours	100
SEC 6.3.3.1	E-Commerce Technologies	2	0	2+0+0	20%	35%	10	10	50	2 Hours	100
SEC 6.3.3.2	E-Commerce Technologies Lab	0	4	0+0+2	10%	35%	5	5	70	3 Hours	100
DSE 6.4.1.1	Data Communication and Computer Networks	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 6.4.1.2	Data Communication and Computer Networks	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	100
DSE 6.4.2.1	System Software & Compiler design	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 6.4.2.2	System Software & Compiler design Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	100
DSE 6.4.3.1	Computer Graphics	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 6.4.3.2	Computer Graphics Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	100
DSE 5.1.3.1	Multimedia Systems and Applications	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 5.1.3.2	Multimedia Systems and Applications Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	100
DSE 5.2.1.1	ASP. Net	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 5.2.1.2	ASP. Net Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	
DSE 5.2.2.1	Visual Programming	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 5.2.2.2	Visual Programming Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	
DSE 5.2.3.1	Artificial Intelligence and Expert Systems	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 5.2.3.2	AI and Expert Systems Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	
DSE 5.3.1.1	Cloud Computing	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 5.3.1.2	Cloud Computing Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	
DSE 5.3.2.1	Enterprise Resource Planning	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 5.3.2.2	Enterprise Resource Planning Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	
DSE 5.3.3.1	Data Mining & Warehousing	4	0	4+0+0	20%	50%	10	10	70	3 Hours	100
DSE 5.3.3.2	Data Mining & Warehousing Lab	0	3	0+0+1.5	10%	20%	05	05	70	3 Hours	

GENERAL RECOMMENDATIONS:

- Teacher who handles theory is completely responsible to prepare the lab exercise well in advance which has to be placed before the department meeting for approval.
- Related practical programs' skeleton has to be discussed in the theory class.
- Lab instructors/lecturers must discuss the lab exercises during the first hour.

JSS COLLEGE OF ARTS, COMMERCE & SCIENCE (Autonomous)
BN ROAD, MYSURU-570025

CBCS SCHEME FOR BCA PROGRAMME

Bachelor of Computer Applications (BCA)

I SEMESTER

AECC 1.1 English   **3 Credits**

AECC 1.2 Kannada / MIL   **3 Credits**

II SEMESTER

AECC 2.1 English   **3 Credits**

AECC 2.2 Kannada / MIL   **3 Credits**

III SEMESTER

AECC 3.1 English   **3 Credits**

AECC 3.2 Kannada / MIL   **3 Credits**

IV SEMESTER

AECC 4.1 English   **3 Credits**

AECC 4.2 Kannada / MIL   **3 Credits**

V SEMESTER

AECC 5.1 Environmental Science   **2 Credits**

VI SEMESTER

AECC 6.1 Indian Constitution   **2 Credits**

As per the syllabus recommended by the Respective BOS Subjects (UG).

I SEMESTER

DSC 1.1: Computer Fundamentals & MIS
Credit (L: T: P = 4 : 0 : 2)
DSC 1.1.1 (Theory)

Unit - 1   **15 Hours**

Introduction: Introduction to computer system, uses, types.

Human Computer Interface: Types of software, Operating system as user interface, utility programs

Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter

Unit - 2   **15 Hours**

Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks

Computer Organization 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.

Unit - 3   **15 Hours**

Overview of Emerging Technologies: Bluetooth, cloud computing, big data, data mining, mobile computing and embedded systems.

Use of Computers in Education and Research: Data analysis, Heterogeneous storage, e-Library, Google Scholar, Domain specific packages such as SPSS, Mathematical etc.

Unit - 4   **15 Hours**

MANAGEMENT INFORMATION SYSTEM: Introduction to data and information, Types of Information, Types of information System. Impact of MIS, Role and Importance, Managers and Activities in IS, Types of Computers Used by Organizations in Setting up MIS, Hardware support for MIS.

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

DSC 1.1.2 (Practical)

LIST OF EXPERIMENTS

1. Study and Identification of standard desktop personal computer

2. Understanding of Motherboard and its interfacing components

3. Install and configure computer drivers and system components.

4. Disk formatting, partitioning and Disk operating system commands

5. Install, upgrade and configure Windows operating systems.

6. Remote desktop connections and file sharing.

7. Identify, Install and manage network connections Configuring IP address and Domain name system

8. Install, upgrade and configure Linux operating systems.

9. Installation Antivirus and configure the antivirus.

10. Installation of printer and scanner software.

11. Disassembly and Reassembly of hardware.

12. Trouble shooting and Managing Systems

I SEMESTER

DSC 1.2:   Computer System Organization and Architecture
Credit (L: T: P = 4: 0: 2)
DSC 1.2.1 (Theory)

Unit - 1   **15 Hours**

Introduction: Logic gates, Boolean algebra, combinational circuits, circuit simplification, flip-flops and sequential circuits, decoders, multiplexors, registers, counters and memory units.

Data Representation and basic Computer Arithmetic: Number systems, complements.

Unit - 2   **15 Hours**

Fixed and floating point representation, character representation, addition, subtraction, magnitude comparison.

Basic Computer Organization and Design: Computer registers, bus system, instruction set

Unit - 3   **15 Hours**

Timing and control, instruction cycle, memory reference, input-output and interrupt.

Central Processing Unit: Register organization, arithmetic and logical micro-operations, stack organization, micro programmed control.

Unit - 4   **15 Hours**

Programming the Basic Computer: Instruction formats, addressing modes, instruction codes, Machine language, and Assembly language, input output programming.

Input-output Organization: Peripheral devices, I/O interface, Modes of data transfer, direct memory access.

Reference Books:
1.   M. Mano, Computer System Architecture, Pearson Education 1992.
2.   A. J. Dos Reis, Assembly Language and Computer Architecture using C++ and JAVA, Course Technology, 2004
3.   W. Stallings, Computer Organization and Architecture Designing for Performance, 8th Edition, Prentice Hall of India, 2009
4.   Digital Design, M.M. Mano, Pearson Education Asia, 1979

DSC 1.2.2 (Practical)

1. Verification of Basic gates(AND,OR,NOT)
2. Verification of Universal gates(NAND,NOR,EX-OR)
3. Verification of NAND gate as a Universal gate
4. Verification of NOR gate as a Universal gate
5. Verification of Demorgon's theorem
6. Verification of Half adder & Full Adder
7. Verification of Half subtractor & Full Subtractor
8. Verification of Half adder & Half subtractor using NAND gate
9. Conversion of Binary to Gray &gray to Binary Code
10. Simplification of Boolean Expressions
11. Simplification of Boolean Expressions using K-Map
12. Flip-Flops: SR FF (clock, without clock)
13. JK FF
14. Toggle FF
15. Delay FF
16. Multiplexer
17. De-multiplexer
18. Simulate the machine for the following memory-reference instructions with I= 0 and address part = 082. The instruction to be stored at address 022 in RAM. Initialize the memory word at address 082 with the operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.
    a. ADD f. BSA
    b. AND g. ISZ
    c. LDA
    d. STA
    e. BUN

19. Simulate the machine for the memory-reference instructions referred in above question with I= 1 and address part = 082. The instruction to be stored at address 026 in RAM. Initialize the memory word at address 082 with the value 298. Initialize the memory word at address 298 with operand B8F2 and AC with A937. Determine the contents of AC, DR, PC, AR and IR in hexadecimal after the execution.
20. Modify the machine created in Practical 1 according to the following instruction format:

Instruction format

0	2	3	4	15
Opcode		I		address

a. The instruction format contains a 3-bit opcode, a 1-bit addressing mode and a 12-bit address. There are only two addressing modes, I = 0 (direct addressing) and I = 1(indirect addressing).
b. Create a new register I of 1 bit.

C. Create two new microinstructions as follows:
i. Check the opcode of instruction to determine type of instruction (Memory Reference/Register Reference/Input-Output) and then jump accordingly.
ii. Check the I bit to determine the addressing mode and then jump accordingly.

I SEMESTER

DSC 1.3: Object Oriented Programming in C++
Credit (L: T: P = 4: 0: 2)
DSC 1.3.1 (Theory)

Unit - 1 15 Hours

Problem solving aspects: Introduction, Problem definition, Problem analysis, Design of problem solution, Algorithm, Flowchart, Coding, Debugging, Types of errors in programming, Program Documentation and Program maintenance.

Techniques of Problem Solving: Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz- top-down and bottom-up programming

Introduction to C++: Concepts of Object-oriented programming, benefits of OOP, Structure of C++ program & Applications of OOP.

Fundamentals: Tokens, Keywords, Identifiers and constants, Basic Data Types, User-defined data types, Derived data Types, Symbolic constants, Declaration of variables.

Operators in C++: Scope resolution operator, Memory management operators, Manipulators, Type cast operator, Expressions and their types.

Unit - 2 15 Hours

Control structures & Functions: The main function, Function prototyping, Call by Reference, Return by Reference, Inline functions, Function overloading, Friend and Virtual functions.

Object Oriented Concepts: Abstraction, encapsulation, objects, classes, methods, constructors, inheritance, polymorphism, static and dynamic binding, overloading.

Classes and Objects: Specifying a Class, Defining member functions, Making an Outside function Inline, Nesting of member functions, Private member functions, Arrays within a Class, Static data members, Static member functions, Arrays of Objects.

Unit - 3 15 Hours

Program Development: Object oriented analysis, design, unit testing & debugging, system testing & integration, maintenance.

Constructors and Destructors: Constructors, Parameterized constructors, copy constructor, Dynamic constructor and Destructor.

Unit - 4 15 Hours

Operator Overloading and Type Conversions : Defining operator overloading, Overloading unary operators, Overloading Binary operators, Rules for overloading operators, Type conversions.

Inheritance- introduction, defining derived classes, single inheritance, making a private member inheritable, multilevel inheritance, hierarchical inheritance, hybrid inheritance.

Polymorphism – introduction, pointers, pointers to objects, this pointer, pointers to derived classes, virtual functions, pure virtual functions.

Reference Books:
1.   P. K. Sinha & Priti Sinha , "Computer Fundamentals", BPB Publications, 2007. 2. Dr. Anita Goel, Computer Fundamentals, Pearson Education, 2010.
 2.   Object Oriented Programming with C++ , M.T. Somashekara, D.S. Guru, H.S. Nagendraswamy, K.S. Manjunatha, PHI Learning, New Delhi, 2012
3.   Object Oriented Programming with C++ by E. Balagurusamy
4.   Richard Johnson, An Introduction to Object-Oriented Application Development, Thomson Learning, 2006
5.   B. Stroupstrup, The C++ Programming Language, Addison Wesley, 2004.

DSC 1.3.2 (Practical)

PART-A

1. PROGRAM TO FIND THE ROOTS OF A QUADRATIC EQUATION

2. PROGRAM TO FIND WHETHER GIVEN NUMBER IS EVEN OR NOT

3. PROGRAM TO FIND LARGEST OF 3 NOS USING NESTED IF

4. PROGRAM TO DISPLAY RAINBOW COLOURS USING SWITCH STATEMENT

5. PROGRAM TO CALCULATE SIMPLE & COMPOUND INTEREST

6. PROGRAM TO FIND MINIMA & MAXIMA IN 1-DIMENSIONAL ARRAY

7. PROGRAM TO GENERATE FIBONACCI SERIES OF A GIVEN NO

8. PROGRAM TO FIND FACTORIAL OF A GIVEN NO

9. PROGRAM TO SEARCH AN ELEMENT IN 1-DIMENSIONAL ARRAY

10. PROGRAM TO DISPLAY N NATURAL NUMBERS & THEIR SUM

PART-B

1. PROGRAM TO SWAP TWO NOS USING CALL BY REFERENCE

2. PROGRAM TO ILLUSTRATE INLINE FUNCTION

3. PROGRAM TO ILLUSTRATE FRIEND FUNCTION

4. PROGRAM TO ILLUSTRATE OPERATOR OVERLOADING

5. PROG PROGRAM TO ILLUSTRATE INLINE FUNCTION

6. PROGRAM TO ILLUSTRATE MULTIPLE INHERITANCE

7. PROGRAM TO CREATE A CLASS CALLED EMPLOYEE. ACCEPT PROGRAM TO ILLUSTRATE INLINE FUNCTION USING ARRRAY OF OBJECTS.

8. PROGRAM TO CREATE A CLASS CALLLED STUDENT & TO ACCCEPT & DISPLAY NECESSARY DETAILS OF A STUDENT USING NESTED CLASS.

9. PROGRAM TO CREATE A CLASS CALLED BANK & ACCEPT CUSTOMER DATA.

10. PROGRAM TO ILLUSTRAT FUNCTION OVER LOADING.

II SEMESTER

DSC 2.1: Data Structures and File Processing
Credit (L: T: P = 4: 0: 2)
DSC 2.1.1 (Theory)

Unit - 1   **15 Hours**

Basic Data Structures: Introduction, Abstract data structures- stacks, queues, linked lists and binary trees. **Sets:** Dictionary implementation, use of priority queues, hashing, binary trees, balanced trees, sets with merge-find operations.

Unit - 2   **15 Hours**

Searching: Internal and external searching, use of hashing and balancing techniques.

Memory Management: Garbage collection algorithms for equal sized blocks, storage allocation for objects with mixed size, buddy systems.

Unit - 3   **15 Hours**

Physical Devices: Characteristics of storage devices such as disks and tapes, I/O buffering.

Basic File System Operations: Create, open, close, extend, delete, read-block, write-block, protection mechanisms.

Unit - 4   **15 Hours**

File Organizations: Sequential, indexed sequential, direct, inverted, multi-list, directory systems, Indexing using B-tree, B+ tree and their variants, hashing – hash function, collision handling methods, extendible hashing.

Reference Books:
1. M.T. Goodrich, R. Tamassia and D. Mount, Data Structures and Algorithms in C++, John Wiley and Sons, Inc., 2004.
2. T.H. Cormen, C.E. Leiserson, R.L. Rivest and C. Stein, Introduction to Algorithms, 2nd Ed., Prentice-Hall of India, 2006.
3. Robert L. Kruse and A.J. Ryba, Data Structures and Program Design in C++, Prentice Hall, Inc., NJ, 1998.
4. B. Stroupstrup, The C++ Programming Language, Addison Wesley, 2004
5. D.E. Knuth, Fundamental Algorithms (Vol. I), Addison Wesley, 1997

DSC 2.1.2 (Practical)

Part - A

1. Program to find lower triangular and upper triangular matrices for the given matrix.
2. Write an interactive program to insert an element at the given position and delete an element at the specified position in the given array.
3. Program to search an element identify the number of occurrences with locations in linear array.
4. Program to sort the given M x N matrix row-wise and column-wise using bubble sorting technique.
5. Write an interactive program to search an element in the given linear array using linear and binary searching technique.
6. Write a program to Merge two sorted arrays.

Part – B

7. Write an interactive program to implement the following operations on stack using arrays
    a.   PUSH
    b.   POP
8. Program to implement Tower of Hanoi problem.
9. Write an interactive program to perform insertion and deletion operations in Linear Queue using arrays.
10. Write an interactive program to perform insertion and deletion operations in Circular Queue using arrays.
11. Write an interactive program to insert a node in a linked list at the front, delete a node from the rear and display.
12. Write an interactive program to implement preorder, post order and in order traversal of a binary tree using linked list.

Note: Lecturer May Change the Programs without deviating Theory Paper

II SEMESTER

DSC 2.2: Operating Systems with Linux

Credit (L : T : P = 4 : 0 : 2)
DSC 2.2.1 (Theory)

Unit - 1 15 Hours

Introduction: System Software, Resource Abstraction, OS strategies. Types of operating systems - Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems.

Operating System Organization: Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs.

Unit - 2 15 Hours

Process Management: System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model

Unit - 3 15 Hours

Scheduling: Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies.

Memory Management: Mapping address space to memory space.

Unit - 4 15 Hours

Memory allocation strategies, fixed partition, variable partition, paging, virtual memory

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

Reference Books:
1.   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.

DSC 2.2.2 (Practical)

Software Lab based on Operating Systems

Note: Following exercises can be performed using Linux or Unix

1. Usage of following commands: ls, pwd, tty, cat, who, who am I, rm, mkdir, rmdir, touch, cd.
2. Usage of following commands: cal, cat(append), cat(concatenate), mv, cp, man, date.
3. Usage of following commands: chmod, grep, tput (clear, highlight), bc.
4. Write a shell script to check if the number entered at the command line is prime or not.
5. Write a shell script to modify "cal" command to display calendars of the specified months.
6. Write a shell script to modify "cal" command to display calendars of the specified range of months.
7. Write a shell script to accept a login name. If not a valid login name display message – "Entered login name is invalid".
8. Write a shell script to display date in the mm/dd/yy format.
9. Write a shell script to display on the screen sorted output of "who" command along with the total number of users.
10. Write a shell script to display the multiplication table any number,
11. Write a shell script to compare two files and if found equal asks the user to delete the duplicate file.
12. Write a shell script to find the sum of digits of a given number.
13. Write a shell script to merge the contents of three files, sort the contents and then display them page by page.
14. Write a shell script to find the LCD(least common divisor) of two numbers.
15. Write a shell script to perform the tasks of basic calculator.
16. Write a shell script to find the power of a given number.
17. Write a shell script to find the factorial of a given number.
18. Write a shell script to check whether the number is Armstrong or not.
19. Write a shell script to check whether the file have all the permissions or not.
20. Program to show the pyramid of special character "*".

II SEMESTER

DSC 2.3: Programming in JAVA
Credit (L : T : P = 4 : 0 : 2)
DSC 2.3.1 (Theory)

Unit - 1 **15 Hours**

Introduction to Java: Features of Java, JDK Environment, Object Oriented Programming Concept Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA

Java Programming Fundamental: Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch),Looping(for, while) ,Type Casting

Unit - 2 **15 Hours**

Classes and Objects: Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes

Arrays and Strings: Arrays, Creating an array, Types of Arrays, String class Methods, String Buffer methods.

Unit - 3 **15 Hours**

Abstract Class, Interface and Packages: Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages

Exception Handling: Exception types, Using try catch and multiple catch, Nested try, throw throws and finally, Creating User defined Exceptions.

Unit - 4 **15 Hours**

File Handling: Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File.

Applet Programming: Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag.

Reference 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.   E Balagurusamy , Programming with JAVA, TMH, 2007

DSC 2.3.2 (Practical)

Software Lab based on Java

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. Write a menu driven program for following:
    a. Display a Fibonacci series
    b. Compute Factorial of a number
    c. WAP to check whether a given number is odd or even.
    d. WAP to check whether a given string is palindrome or not.
4. WAP to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write java program for the following matrix operations:
    a. Addition of two matrices
    b. Summation of two matrices
    c. Transpose of a matrix
    d. Input the elements of matrices from user.
9. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of Multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
12. Write a java program to draw a line between two coordinates in a window.
13. Write a java program to display the following graphics in an applet window.
    a. Rectangles
    b. Circles
    c. Ellipses
    d. Arcs
    e. Polygons
14. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by NumberFormatException object. After that ex.getMessage() prints the information about the error occurring causes.
15. Write a program for the following string operations:
    a. Compare two strings
    b. Concatenate two strings
    c. Compute length of a string
16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

III SEMESTER

DSC 3.1.1: Discrete Mathematics & Logic Computation

Credit (L : T : P = 5 : 1 : 0)

Unit - 1	**15 Hours**

Basics of Set Theory: Notation, Inclusion and Equality of Sets, The Power set, Operations on sets, Venn diagram, Set identities, Ordered pairs and Cartesian Products.

Graph Theory: Basic Definitions, Paths and Connectedness, Matrix Representation of Graphs, Trees.

Unit - 2	**15 Hours**

Relations and ordering – Properties of binary relations in a Set, Relation Matrix and the Graph of a Relation, Equivalence Relations, Compatibility Relations, Composition of Binary Relation

Unit – 3	**15 Hours**

Functions: Definition and Introduction, Composition of Functions, Inverse Functions.

Unit - 4	**15 Hours**

. **Mathematical Logic:** Statements and Notation, Connectives, Negation, Conjunction, Disjunction, Statement Formulas and Truth Tables, Conditional and Bi-conditional, Tautologies, Equivalence of Formulas, Tautological Implications.

Unit - 5	**15 Hours**

Boolean Algebra & Formal: Boolean algebra - Application of Boolean Algebra to switching theory. Languages - Recognition and generation - Phase structure grammars and languages – Finite state Machine - Recognition in regular languages.

Reference Books:

1. Discrete Mathematical Structures with Applications to Computer Science by J.P. Tremblay, R Manohar 3rd Edition – Tata McGraw Hill.
2. Discrete mathematical structures by B. Kolman, R.C. Busby and S. Ross, 3rd edition.
3. Introduction to discrete mathematics by Liu, C.L., McGraw Hill, 2nd edition, 1985.
4. Discrete mathematics by S.A. Witala, McGraw Hill, 1987.

III SEMESTER
DSC 3.2:   Database Management Systems
Credit (L : T : P = 4 : 0 : 2)
DSC 3.2.1 (Theory)

Unit - 1   **15 Hours**

Introduction to Database Management Systems: Definition of Data, Information, DBMS, Data base system application, Purpose of database systems, Characteristics of DB – Self describing nature, Insulation between programs, data and data Abstraction (data Independence), support of multiple views of the data, sharing of data and multiples transaction processing, Storage management, Database language – DDL, DML,DCL. File processing system v/s DBMS, Data models, Levels of Abstraction in a DBMS, Three Schema architecture, Characteristics of database approach,, data models, DBMS architecture and data independence.

Unit - 2   **15 Hours**

Entity Relationship and Enhanced ER Modeling: Entity types, Entity Sets, Attributes, and Keys, Relationships, Relationship Types, Roles, and Structural Constraints, Weak Entity Types, ER Diagrams, Naming Conventions ,SQL99:Schema Definition , constraints, and object modeling

Unit - 3   **15 Hours**

Relational Data Model: Basic concepts, Relational Constraints and Relational Database Schemas, Update Operations and Dealing with Constraint Violations, Basic Relational Algebra Operations.

Database design: ER and EER to relational mapping, functional dependencies, normal forms-first normal form, second normal forms. Third normal form BCNF

Unit - 4   **15 Hours**

MYSQL (SQL/PL-SQL): SQL VS. SQL * PLUS: SQL COMMANDS AND DATA TYPES, OPERATORS AND EXPRESSIONS, INTRODUCTION TO SQL * PLUS.
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 OTHER DATABASE OBJECTS
- VIEW • SYNONYMS, INDEX TRANSACTION CONTROL STATEMENTS
- COMMIT, ROLLBACK, SAVEPOINT 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)

Reference Books:

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.

DSC 3.2.2 (Practical)
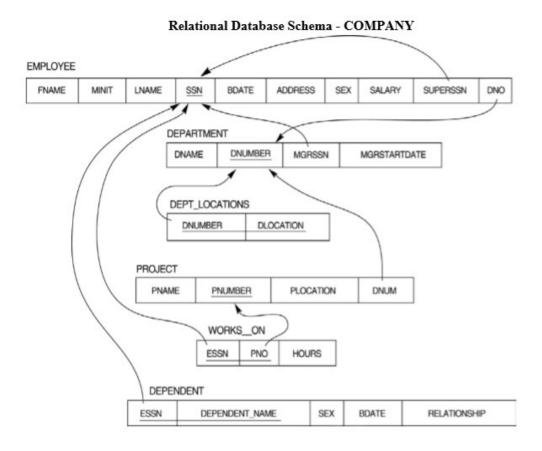
Software Lab based on Database Management Systems

The following concepts must be introduced to the students: **Note:** MS Access / MySQL may be used.

DDL Commands
- Create table, alter table, drop table

DML Commands
- Select , update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or, not,=,<>,>,<,>=,<=)
- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables) • Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by……..having
- Arranging using order by

Relational Database Schema - COMPANY

1.   Create tables with relevant foreign key constraints
2.   Populate the tables with data
3.   Perform the following queries on the database :
    a.   Display all the details of all employees working in the company.
    b.   Display ssn, lname, fname, address of employees who work in department no 7.
    c.   Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
4.   Retrieve the name and salary of every employee
5.   Retrieve all distinct salary values
6.   Retrieve all employee names whose address is in 'Bellaire'
7.   Retrieve all employees who were born during the 1950s
8.   Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
9.   Retrieve the names of all employees who do not have supervisors
10.   Retrieve SSN and department name for all employees
11.   Retrieve the name and address of all employees who work for the 'Research' department 12. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
13.   For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
14.   Retrieve all combinations of Employee Name and Department Name
15.   Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls   the project. 16. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.

17. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
18. Select the names of employees whose salary does not match with salary of any employee in department 10.
19. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
20. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
21. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
22. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department
23. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
24. For each department, retrieve the department number, the number of employees in the department, and their average salary.
25. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
26. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively. 27. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
28. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary insertion in the Department table.
29. Delete all dependents of employee whose ssn is '123456789'.
30. Delete an employee from Employee table with ssn = '12345' (make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL 31. Perform a query using alter command to drop/add field and a constraint in Employee table.

III SEMESTER

DSC 3.3:   Web Technologies
Credit (L : T : P = 4 : 0 : 2)
DSC 3.3.1 (Theory)

Unit - 1   **15 Hours**

Introduction to Web Design: Introduction to hyper text markup language (html) , header, footer, formatting tags, graphical elements, inserting images, lists, hyper links, tables. **Frames-**introduction, frameset. Forms- attributes of forms. Creating web pages

Unit - 2   **15 Hours**

Cascading Style Sheets: Introduction, Understanding the Basic CSS syntax ,Types of style sheets, multiple sheets, Background properties ,Text properties, Font properties ,Border properties, Margin properties Padding list & table properties . DIV, SPAN

Unit - 3   **15 Hours**

JavaScript: Introduction, Java script in HTML, Java script statement, comments, Expressions, Data types, operators, Conditional statements, Loop statements, functions, Popup boxes ,Array & Boolean Objects Math & Date Objects String & Number Objects, events and event handling & form document object.

Unit - 4   **15 Hours**

DOM and XML: Basics of DOM, DOM methods, functions Forms collection, table collections Inner HTML.
  XML Introduction; Syntax: Document structure; Document Type definitions; Namespaces; XML schemas; Displaying raw XML documents; Displaying XML documents with CSS; XSLT style sheets.

Reference Books:
1.   M.Deitel, P.J.Deitel, A.B.Goldberg: Internet & World Wide Web How to program, 3rd Edition, Pearson Education / PHI, 2004.
2.   Chris Bates: Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2006.
3.   Xue Bai et al: The Web Warrior Guide to Web Programming,   Thomson, 2003.

DSC 3.3.2 (Practical)

Web Technologies

1. Program for formatting tags.
2. Creating a Webpage having Hyperlink.
3. Creating Types of Lists (Ordered, UnOrdered, Definition).
4. Creating a Nested List.
5. Creating a Time Table.
6. Creating a HTML document having vertical frames.
7. Creating Student Application Form.
8. Program to insert audio & video files
9. Creating Internal & External Style Sheets.
10. Program to Margin & Padding.
11. Program to create a Greeting card
12. Program to Image Transparency
13. Program to generate Fibonacci series in Javascript.
14. Program to display Rainbow Colours in Javascript.
15. Program to create Pop-Up Boxes.
16. Program to generate multiplication table.
17. Program to find even and odd numbers.
18. Program to add 2 numbers.
19. Program to find factorial of a numbers.
20. Program to generate 2 different patterns.
21. Program to change background color after 5 sec of page load.
22. Display reverse of a given number.
23. Program to generate random numbers.
24. Program to find the sum of individual numbers.
25. Program to display Book information in XML.

IV SEMESTER

SEC 4.1.1: Elective: Mathematics (Theory)
Credit (L : T : P = 3 : 1 : 0)

Unit - 1   15 Hours

PARTIAL FRACTIONS: Proper & improper fractions-all four types.
LOGARITHMS: All problems, except common logarithms.
MATHEMATICAL INDUCTION: Simple problems on all types.
THEORY OF EQUATIONS:
i)	Solutions of cubic, bi quadratic equations when complex and irrational roots are given
ii)	Solutions of cubic, bi quadratic equations when roots are in AP, GP and HP.
iii)	Solutions of cubic, bi quadratic equations using synthetic division.
iv)	Operations on complex numbers.
BINOMIAL THEOREM: NO PROOF.
i)	Expansion - problems thereon.
ii)	Finding middle terms.
iii)	Finding constant terms or terms independent of x.
TRIGONOMETRY:
i)	Definition of radian (no proof for constant angle)
ii)	Problems on conversion of radians to degree and vice versa
iii)	Problems on $s = r\theta$, $s = \dfrac{1}{2} r^2 \theta$ (no proofs)

TRIGONOMETRIC FUNCTIONS AND IDENTITIES: Simple problems
GRAPHS OF TRIGONOMETRIC FUNCTIONS: for sine, cos and tan functions.
Allied angles: Problems thereon

Unit - 2   15 Hours

COMPLEX NUMBERS:
i)	Finding modulus and amplitude of complex numbers
ii)	Solving problems using Domoivre's Theorem.
ANALYTICAL GEOMETRY
i)	Problems on distance formula - Proving parallelogram, square, rhombus, equilateral triangle, Co linearity.
ii)	Problems on section formula - internal division, external division, midpoint formula, centroid of a triangle.
iii)	Problems on area of a triangle.

Unit - 3   15 Hours
STRAIGHT LINES:
i)	By finding slopes - show that lines are parallel and perpendicular.
ii)	Finding slopes - when two points are given
iii)	Equation of straight lines - passing through given point, parallel and perpendicular to given line.
iv)	Problems on intercept form, slope form, normal form, two point form.
v)	Problems on angle between two lines.
vi)	Concurrency of three lines and point of concurrency.

PAIR OF LINES

i)   Angle between two lines $ax^2 + 2hxy + by^2 = 0$. $ax^2 + 2hxy + by^2 + 2gx + 2fy + C = 0$.
ii)   Point of Intersection.
iii) Condition for an equation to represent pair of lines.

CIRCLES:
i)   Finding centre and radius.
ii)   Finding equation of a circle passing through three points, when different conditions are given, passing through x and y- axis.

CONICS: PARABOLA -

Finding vertex, focus, tangent, normal, length of latus rectum, eccentricity. (No proofs)

Unit - 4   15 Hours

LIMITS AND CONTINUITY:

i)   Simple direct problems on limits of the form $\left(\dfrac{x^n - a^n}{x - a} \right)$, $\dfrac{\sin\theta}{\theta}$, $\dfrac{\tan\theta}{\theta}$ (no determinate forms).

ii)   Simple problems on continuity.

DIFFERENTIATION:
i)   Problems on sum , product, quotient, chain rule (No parametric, logarithmic functions)

DIFFERENTIAL EQUATIONS:
      Solving problems by variable separable form.

INTEGRATION:

i)   By substitution
ii)   By parts
iii) By partial fractions
iv)   Problems of types

$$\int \frac{dx}{a^2 + x^2}, \int \frac{dx}{a^2 - x^2}, \int \frac{dx}{x^2 - a^2}, \int \frac{dx}{\sqrt{a^2 - x^2}}, \int \frac{dx}{\sqrt{a^2 + x^2}}, \int \frac{dx}{\sqrt{x^2 - a^2}}, \int \frac{dx}{x\sqrt{x^2 - a^2}}, \int \frac{dx}{x\sqrt{x^2 + a^2}}$$

$$\int \sqrt{a^2 - x^2}\,dx, \int \sqrt{a^2 + x^2}\,dx, \int \sqrt{x^2 - a^2}\,dx$$

$$\int \frac{dx}{ax^2 + bx + c}, \int \frac{dx}{\sqrt{ax^2 + bx + c}}$$

APPLICATION OF INTEGRATION:

Simple problems on area
i)   Find the area of circle, ellipse, parabola & the ordinate x=a by integration
ii)   Find the area bounded by the parabola $y^2 = 4ax$, x – axis and x = 1, x = y.
Find the area bounded by y = sin x, x - axis & x = 0, y = z.

Reference Books:
1.   Theory and Problems in Mathematics – I by BOSCO Publications 2004.
2.   Theory and Problems in Mathematics – II by BOSCO Publications 2005.
3.   Engineering Mathematics, Volumes I–IV by S Chandrasekhar.

IV SEMESTER

SEC 4.1.2: Elective: Business Mathematics (Theory)

Credit (L : T : P = 3 : 1 : 0)

Unit - 1   **15 Hours**

Matrices and Determinants: Order - Types of matrices - Addition and subtraction of matrices and Multiplication of a matrix by a scalar - Product of matrices. Evaluation of determinants of order two and three - Properties of determinants (Statements only) - Singular and non singular matrices - Product of two determinants.

Unit - 2   **15 Hours**

Algebra: Partial fractions - Linear non repeated and repeated factors - Quadratic non repeated types. Permutations - Applications - Permutation of repeated objects - Circular permutaion.

Combinations - Applications - Mathematical induction - Summation of series using ∑n, ∑n2 and ∑n3. Binomial theorem for a positive integral index - Binomial coefficients.

Unit - 3   **15 Hours**

Sequences and series: Harnomic progression - Means of two positive real numbers - Relation between A.M., G.M., and H.M. - Sequences in general - Specifying a sequence by a rule and by a recursive relation - Compound interest - Nominal rate and effective rate - Annuities - immediate and due.

Unit - 4   **15 Hours**

Ordinate Geometry: Rectangular castes ion Co–ordinates in a Plane, Equations of straight lines and the concept of gradient with its practical applications in real life business problems.

Reference Books:
1.   Mathematics for Economics and Business by R.S. Bhardwaj .
2.   Business Mathematics by Padmalochan Hazarika.
3.   Business Mathematics by D.C. Sancheti and V.K. Kapoor.
4.   Mathematical Economics by Dowling, T. Edword.
5.   Mathematical Analysis for Economics by Allen, RGD.

IV SEMESTER

SEC 4.1.3: Elective: Accountancy & Financial Management (Theory)

Credit (L : T : P = 3 : 1 : 0)

Unit - 1   **15 Hours**
ACCOUNTING:
1. Introduction: Principles, concepts and conventions, double entry system of Accounting, ledger keeping.
2. Subsidiary books with special reference to simple cash book and three columns cash book.
3. Trial balance and final accounts of sole trader: Preparation trial balance, adjusting entries, including revenue for bad debts, revenue for discount on debtors and creditors, preparation of final accounts.

Unit - 2   **15 Hours**
FINANCIAL MANAGEMENT:
4. Final accounts of joint stock companies.
5. Introduction: Meaning and scope of financial management, functions of the financial manager.
6. Ratio analysis: Meaning of ratio, advantages, limitations, types of ratios and their usefulness, liquidity and ratios, profitability rations, efficiency ratios, solvency ratios, problems including preparation of balance sheet.

Unit - 3   **15 Hours**
COSTING & BUDGETARY CONTROL:
7. Funds flow statement: Meaning and concepts of funds, preparation of fund flow statement.
8. Unit costing: Preparation of cost sheet and tender price statement.
9. Marginal costing: Concepts, Marginal cost equations, P/V ratio, B.E.P., Margin of safety, Sales to earn a desired profit, Problems on the above.

Unit - 4   **15 Hours**
10. Budgetary Control: Meaning and definition, preparation of flexible budget and cash budget.
11. Standard costing: Meaning of standard cost and standard costing, analysis of variances – material and labour variances only.

Reference Books:
1. Accountancy Vol. 1 by B.S. Raman.
2. Accountancy Vol. 2 by B.S. Raman.
3. Management Accounting by R.K. Sharma and Gupta.
4. Financial Management by I.M. Pandey.

IV SEMESTER
SEC 4.1.4: Elective: Entrepreneurship Development (Theory)
Credit (L : T : P = 3 : 1 : 0)

Unit - 1   **15 Hours**

Need scope and characteristics of entrepreneurships special schemes for a technical entrepreneur STED.

Identification of opportunities: Exposure to Demand based, Resource based, Service based important substitutes and expert promotion industries. Market surveys techniques.

Need scope and approaches for the project formulation.

Criteria for the principles of products selection and development.

Unit - 2   **15 Hours**

Structure of the project report, Choice of technology, plant and equipment.

Institutions financing procedure and financial incentives. financial ratios and their significance. Books of accounts, financial statements and funds flow analysis.

Resource management, man machine and material. The critical path method (CPM) and project evolution, review techniques (PERT).

Planning tools for establishing SSI
   a. CREATIVITY AND INNOVATION   b. ROBLEM SOLVING APPROACH
   c. STRENGTH AND WEAKNESS OPPORTUNITY AND THREAT (SWOT) techniques.

Unit - 3   **15 Hours**

Techno economics feasibility of the project. Plan layout and process planning for the product. Quality control / quality assurances and testing of the products. Costing and pricing.

Management of self and understanding human behavior. Sickness in small-scale industries and their remedial measures.

Unit - 4   **15 Hours**

Coping and uncertainties, stress management, and positive reinforcement
   a. Licensing registration, b. Municipal by laws and insurance coverage
      Important provision of factory acts sales of goods act partnership act.
   a. DILUTION CONTROL,
   b. SOCIAL RESPONSIBILITY AND BUSINESS ETHIQUES
      Income tax, sales tax and excise rule.

Reference Books:
1.   Entrepreneurship Development – Kanaka
2.   Entrepreneurship Development – Vasanth Desa

IV SEMESTER
DSC 4.1: Numerical Analysis and Statistics
Credit (L : T : P = 4 : 0 : 2)
DSC 4.1.1 (Theory)

Unit - 1   **15 Hours**

Computer Arithmetic: Fixed and Floating point representation, Normalization of numbers. Errors in numbers.

Iterative methods: Bisection method, Regula-Falsi method, Secant method, Newton-Raphson method

Unit - 2   **15 Hours**

Matrices and Linear System of Equations: LU decomposition method, Gauss elimination, Gauss seidal and Gauss Jordan for solving system of equations

Interpolation: Polynomial interpolation, Newton-Gregory forward and backward interpolation, Newton's divided differences interpolation formulae.

Unit - 3   **15 Hours**

Numerical Integration: Trapezoidal rule, Simpson's 1/3 rd and 3/8 th rule,

Numerical Differentiation: Euler's, modified Euler's and Runge-Kutta (RK) 2nd order and 4th order.

Unit - 4   **15 Hours**

Statistics: Definition, Importance, Functions and Limitations of statistics.

Graphic presentation: Frequency distribution, Histogram, Frequency polygon, frequency curve and O gives Measures of central tendency: (Mean, Median, Mode) Dispersion, Correlation, Regression.

Reference Books:
1.   K.E. Atkinson, W. Han, Elementary Numerical Analysis, 3rd Ed., Wiley, 2003.
2.   C. Xavier, S.S. Iyengar, Introduction to Parallel Algorithms, Wiley-Interscience, 1998.
3.   A. Kharab, R.B. Guenther, An Introduction to Numerical Methods: A MATLAB Approach,1st Ed. Chapman and Hall/CRC, 2001.
4.   B. Bradie, A Friendly Introduction to Numerical Analysis, Pearson Education, 2007.
5.   S.R. Otto and J.P. Denier, An Introduction to Programming and Numerical Methods in MATLAB, Springer, 2005.
6.   M.K. Jain, S.R.K. Iyengar and R.K. Jain, Numerical Methods for Scientific and Engineering Computation, 7th Ed., New Age International Publishers, 2007.
7.   Computer oriented numerical methods by V Rajaraman
8.   Statistics Theory and Practice by R S N Pillai, Bagavathi
9.   Practical statistics by S P Gupta

DSC 4.1.2 (Practical)

Software lab based on numerical techniques and statistics

1. BRUTE FORCE METHOD
2. BISECTION METHOD
3. REGULA –FALSI METHOD
4. NEWTON RAPHSON
5. SECANT
6. LU DECOMPOSITION
7. GAUSS ELIMINATION
8. GAUSS JORDAN
9. GAUSS SEIDAL
10. EULER'S
11. MODIFIED EULER'S
12. RUNGE KUTTA II ORDER
13. RUNGE KUTTA IV ORDER
14. TRAPEZOIDAL
15. SIMPSONS 1/3 RD
16. SIMPSONS 3/8 TH
17. FINDING THE MEAN, MEDIAN AND MODE OF A SET OF DATA
18. FINDING THE RANGE OF A SET OF DATA
19. FINDING THE STANDARD DEVIATION OF A SET OF DATA
20. NEWTONS FORWARD AND BACKWARD INTERPOLATION
21. NEWTONS DIVIDED DIFFERENCE

IV SEMESTER

DSC 4.2: J2EE
Credit (L : T : P = 4 : 0 : 2)
DSC 4.2.1 (Theory)

Unit - 1   **15 Hours**

Interdiction: The ABC of Programming Languages, taking programming languages up a notch, the beginning of java, java byte-code, the advantages of Java, J2EE and J2SE.

J2EE Multi-Tier Architecture: Distributive systems, the Tier, J2EE Multi-Tier Architecture, Client Tier Implementation, Web Tier Implementation, Enterprise JavaBeans Tier Implementation, Enterprise Information Systems Tier Implementation, Challenges.

J2EE Nest Practices: Enterprise Application Strategy, The enterprise application, clients, Sessions Management, Web Tier and Java Server pages, Enterprise Java Beans Tier, The Myth of using inheritance, Maintainable classes, Performance Enhancements, The power of Interfaces, The power of threads, The power of Notification.

Unit - 2   **15 Hours**

J2EE Database Concepts: Data, Database, Database Schema, The Art of Indexing.

JDBC Objects: The concept of JDBC, JDBC Driver Types, JDBC packages, A Brief overview of the JDBC Process, Database Connection, Associating the JDBC / ODBC Bridge with the database, Statement Objects, Result Set, Transaction Processing, Metadata.

Unit - 3   **15 Hours**

JDBC and Embedded SQL: Model Programs: Model A Program, Model B Program, Tables: Creating a Table, Dropping a Table, Indexing: Creating an Index, Dropping an Index, Inserting Data into tables: Inserting a Row, Inserting the systems date into a column, Inserting the system Time into a column, Inserting a Timestamp into a column, Selecting Data from a Table: Selecting all data from a Table, Requesting one column, Requesting Multiple column, Requesting rows, Requesting rows and columns, AND, OR, and NOT clauses, Joining multiple compound expressions, equal & not equal operators, Less than & greater than operators, Less than equal to & greater than equal to, BETWEEN, LIKE, IS NULL Operator, DISTINCT Modifier, IN modifier,

Unit - 4   **15 Hours**

Metadata: Number of columns in result set, Data type of a column, Name of a column, Column Size, updating Tables: Updating a row and column, updating multiple rows, Deleting Data from a table: Deleting a Row from a table, Joining tables, Calculating Data, Grouping and ordering data, sub queries, view.

Java Servlets: Java servlets and common gateway interface programming: Benefits of using a Java servlet, A simple Java servlet, Anatomy of a java servlet: Development Descriptor, Reading Data from a client, Reading HTTP request Headers, Sending Data to a Client & writing the HTTP response Header, Working with cookies, Tracking Sessions, Quick reference guide.

JAVA Server Pages: JSP installation, JSP Tags: Variables & objects, Methods, Control Statements, Loops, Tomcat, Request string: Parsing other information, User sessions, cookies, Session objects, Quick reference guide.

Reference Books:
1.   The complete reference J2EE seventh edition - Java 2 Enterprise edition overview
2.   J2EE: The complete Reference - McGraw-Hill Education

DSC 4.2.2 (Practical)

J2EE LAB CYCLE

1. Program To Create Jdbc Connection

2. Application to access the database using the Java Database Connectivity (JDBC).

3. Perform a Database Query and View Results.

4. Write a program to demonstrate Basic Servlet.

5. Write a program to Display request header information.

6. Write a program to design web application

7. Write a program to display cookie value, cookie age and cookie path.

8. Write a program in JSP file to set and then display the cookie.

9. Write a program for Java script validation.

10. Write a JAVA Servlet Program to implement a dynamic HTML using Servlet(user name and password should be accepted using HTML and displayed using a Servlet).

11. Write a JAVA Servlet Program to Download a file and display it on the screen(A link has to be provided in HTML, when the link is clicked corresponding filehas to be displayed on Screen)

12. Write a JAVA Servlet Program to implement RequestDispatcher object (use include() and forward() methods)

13. Write a JAVA Servlet Program to implement and demonstrate get() and Postmethods(Using HTTP Servlet Class).

14. Write a JAVA Servlet Program to implement sendRedirect() method(usingHTTP Servlet Class).

15. Write a JAVA Servlet Program to implement sessions (Using HTTP SessionInterface).

16. Write a JAVA JSP Program to print 10 even and 10 odd number.

17. Write a JAVA JSP Program to implement verification of a particular userlogin and display a welcome page.

18. Write a JAVA JSP Program to get student information through a HTML and create a JAVA Bean Class, populate Bean and display the same informationthrough another JSP.

19. Write a JAVA JSP Program which uses <jsp:plugin> tag to run a applet

20. Write a JAVA JSP Program whch implements nested tags and also usesTagSupport Class.

IV SEMESTER

DSC 4.3: Software Engineering and Software Testing
Credit (L : T : P = 4 : 0 : 2)
DSC 4.3.1 (Theory)

Unit - 1   **15 Hours**

Software Process: Introduction, S/W Engineering Paradigm, life cycle models (water fall, incremental, spiral, evolutionary, prototyping, object oriented) , System engineering, computer based system, verification, validation, life cycle process, development process, system engineering hierarchy.

Software requirements: Functional and non-functional, user, system, requirement engineering process, feasibility studies, requirements, elicitation, validation and management, software prototyping, prototyping in the software process, rapid prototyping techniques, user interface prototyping, S/W document.

Unit - 2   **15 Hours**

Software Analysis: Analysis and modeling, data, functional and behavioral models, structured analysis and data dictionary.

Design Concepts and Principles: Design process and concepts, modular design, design heuristic, design model and document, Architectural design, software architecture, data design, architectural design, transform and transaction mapping, user interface design, user interface design principles. Real time systems, Real time software design, system design, real time executives, data acquisition system, monitoring and control system.

Unit - 3   **15 Hours**

Software Configuration Management: The SCM process, Version control, Change control, Configuration audit, SCM standards.

Software Project Management: Measures and measurements, S/W complexity and science measure, size measure, data and logic structure measure, information flow measure. Estimations for Software Projects, Empirical Estimation Models, Project Scheduling.

Unit - 4   **15 Hours**

Testing: Taxonomy of software testing, levels, test activities, types of s/w test, black box testing, testing boundary conditions, structural testing, test coverage criteria based on data flow, mechanisms, regression testing, testing in the large. S/W testing

strategies, strategic approach and issues, unit testing, integration testing, validation testing, system testing and debugging.

Trends in Software Engineering: Reverse Engineering and Re-engineering – wrappers – Case Study of CASE tools.

Reference Books:
1.   Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill
2.   Ian Sommerville, Software engineering, Pearson education Asia, 6th edition, 2000.
3.   Pankaj Jalote- An Integrated Approach to Software Engineering, Springer Verlag, 1997.
4.   James F Peters and Witold Pedryez, "Software Engineering – An Engineering Approach", John Wiley and Sons, New Delhi, 2000.
5.   Ali Behforooz and Frederick J Hudson, "Software Engineering Fundamentals", Oxfor University Press, New Delhi, 1996.
6.   Pfleeger, "Software Engineering", Pearson Education India, New Delhi, 1999.
      Carlo Ghezzi, Mehdi Jazayari and Dino Mandrioli, "Fundamentals of Software Engineering", Prentice Hall of India, New Delhi, 1991.

DSC 4.3.2 (Practicls)

Lab based on Software Engineering

1. Practical Title
   - Problem Statement,
   - Process Model
2. Requirement Analysis
   - Creating a Data Flow
   - Data Dictionary,
   - Use Cases
3. Project Management
   - Computing FP
   - Effort
   - Schedule, Risk Table, Timeline chart
4. Design Engineering
   - Architectural Design
   - Data Design, Component Level Design
5. Testing
   - Basis Path Testing

Sample Projects like

- DTC Route Information: Online information about the bus routes and their frequency and fares
- Car Pooling: To maintain a web based intranet application that enables the corporate
- Employees within an organization to avail the facility of carpooling effectively.
- Patient Appointment and Prescription Management System
- Organized Retail Shopping Management Software
- Parking Allocation System
- Wholesale Management System

V SEMESTER

SEC 5.1.1: Elective: Object Oriented Modeling & Design with UML
Credit (L : T : P = 3 : 0 : 1)
SEC 5.1.1.1: (Theory)

Unit - 1   **15 Hours**

INTRODUCTION: What is object orientation? What is OO development? OO themes, Evidence for usefulness of OO development, OO Modeling history. Introduction to UML, Importance of modeling, Principles of modeling, Object oriented modeling, Overview of UML, Conceptual model of the UML, Architecture, Software development life cycle.

MODELING CONCEPTS: Modeling as a design technique- Modeling, Abstraction, the three models. Class modeling -object and class concepts, link and association concepts, Generalization and inheritance, a sample model, navigation of class models, Advanced class modeling, advanced object and class concepts, association ends, n-ray associations, aggregation, abstract classes, multiple inheritance, metadata, reification, constraints, derived data, packages.

Unit - 2   **15 Hours**

State modeling events, states, transitions and conditions, state diagrams, state diagram behavior. Interaction modeling- use case models, sequence models, activity models. Advanced Interaction Modeling- use case relationships, procedural sequence models, special constructs for activity models

PROCESS OVERVIEW- development stages, development life cycle, Doman analysis- overview of analysis, domain class model, domain state model, domain interaction model, iterating the analysis.

Unit - 3   **15 Hours**

SYSTEM DESIGN-overview of system design, estimating performance, making a reuse plan, breaking a system into subsystems, identifying concurrency, allocation of subsystems, management of data storage, handling global resources, choosing a software control strategy, handling boundary conditions.

CLASS DESIGN- Overview of class design, Bridging the gap, realizing use cases, designing algorithms, Recursing downward, refactoring, Design Optimization Reification of Behavior, adjustment of inheritance, organizing a class design.

IMPLEMENTATION MODELING-Overview of Implementation, fine-tuning classes Fine-tuning generalizations, Realizing associations testing.

Reference Books:

1.   1. Object –oriented modeling and design- Michael R Blaha and James R Rumbaugh
2.   Object Technology- David A.Taylor
3.   Designing Flexible Object Oriented systems with UML – Charles Ritcher
4.   Object Oriented Analysis & Design, Sat/.inger. Jackson, BurdThomson
5.   Object Oriented Modeling and Design - James Rumbaugh
6.   Teach Yourself UML in 24 Hours - Joseph Schmuilers

SEC 5.1.1.2: Elective: (Practical)

Term Work / Assignment
 Each candidate will submit an approximately10-page written report on a case study or mini project. Students have todo OO analysis & design for the project problem, and develop use case model, analysis model and design model for it, using UML.

Practical assignment
Nine assignments, one on each of the diagrams learnt in UML.

V SEMESTER

SEC 5.2.1: Elective: Analysis and Design of Algorithms

Credit L : T : P = 3 : 1 : 0
SEC 5.2.1.1: (Theory)

Unit - 1   **15 Hours**

Introduction: Notion of Algorithm, Review of Asymptotic Notations, Mathematical Analysis of Non-Recursive and Recursive Algorithms Correctness of Algorithm

Algorithm Design Techniques: Iterative techniques Divide and conquer greedy algorithms.

Sorting Techniques: Selection sort, bubble sort, insertion sort, more sorting techniques-quick sort, merge sort. Radix sort,

Unit - 2   **15 Hours**

Searching Techniques: Linear and Binary search, Complexity Analysis.

Graphs: Analysis of Graph algorithms -Depth-First Search Breadth-First Search and its applications, minimum Spanning Trees and Shortest Paths -PRIM 'S, KRUSKAL, Dijkstra's algorithm. Branching-Hamiltonian Circuit problem.

Unit - 3   **15 Hours**

DYNAMIC PROGRAMMING: The General Method, Warshall's Algorithm, Floyd's Algorithm for the All-Pairs Shortest Paths, Single-Source Shortest Paths: The Travelling Salesperson problem.

Reference Books:
1.   Analysis & design of Algorithm-Padma Reddy
2.   A.V. Levitin, Introduction to the Design and Analysis of Algorithms, Pearson Education, 2006.
3.   J. Kleinberg and E. Tardos, Algorithms Design, Pearson Education, 2006.

SEC 5.2.2.2: Elective: (Practical)

1. Implement Insertion Sort.

2. Implement Merge Sort.

3. Implement recursive algorithm

4. Implement Randomized Quick sort.

5. Implement Radix Sort.

6. Implement Searching Techniques (linear & Binary)

7. Implement selection sort

8. Implement Bubble sort

9. Implement Prim's Algorithm

10. Implement Dijkstra's Algorithm

11. Implement Krushkal's Algorithm

12. Implement Travelling Salesperson problem

13. Implement Floyd's Algorithm

14. Implement Depth First Search

15. Implement Binary Search tree.

V SEMESTER
SEC 5.3.3: Elective: E-Commerce Technologies (Theory)
Credit (L : T : P = 3 : 0 : 1)

SEC 5.3.3.1: (Theory)

Unit - 1   **15 Hours**

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)

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.

Unit - 2   **15 Hours**

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, Authorization and Authentication, Firewall, Digital Signature(How it Works)

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.

Unit - 3   **15 Hours**

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.

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 marketing, Personalization e-commerce.

Reference 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

SEC 5.3.3.2: (Practical)

Software Lab based on E-Commerce Technologies

E-commerce concepts are to be implemented in developing a website using a combination of following technologies:

1. Hyper Text Markup Language (HTML)

2. Cascading Style Sheets (CSS)

3. JavaScript

4. ASP

5. PHP

6. XML

7. Joomla

V SEMESTER
DSE 5.1.1: Elective: Data Communication and Computer Networks
Credit L : T : P = 4 : 0 : 1.5
DSE 5.1.1.1 (Theory)

Unit - 1 **15 Hours**

Data Communications: Components, Data Representation, Dataflow

Networks: Network criteria, Physical Structures, Topology (Mesh, Star, Tree, Bus, Ring, Hybrid)

Categories of Network: LAN, MAN, WAN

History of Network: Protocols and Standards: Protocols (Standards organization),

Addressing: Physical, Logical, Port, Specific.

Unit - 2 **15 Hours**

Transmission Media: Guided Media – Twisted pair cable, co-axial cable, optical fiber, Unguided Media – Radio waves, microwaves, Infrared.

Signals: Analog and Digital Data, Analog and Digital Signals, periodic and non periodic signals. Analog Signals – Sine wave, Peak Amplitude, Period and frequency, Phase, wave length, composite signals. Digital Signals – Band width, Bit length, Bit rate, base band transmission, Digital v/s Analog. Transmission Impairment, Data rate limits (Noisy and noiseless channel)

Unit - 3 **15 Hours**

Network Models: Layered tasks, OSI model (peer – to – peer), Layered Architecture. Functions of Layers (OSI), TCP / IP Protocol suite

Multiplexing: FDM (MUX and DEMUX process, Application of FDM), WDM, TDM (Interleaving, synchronizing, bit padding)

Switching Concept: Working principle of circuit switching and packet switching. Circuit switched networks, three phases efficiency, delay. Data grams network, routing table, delay efficiency, virtual.

Error Detection and Correction: Types of Errors, Redundancy, Error detection virus Error Correction.

Error Detection: Parity check, Cyclic Redundancy Check (CRC), Check Sum. Error Correction - Retransmission, Forward Error Correction, Burst error Correction.

Unit - 4 15 Hours

Networking And Internetworking Devices: Connecting Devices - Hubs, Repeaters, Amplifiers, Bridges – LAN bridges, transparent bridges, Source-route bridges, Routers, Gateways, 2 layer and 3 layers switches.

Routing Concepts: Types, Shortest path, flooding.

Wireless Lan's: Blue tooth - Architecture, Blue tooth layers.

Network Layer : IPV4, IPV6 addresses

Transport Layer: UDP – user datagram, operations, Application. TCP - Services, TCP segment, SCTP - Services, packet format.

Application Layer: - SMTP, SNMP, HTTP, FTP

Reference Books:
1. Data Communication and Networking – Forouzan
2. Computer Network – Tanenbaurn – 3rd Editions
3. Computer Network – Larry L. Peterson & Bruce S. Davie

DSE 5.1.1.2 (Practical)

1. Program for Identifying well known Ports

2. Program for Data Retrieval from Remote Database.

3. Program for Simulating SMTP Client.

4. Program for Simulating Telnet Client

5. Program for Simple file transfer between two systems, (without using Protocols)

6. Program for implementing HTTP.

7. Program for Downloading Image files.

8. Simulate Checksum Algorithm.

9. Simulate Stop & Wait   Protocol.

10. Simulate Go-Back-N Protocol.

11. Simulate Selective Repeat   Protocol.

12. Take an example subnet of hosts. Obtain broadcast tree for it.

13. Network address with automatic subnet address generation:

V SEMESTER
DSE 5.1.2: Elective: Computer Graphics
Credit L : T : P = 4 : 0 : 1.5
DSE 5.1.2.1 (Theory)

Unit - 1   **15 Hours**

INTRODUCTION: Survey of computer graphics, Overview of graphics systems – Video display devices, Raster scan systems, Random scan systems, Graphics monitors and Workstations, Input devices, Hard copy Devices, Graphics Software; Output primitives – points and lines, line drawing algorithms, loading the frame buffer, line function; circle and ellipse generating algorithms; Pixel addressing and object geometry, filled area primitives.

Unit - 2   **15 Hours**

TWO DIMENSIONAL GRAPHICS: Two dimensional geometric transformations – Matrix representations and homogeneous coordinates, composite transformations; Two dimensional viewing – viewing pipeline, viewing coordinate reference frame; widow-to-viewport coordinate transformation, Two dimensional viewing functions; clipping operations – point, line, and polygon clipping algorithms.

Unit - 3   **15 Hours**

THREE DIMENSIONAL GRAPHICS: Three dimensional concepts; Three dimensional object representations – Polygon surfaces Polygon tables- Plane equations – Polygon meshes; Curved Lines and surfaces, Quadratic surfaces; Blobby objects; Spline representations – Bezier curves and surfaces -B-Spline curves and surfaces.

TRANSFORMATION AND VIEWING: Three dimensional geometric and modeling transformations – Translation, Rotation, Scaling, composite transformations; three dimensional viewing – viewing pipeline, viewing coordinates, Projections, Clipping; Visible surface detection methods.

Unit - 4   **15 Hours**

ILLUMINATION AND COLOUR MODELS: Light sources – basic illumination models – halftone patterns and dithering techniques; Properties of light – Standard primaries and chromaticity diagram; Intuitive colour concepts – RGB colour model – YIQ colour model – CMY colour model – HSV colour model – HLS colour model; Colour selection.

Reference Books:
1. Computer Graphics C Version by Donald Hearn & M. Pauline Baker Pearson Education, New Delhi, 2004
2. Procedural Elements for Computer Graphics by David F. Rogers, Tata McGraw Hill Book Company, New Delhi, 2003
3. Computer Graphics: Principles & Practice in C by J. D. Foley, S. K Feiner, A Van Dam F. H John, Pearson Education, 2004
4. Computer Graphics using Open GL by Franscis S Hill Jr Pearson Education, 2004.

DSE 5.1.2.2 (Practical)

1. Implementation of Bresenhams Algorithm – Line, Circle, Ellipse.

2. Implementation of Line, Circle and ellipse Attributes

3. Two Dimensional transformations - Translation, Rotation, Scaling, Reflection, Shear.

4. Composite 2D Transformations

5. Cohen Sutherland 2D line clipping and Windowing

6. Sutherland – Hodgeman Polygon clipping Algorithm

7. Three dimensional transformations - Translation, Rotation, Scaling

8. Composite 3D transformations

9. Drawing three dimensional objects and Scenes

10. Generating Fractal images

V SEMESTER
DSE 5.1.3: Elective: Multimedia Systems and Applications
Credit (L : T : P = 4 : 0 : 1.5)
DSE 5.1.3.1 (Theory)

Unit - 1   **15 Hours**

Multimedia: Introduction to multimedia, components, uses of multimedia, multimedia applications, virtual reality.

Text: Fonts & Faces, Using Text in Multimedia, Font Editing & Design Tools, Hypermedia & Hypertext.

Images: Still Images – bitmaps, vector drawing, 3D drawing & rendering, natural light & colors, computerized colors, color palettes, image file formats.

Unit - 2   **15 Hours**

Sound: Digital Audio, MIDI Audio, MIDI vs Digital Audio, Audio File Formats.

Video: How video works, analog video, digital video, video file formats, video shooting and editing.

Unit - 3   **15 Hours**

Animation: Principle of animations, animation techniques, animation file formats.

Internet and Multimedia: www and HTML, multimedia on the web – web servers, web browsers, web page makers and site builders.

Unit - 4   **15 Hours**

Making Multimedia: Stages of a multimedia project, Requirements to make good multimedia, Multimedia Hardware - Macintosh and Windows production Platforms, Hardware peripherals - Connections, Memory and storage devices, Multimedia software and Authoring tools.

Reference Books:
1. Tay Vaughan, "Multimedia: Making it work", TMH, Eighth edition.
2. Ralf Steinmetz and Klara Naharstedt, "Multimedia: Computing, Communications Applications", Pearson.
3. Keyes, "Multimedia Handbook", TMH.
4. K. Andleigh and K. Thakkar, "Multimedia System Design", PHI.

DSE 5.1.3.2 (Practical)

Practical exercises based on concepts listed in theory using Presentation tools in office automation tool/ GIMP/Blender / Audacity/ Animation Tools/ Image Editors/ Video Editors.

Implement the followings using Blender -

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).

Project :
Design a minimum 10 page interactive website using Joomla or WordPress.

V SEMESTER

DSE 5.2.1: Elective: ASP.Net

Credit (L : T : P = 4 : 0 : 1.5)
DSE 5.2.1.1 (Theory)

Unit - 1   **15 Hours**

Overview of the ASP.NET: Introduction of different Web Technology, What is Asp.Net, How Asp.Net Works, Use of visual studio, Different Languages used in ASP.Net., Summary.

Framework: Common Language Runtime (CLR), .NET Framework Class Library, Summary

Unit - 2   **15 Hours**

Setting up and Installing ASP.NET: Installing Internet Information Server, Installation of Asp.Net, virtual directory, Application Setting in IIS, Summary.

Unit - 3   **15 Hours**

Asp.Net Standard Controls, Displaying information, Label Controls, Literal Controls, Bulleted List, Accepting User Input, Textbox controls, Radio Button and Radio ButtonList Controls, Checkbox and Checkbox List Controls, Button controls, Link Button Control, Image Button Control, Using Hyperlink Control, Dropdown List, List Box, Displaying Images, Image Control, Image Map Control, Using Panel Control, Using Hyperlink Control, Asp.Net, Page & State Management, Overview of events in page, Summary.

Unit - 4   **15 Hours**

Designing Websites with master pages, creating master pages, Creating default contents, nesting master pages, Registering master pages in web configuration, Summary.

ASP.Net Theme: ASP.NET Website Theme, Named Skin and Default Skin In ASP.NET Theme, Style Sheet Theme and Theme Attributes Of A Page Directive

Using the Rich Controls: Accepting File Uploads, Saving files to file system, Calendar Control, Displaying advertisements, Displaying Different Page view, Displaying a Tabbed Page View, Wizard Control, Summary.

Reference Books:
1.   Mathew Mac Donald, ASP . Net The Complete Reference, Mc Graw –Hill, 2002.

DSE 5.2.1.2 (Practical)

LAB MANUAL:

1. Write a Program to generate the factorial operation.

2. Write a Program to perform Money Conversion.

3. Write a Program to generate the Quadratic Equation.

4. Write a Program to generate the Login control.

5. Write a Program to perform Asp.Net state.

6. Write a Program to perform validation operation.

7. Write a Program to perform Tree view operation.

8. Write a Program to display the phone no of an author using database.

9. Write a Program to insert the data in to database using Execute-Non Query.

10. Write a Program to bind data using template in data list.

11. Write a Program to bind data using Hyperlink column in data grid.

V SEMESTER
DSE 5.2.2: Elective: Visual Programming
Credit (L : T : P = 4 : 0 : 1.5)
DSE 5.2.2.1 (Theory)

{**Note:** Use any open source alternative such as Tkinter with Python /SharpDevelop/GAMBAS/OPENXAVA with JAVA}

Unit - 1   **15 Hours**

GUI Environment: Introduction to graphical user interface (GUI), programming language (procedural, object oriented, event driven), the GUI environment, compiling, debugging, and running the programs.

Controls: Introduction to controls textboxes, frames, check boxes, option buttons, images, setting borders and styles, the shape control, the line control, working with multiple controls and their properties, designing the user interface, keyboard access, tab controls, default & cancel property, coding for controls.

Operations: Data types, constants, named & intrinsic, declaring variables, scope of variables, val function, arithmetic operations, formatting data.

Unit - 2   **15 Hours**

Decision Making: If statement, comparing strings, compound conditions (and, or, not), nested if statements, case structure, using if statements with option buttons & check boxes, displaying message in message box, testing whether input is valid or not.

Modular programming: Menus, sub-procedures and sub-functions defining / creating and modifying a menu, using common dialog box, creating a new sub-procedure, passing variables to procedures, passing argument by value or by reference, writing a function/ procedure.

Unit - 3   **15 Hours**

Forms Handling: Multiple forms creating, adding, removing forms in project, hide, show method, load, unload statement, me keyword, referring to objects on a different forms

Iteration Handling: Do/loops, for/next loops, using msgbox function, using string function

Arrays and Grouped Data Control: Arrays - 1-dimension arrays, initializing an array using for each, user-defined data types, accessing information with user-defined data types, using list boxes with array, two dimensional arrays.

Unit - 4   **15 Hours**

lists, loops and printing list boxes & combo boxes, filling the list using property window / additem method, clear method, list box properties, removing an item from a list, list box/ combo box operations.

Database Connectivity: Database connectivity of forms with back end tool like mysql, populating the data in text boxes, list boxes etc. searching of data in database using forms. Updating/ editing of data based on a criterion.

Reference Books:
1. Reference: Programming in Visual Basic 6.0 by Julia Case Bradley, Anita C. Millispangh (Tata Mcgraw Hill Edition 2000 (Fourteenth Reprint 2004))

DSE 5.2.2.2 (Practical)

Practical:

1. Print a table of numbers from 5 to 15 and their squares and Cubes.

2. Print the largest of three numbers.

3. Find the factional 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. Complete the amount in the account at the end of each year for n years.

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

7. Read n numbers. Count the number of negative numbers, positive numbers and zeroes in the list. use arrays.

8. Read a single dimension array. Find the sum and average of these numbers.

9. Read a two dimension array. Find the sum of two 2D Array.

10. Create a database Employee and Make a form to allow data entry to Employee Form with the following command buttons:

V SEMESTER
DSE 5.2.3: Elective: Artificial Intelligence and Expert Systems
Credit (L : T : P = 4 : 0 : 2)
DSE 5.2.3.1 (Theory)

Unit - 1   **15 Hours**

INTRODUCTION TO AI AND PRODUCTION SYSTEMS: Introduction to AI-Problem formulation, Problem Definition -Production systems, Control strategies, Search strategies. Problem characteristics, Production system characteristics -Specialized production system- Problem solving methods - Problem graphs, Matching, Indexing and Heuristic functions -Hill Climbing-Depth first and Breath first, Constraints satisfaction - Related algorithms, Measure of performance and analysis of search algorithms.

REPRESENTATION OF KNOWLEDGE: Game playing - Knowledge representation, Knowledge representation using Predicate logic,

Unit - 2   **15 Hours**

Introduction to predicate calculus, Resolution, Use of predicate calculus, Knowledge representation using other logic-Structured representation of knowledge.

KNOWLEDGE INFERENCE: Knowledge representation -Production based system, Frame based system. Inference - Backward chaining, Forward chaining, Rule value approach, Fuzzy reasoning - Certainty factors, Bayesian Theory-Bayesian Network-Dempster -Shafer theory.

Unit - 3   **15 Hours**

PLANNING AND MACHINE LEARNING: Basic plan generation systems - Strips -Advanced plan generation systems - Kstrips -Strategic explanations -Why, Why not and how explanations. Learning- Machine learning, adaptive Learning.

Unit - 4   **15 Hours**

EXPERT SYSTEMS: Expert systems - Architecture of expert systems, Roles of expert systems -Knowledge Acquisition –Meta knowledge, Heuristics. Typical expert systems - MYCIN, DART, XOON, Expert systems shells.

Reference Books:
1. Kevin Night, Elaine Rich, Nair B., "Artificial Intelligence (SIE)",McGraw Hill- 2008. (Unit-1,2,4,5)
2. Dan W. Patterson, "Introduction to AI and ES", Pearson Education, 2007. (Unit-III)
3. Peter Jackson, "Introduction to Expert Systems", 3rd Edition, Pearson Education, 2007.
4. Stuart Russel, Peter Norvig "AI – A Modern Approach", 2nd Edition, Pearson Education 2007.

DSE 5.2.3.2 (Practical)

1. Implement Breadth First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)

2. Implement Depth First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)

3. Implement Best First Search (for 8 puzzle problem or Water Jug problem or any AI search problem)

4. Implement Single Player Game (Using Heuristic Function)

5. Implement Two Player Game (Using Heuristic Function)

6. Implement A* Algorithm

7. Implement Propositional calculus related problem

8. Implement First order propositional calculus related problem

9. Implement Certainty Factor problem

10. Implement Syntax Checking of English sentences-English Grammar

11. Develop an Expert system for Medical diagnosis.

12. Develop any Rule based system for an application of your choice.

V SEMESTER

DSE 5.3.1: Cloud Computing
Credit (L : T : P = 4 : 0 : 2)
DSE 5.3.1.1 (Theory)

Unit - 1   **15 Hours**

Cloud Introduction: Cloud Computing Fundamentals: Cloud Computing definition, Types of cloud, Cloud services: Benefits and challenges of cloud computing, Evolution of Cloud Computing , usage scenarios and Applications , Business models around Cloud– Major Players in Cloud Computing - Issues in Cloud - Eucalyptus - Nimbus - Open Nebula, CloudSim.

Cloud Services And File System: Types of Cloud services: Software as a Service - Platform as a Service – Infrastructure as a Service - Database as a Service - Monitoring as a Service –Communication as services.

Unit - 2   **15 Hours**

Service providers- Google App Engine, Amazon EC2, Microsoft Azure, Sales force.

Collaborating With Cloud: Collaborating on Calendars, Schedules and Task Management – Collaborating on Event Management, Contact Management, Project Management –Collaborating on Word Processing , Databases – Storing and Sharing Files- Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services – Collaborating via Social Networks – Collaborating via Blogs and Wikis.

Unit - 3   **15 Hours**

Virtualization For Cloud: Need for Virtualization – Pros and cons of Virtualization – Types of Virtualization – System Vm, Process VM, Virtual Machine monitor – Virtual machine properties - Interpretation and binary translation, HLL VM - Hypervisors – Xen, KVM , VMWare, Virtual Box, Hyper-V.

Unit - 4   **15 Hours**

Security, Standards, And Applications: Security in Clouds: Cloud security challenges – Software as a Service Security, Common Standards: The Open Cloud Consortium – The Distributed management Task Force – Standards for application Developers – Standards for Messaging – Standards for Security, End user access to cloud computing, Mobile Internet devices and the cloud.

Reference Books:
1. Bloor R., Kanfman M., Halper F. Judith Hurwitz "Cloud Computing " Wiley India Edition,2010
2. John Rittinghouse & James Ransome, "Cloud Computing Implementation Management and Strategy", CRC Press, 2010
3. Antohy T Velte ,Cloud Computing : "A Practical Approach", McGraw Hill,2009
4. Michael Miller, Cloud Computing: "Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008.
5. James E Smith, Ravi Nair, "Virtual Machines", Morgan Kaufmann Publishers, 2006.

Online Reading/Supporting Material
1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing", Applications and Data Centers in the Cloud with SLAs, Emereo Pty Limited, July 2008
2. webpages.iust.ac.ir/hsalimi/.../89.../Cloud%20Common%20standards.pptop ennebula.org,
3. www.cloudbus.org/cloudsim/, http://www.eucalyptus.com/
4. hadoop.apache.org
5. http://hadoop.apache.org/docs/stable/hdfs_design.html
6.http://static.googleusercontent.com/external_content/untrusted_dlcp/research.google.com/en//archive /mapreduce-osdi04.pdf

DSE 5.3.1.2 (Practical)

Software Lab based on Cloud Computing:

1. Create virtual machines that access different programs on same platform.

2. Create virtual machines that access different programs on different platforms.

3. Exploring Google cloud for the following

   a) Storage
   b) Sharing of data
   c) Manage your calendar, to-do lists,
   d) A document editing tool

4. Exploring Open source cloud (Any two)

V SEMESTER
DSE 5.3.2: Elective: Enterprise Resource Planning
Credit (L : T : P = 4 : 0 : 2)
DSE 5.3.2.1 (Theory)

Unit - 1 **15 Hours**

Introduction To ERP, Evolution of ERP, What is ERP? Reasons for the growth of ERP, Scenario and Justification of ERP in India, Evaluation of ERP, Various Modules of ERP, Advantage of ERP and Disdvantage of ERP.

Unit - 2 **15 Hours**

An overview of Enterprise, Integrated Management Information, Business Modeling, ERP for Small Business, ERP for make to order companies, Business Process Mapping for ERP Module Design, Hardware Environment and its Selection for ERP Implementation.

Unit - 3 **15 Hours**

ERP and Related Technologies, Business Process Reengineering (BPR), Management Information System (MIS), Executive Information System (EIS), Decision support System (DSS), Supply Chain Management (SCM) (With Example)

Unit - 4 **15 Hours**

ERP Modules, Introduction to Finance, Plant Maintenance, Quality Management, Materials Management, ERP Market, Introduction, SAP AG, Baan Company, Oracle Corporation, People Soft, JD Edwards World Solutions Company, System Software Associates.

Reference Books:
1. C.S. V Murthy Enterprise Resource Planning
2. R.G. Saha – Enterprise Resource Planning - HPH
3. Alexis Leon, Leon Publishers: Enterprise Resource Planning
4. Ravi Anupindi, Sunil Chopra, Pearson Education". "Managing Business Process Flows
5. Altekar, PHI. Enterprise Resource Planning
6. Srivatsava, I.K. International Publishers, Enterprise Resource Planning
7. P. Diwan Vinod Kumar Garg and N.K. Venkitakrishnan, PHI. Enterprise Resource Planning
8. Introduction to SAP, an Overview of SD: MM, PP, FI/CO Modules of SAP. 10. Zaveri Jyotindra Enterprise Resource Planning

DSE 5.3.2.2 (Practical)
Students should be Prepare ERP Solution Report for his / her Case Study under the supervision of Teacher/ Lecturer

V SEMESTER
DSE 5.3.3: Elective: Data Mining and Data Warehousing
Credit (L : T : P = 4 : 0 : 2)
DSE 5.3.3.1 (Theory)

Unit - 1   **15 Hours**

Data Warehousing: Introduction- Definition and description need for data ware housing, need `for strategic information, failures of past decision support systems, OLTP vs DWH-DWH requirements-trends in DWH-Application of DWH.

Data Warehousing Architecture: Reference architecture- Components of reference architecture - Data warehouse building blocks, implementation, physical design process and DWH deployment process.

Unit - 2   **15 Hours**

A Multidimensional Data, Model Data Warehouse Architecture.

Data Mining: Data mining tasks-Data mining vs KDD- Issues in data mining, Data Mining metrics, Data mining architecture - Data cleaning- Data transformation- Data reduction - Data mining primitives.

Unit - 3   **15 Hours**

Association Rule Mining: Introduction - Mining single dimensional Boolean association rules from transactional databases - Mining multi-dimensional association rules.

Classification and Prediction: Classification Techniques - Issues regarding classification and prediction - decision tree - Bayesian classification –Classifier accuracy.

Unit - 4   **15 Hours**

Clustering: Clustering Methods - Outlier analysis.

Applications and Other Data Mining Methods: Distributed and parallel Data Mining Algorithms, Text mining- Web mining.

Reference Books:
1.   Jiawei Han and Micheline Kamber, ” Data Mining Concepts and Techniques”, Morgan Kaufmann Publishers, USA, 2006.
2.   Berson,”DataWarehousing, Data Mining and OLAP”, Tata McGraw Hill Ltd, New Delhi, 2004.
3.   Pang-Ning Tan, Michael Steinbach, Vipin Kumar, Introduction to Data Mining, , Pearson Education.
4.   Arun K Pujari,”Data mining techniques”, Oxford University Press, London, 2003.
5.   Dunham M H,”Data mining: Introductory and Advanced Topics”. Pearson Education, New Delhi, 2003.
6.   Mehmed Kantardzic,” Data Mining Concepts, Methods and Algorithms”, John Wiley and Sons, USA, 2003.
7.   Soman K. P., DiwakarShyam, Ajay V., Insight into Data mining: Theory and Practice, PHI 2006

DSE 5.3.3.2 (Practical)

Software Lab based on Data Mining:

Practical List: Practical are to be done using Weka, and a report prepared as per the format*.

The operations are to be performed on built-in dummy data sets of weka and/or the downloadable datasets mentioned in references below. Also wherever applicable, the parameter values are to be varied (upto 3 distinct values). The 'Visualize' tab is to be explored with each operation.

1.   Preprocessing: Apply the following filters –
     a.   weka>filter>supervised>attributed>
           AddClassification , AttributeSelection, Discretize , NominalToBinary
     b.   weka>filter>supervised>instance:
           StratifiedRemoveFolds, Resample
     c.   weka>filter>unsupervised>attribute>
           Add, AddExpression, AddNoise , Center , Discretize , MathExpression ,
           MergeTwoValues , NominalToBinary , NominalToString, Normalize
           NumericToBinary , NumericToNominal , NumericTransform , PrincipalComponent,
           RandomSubset , Remove , RemoveType , ReplaceMissingValues , Standardize
     d.   weka>filter>unsupervised>instance>
           Normalize , Randomize , Standardize, RemoveFrequentValues, RemoveWithValues ,
           Resample , SubsetByExpression
2.   Explore the 'select attribute' as follows
           weka>attributeSelection> , FilteredSubsetEval , WrapperSubsetEval
3.   Association mining
     weka>associations> , Apriori, FPGrowth
4.   Classification**
     weka>classifiers>bayes> , NaïveBayes , weka>classifiers>lazy> : IB1 , IBk
     weka>classifiers>trees , SimpleCart , RandomTree , ID3
5.   Clustering**
     weka>clusters> , SimpleKMeans , FarthestFirst algorithm, DBSCAN, hierarchicalClusterer

VI SEMESTER

SEC 6.3.1: PHP Programming
Credit (L : T : P = 3 : 0 : 1)

SEC 6.3.1.1: (Theory)

Unit - 1   **15 Hours**

Introduction Basic PHP Development Control Structure: Introduction to www, History, Understanding client/server roles Apache, PHP, MySQL, XAMPP Installation PHP Basic syntax, PHP data Types, PHP Variables PHP Constants, PHP Expressions, PHP Operators Control Structures & Loop

Unit - 2   **15 Hours**

Working With the File System Working With Regular Expressions, Opening a File, Reading from a File, Writing to a File, File Locking, Uploading Files via an HTML Form, Getting File Information, Directory Functions, Getting a Directory Listing, The basic regular expressions, Matching patterns, Finding matches, Replace patterns

WORKING WITH FORMS: PHP Form handling, PHP GET/POST, PHP Form Validation, Accessing user input, Combine HTML and PHP code Using hidden fields, Redirecting the user, File upload

Unit - 3   **15 Hours**

CLASSES AND OBJECTS: Object oriented concepts, Define a class, attributes, Object, Object properties, methods, constructors and destructors, Class constants, Static method, Class inheritance, Abstract classes, Final keyword, Implementing Interface, Object serialization

INTRODUCTION TO DATABASE: What is RDBMS technology?, Introduction to SQL, Connecting to the MYSQL, Selecting a database, Adding data to a table, Displaying returned data on Web pages ,Finding the number of row, Inserting, Deleting , Entering and updating data, Executing multiple queries, Understanding Primary and Foreign Key, Understanding Database Normalization, Dealing with Dates and Times

Reference Books:

1. Complete Beginner's Guide to PHP: Programming & Web Development by Cedric Palmer (22 February 2014

2. PHP and MySQL Web Development by Laura Thomson and Luke Welling

3. PHP Reference: Beginner to Intermediate PHP5 by Mario Lurig

4. PHP 4: A Beginner's Guide by William Mccarty

SEC 6.1.2: Elective: (Practical)

Students should do Mini Project Using PHP under the supervision of Teacher/ Lecturer

V SEMESTER
SEC 6.2:   Elective: Computer Simulations
Credit (L : T : P = 3 : 1 : 0)

SEC 6.2.1: (Theory)

Unit - 1   **15 Hours**

INTRODUCTION: Concept of simulation – simulation as a decision making tool-Monte Carlo simulation.

RANDOM NUMBERS/VARIATES: Pseudo random numbers – methods of generating random variates – random variates for uniform, normal, binominal, passion, exponential distributions.

Unit - 2   **15 Hours**

DESIGN OF SIMULATION EXPERIMENTS: Problem formulation – data collection and reduction – logic developments – initial conditions – run length, tabular method of simulation – development of models using higher level languages for systems like queuing, production, inventory and maintenance – output analysis and interpretation, validation.

Unit - 3   **15 Hours**

DISCRETE SYSTEM SIMULATION LANGUAGES: Need for simulation language – Comparison of simulation languages: SIMCRIPT, GASP, SIMULA, GPSS, PROMODEL, etc…

CASE STUDIES USING SIMULATION LANGUAGES: Development of simulation models using the simulation language studies for systems for systems like, queuing systems, production systems, inventory systems, maintenance and replacement systems, investment analysis and network.

Reference Books:
1. Jerry Banks and John S.Carson, Barry L Nelson, David M.Nicol, P.Shahabudeen "Discrete event system simulation"' Pearson, 2007.
2. Thomas J.Schriber, "Simulation using GPSS", John Wiley, 2002.
    Law A.M. and Kelton W.D "Simulation Modeling and Analysis, McGraw Hill, 2003

SEC 6.3.2.2: Elective: (Practical)

Design lab Cycle based on Computer Simulations (Theory) Paper by Concerned Teacher / Lecturer

V SEMESTER
SEC 6.3.3: Elective: Information Security and Cyber Laws
Credit (L : T : P = 3 : 0 : 1)

SEC 6.3.3.1: (Theory)

Unit - 1 15 Hours

Introduction: Computer network as a threat, hardware vulnerability, software vulnerability, importance of data security.

Digital Crime: Overview of digital crime, criminology of computer crime.

Information Gathering Techniques: Tools of the attacker, information and cyber warfare, scanning and spoofing, password cracking, malicious software, session hijacking

Unit - 2 15 Hours

Risk Analysis and Threat: Risk analysis, process, key principles of conventional computer security, security policies, authentication, data protection, access control,internal vs external threat, security assurance, passwords, authentication, and access control, computer forensics and incident response

Introduction to Cryptography and Applications: Important terms, Threat, Flaw, Vulnerability, Exploit, Attack, Ciphers, Codes, Substitution Cipher (Caeser), Transposition Cipher (Rail-Fence), Public key cryptography (Definitions only), Private key cryptography (Definition and Example), Cyber forensics, Steganography

Safety Tools and Issues: Firewalls, logging and intrusion detection systems, Windows and windows XP / NT security, Unix/Linux security, ethics of hacking and cracking

Unit - 3 15 Hours

Cyber laws to be covered as per IT 2008:

• Chapter 1: Definitions
• Chapter 2: Digital Signature And Electronic Signature
• [Section 43] Penalty and Compensation for damage to computer, computer system, etc.
• [Section 65] Tampering with Computer Source Documents
• [Section 66 A] Punishment for sending offensive messages through communication service, etc.
• [Section 66 B] Punishments for dishonestly receiving stolen computer resource or communication device

- [Section 66C] Punishment for identity theft
- [Section 66D] Punishment for cheating by personation by using computer resource
- [Section 66E] Punishment for violation of privacy
- [Section 66F] Punishment for cyber terrorism
- [Section 67] Punishment for publishing or transmitting obscene material in electronic form
- [Section 67A] Punishment for publishing or transmitting of material containing sexually explicit act, etc. in electronic form[Section 67B] Punishment for publishing or transmitting of material depicting children in sexually explicit act, etc. in electronic form
- [Section 72] Breach of confidentiality and privacy

Reference Books:
1. M. Merkow, J. Breithaupt, Information Security Principles and Practices, Pearson Education.
2. G.R.F. Snyder, T. Pardoe, Network Security, Cengage Learning, 2010
3. A. Basta, W.Halton, Computer Security: Concepts, Issues and Implementation, Cengage Learning India, 2008
4. Anderson, Ross. Security engineering. John Wiley & Sons, 2008. (Freely available online)

SEC 6.3.3.2: Elective: (Practical)

1. Demonstrate the use of Network tools: ping, ipconfig, ifconfig, tracert, arp, netstat, whois
2. Use of Password cracking tools: John the Ripper, Ophcrack. Verify the strength of passwords using these tools.
3. Perform encryption and decryption of Caesar cipher. Write a script for performing these operations.
4. Perform encryption and decryption of a Rail fence cipher. Write a script for performing these operations.
5. Use nmap/zenmap to analyse a remote machine.
6. Use Burp proxy to capture and modify the message.
7. Demonstrate sending of a protected word document.
8. Demonstrate sending of a digitally signed document.
9. Demonstrate sending of a protected worksheet.
10. Demonstrate use of steganography tools.
11. Demonstrate use of gpg utility for signing and encrypting purposes.

VI SEMESTER

DSE 6.4.1: Elective: Operation Research
Credit (L : T : P = 4 : 0 : 1.5)
DSE 6.4.1.1 (Theory)

Unit - 1   **15 Hours**

Linear Programming Problems: Origin and development of operations research, formulation of Linear Programming problem, Graphical solution. Theory of simplex method, Use of artificial variables and their solution.

Unit - 2   **15 Hours**

Transportation Problem: Mathematical formulation of transportation problem, Initial basic Feasible solution, North West corner rule, Matrix minima method, Vogel's approximation method, MODI method to find optimal solution.

Unit - 3   **15 Hours**

Assignment Problem: Mathematical formulation of an Assignment problem, Assignment algorithm, Hungarian Method to solve Assignment Problem.

Unit - 4   **15 Hours**

Network Analysis: Basic components of Network, Rules for drawing Network diagram Time calculation in Networks. Critical Path Method and PROJECT Evaluation and Review Techniques. Algorithm and flow chart for CPM and PERT.

Reference Books:
1.   Taha, "Operations Research", 7 th edition, Pearson Education, 2007.
2.   Billey E. Gillett, "Introduction to Operations Research" , Himalaya Publishing House, Delhi,1979.
3.   Hamady A.Taha "Operations Research" , Collin Mac Millan, 1982

DSE 6.4.1.2 (Practical)

Lab based on Operation Research

1.   LPP
2.   Simplex
3.   Dual Simplex
4.   Big – M
5.   Vogel's
6.   Maxima and Minima
7.   North West corner
8.   Sequencing Problems
9.   Modi Method
10.   Hugarian Method
11.   Assignment Problem

VI SEMESTER

DSE 6.4.2: Elective: System Software & Compiler design
Credit (L : T : P = 4 : 0 : 1.5)
DSE 6.4.2.1 (Theory)

Unit - 1   **15 Hours**

ASSEMBLERS & MACROS: Overview of Language processors – Assemblers: Design of two pass assemblers - single pass assemblers

MACRO: Macro definition- macro call – macro expansion- nested macro advanced

Macro facilities- Design of Microprocessor.

LINKERS & LOADERS: Relocation and linking concepts – Design of linker – self relocating programs – linking in MS-DOS – overlays

DYNAMIC LINKING: Loaders – Absolute loaders- relocating loaders

Unit - 2   **15 Hours**

COMPILERS: GRAMMARS & AUTOMATA - Languages – Grammars – Types of grammars – Context free grammar – regular expression - Recognizing of patterns - finite automation (deterministic & non deterministic) Conversion of NDFA to DFA - Conversion of regular expression of NDFA – Thompson's construction- minimization of NDFA - Derivation - parse tree - ambiguity – Lexical analysis- handles - token specification - design of lexical analysis (LEX) - Automatic generation of lexical analyzer - input buffering – A language for specifying lexical analyzers - implementation of lexical analyzer

SYNTAX ANALYSIS – PARSING: Definition - role of parsers - top down parsing - bottom-up parsing - Left recursion - left factoring - Handle pruning , Shift reduce parsing - operator precedence parsing – FIRST- FOLLOW- LEADING- TRAILING

Unit - 3   **15 Hours**

Predictive parsing – recursive descent parsing. LR parsing – LR (0) items - SLR parsing – Canonical LR – LALR parsing - generation of LALR - Ambiguous grammars - error recovery

SYNTAX DIRECTED TRANSLATION & CODE OPTIMIZATION: Intermediate Languages - prefix - postfix - Quadruple - triple - indirect triples –syntax tree- Evaluation of expression - three-address code- Synthesized attributes – Inherited attributes – Conversion of Assignment statements- Boolean expressions – Backpatching - Declaration - CASE statements

Unit - 4 **15 Hours**

CODE OPTIMIZATION: Local optimization- Loop Optimization techniques – DAG –Dominators- Flow graphs – Storage allocations- Peephole optimization – Issues in Code Generation.

Reference Books:
1. Alfred V Aho , Jeffery D Ullman , Ravi Sethi, " Compilers , Principles techniques and tools ", Pearson Education 2011
2. Dhamdhere D.M., "Systems Programming", Tata McGraw Hill Education Pvt. Ltd., 2011.
3. Srimanta Pal, "Systems Programming", Oxford University Press, 2011.
4. Raghavan V., "Principles of Compiler Design", Tata McGraw Hill Education Pvt. Ltd., 2010.
5. David Galles, "Modern Compiler Design", Pearson Education, Reprint 2012.
6. Dasaradh Ramaiah. K., "Introduction to Automata and Compiler Design", PHI, 2011.

DSE 6.4.2.2 (Practical)

1. Implementation of a text editor

2. Implementation of an Assembler

3. Implementation of Macro processor

4. Converting a regular expression to NFA

5. Conversion of an NFA to DFA

6. Computation of FIRST and FOLLOW sets

    131 CS-Engg&Tech-SRM-2013

7. Computation of Leading and Trailing Sets

8. Construction of Predictive Parsing Table

9. Implementation of Shift Reduce Parsing

10. Computation of LR(0) items

11. Construction of DAG

12. Intermediate code generation

VI SEMESTER

DSE 6.4.3: Elective: Digital Image Processing
Credit (L : T : P = 4 : 0 : 1.5)
DSE 6.4.3.1 (Theory)

Unit - 1   **15 Hours**

DIGITAL IMAGE FUNDAMENTALS   Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, mach band effect, Color image fundamentals - RGB, HSI models, Image sampling, Quantization, dither, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD.

IMAGE ENHANCEMENT: Histogram equalization and specification techniques, Noise distributions, Spatial averaging,

Unit - 2   **15 Hours**

Directional Smoothing, Median, Geometric mean, Harmonic mean, Contra harmonic mean filters, Homomorphism filtering, Color image enhancement.

IMAGE RESTORATION: Image Restoration - degradation model, Unconstrained restoration - Lagrange multiplier and Constrained restoration, Inverse filtering-removal of blur caused by uniform linear motion, Wiener filtering,

Unit - 3   **15 Hours**

Geometric transformations-spatial transformations.

IMAGE SEGMENTATION: Edge detection, Edge linking via Hough transform – Thresholding - Region based segmentation – Region growing – Region splitting and Merging – Segmentation by morphological watersheds – basic concepts – Dam construction   – Watershed segmentation algorithm.

Unit - 4   **15 Hours**

IMAGE COMPRESSION: Need for data compression, Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG.

Reference Books:
1.   Rafael C. Gonzalez, Richard E. Woods, , Digital Image Processing', Pearson, Second Edition, 2004.
2.   Anil K. Jain, , Fundamentals of Digital Image Processing', Pearson 2002.

DSE 6.4.3.2 (Practical)

Lab 1:   Write a program for image enhancement

Lab2:   Write a program for image compression

Lab3:   Write a program for color image processing

Lab4:   Write a program for image segmentation

Lab 5:   Write a program for image morphology

Lab 6:   Image Restoration

Lab 7:   Edge detection

Lab 8:   Blurring 8 bit color versus monochrome

VI SEMESTER

DSE 6.5.1: Elective: Dissertation / Project
Credit (L : T : P = 0 : 0 : 6) 12 Hours/Week

- This option is to be offered only in 6th Semester.

- The students will be allowed to work on any project based on the concepts studied in

  Core/elective or skill based elective courses.

- The group size should be maximum of TWO (02) students.

- Each group will be assigned a teacher as a supervisor who will handle both their theory as Well as lab classes.

- A maximum of Four (04) projects would be assigned to one teacher.

Question Paper Pattern
Theory (3 or 4 Credits)

Time: 3 Hours   Max. Marks: 70

Part – A

I.   **Answer any Eleven Question out of given Twelve Questions.**   **11 X 2 = 22**

1.
2.
3.
4.
5.
6.
7.
8.
9.
10.
11.
12.

Note: Three Questions each from the Units 1, 2, 3, and 4

Part - B

II.   **Answer any Two Sub Questions from each main Question.**

13. A)   **2 X 6 = 12**
    B)
    C)
14. A)   **2 X 6 = 12**
    B)
    C)
15. A)   **2 X 6 = 12**
    B)
    C)
16. A)   **2 X 6 = 12**
    B)
    C)

Note: Each Main questions contains 3 sub questions carries 06 Marks (may have internal Split-ups) and from Units 1, 2, 3 and 4 respectively

Question Paper Pattern

Theory (1 or 2 Credits)

Time: 2 Hours Max. Marks: 50

Part – A

I. **Answer all Questions.** **05 X 02 = 10**

1.
2.
3.
4.
5.

Part - B

II. **Answer any Four Questions out of given Five Questions.** **4 X 10 = 40**

6.
7.
8.
9.
10.

Note: Each Main questions contains 3 sub questions carries 06 Marks (may have internal Split-ups) and from Units 1, 2, 3 and 4 respectively

Question Paper Pattern

Practical / Project (1 or 1.5 or 2 Credits)

Time: 3 Hours   Max. Marks: 70

Practical's

1. Two Experiments/ Programs 20 Marks Each   2 x 20 = 40 Marks

    a. Write-ups 10 Marks

    b. Conducting & Results 10 Marks (Any One for 2 Hours of Practical's)

2. Viva – Voice   10 Marks

3. Record   10 Marks

Project

1. Project Presentation   10% Marks

2. Project Demo   20% Marks

3. Viva – Voice   20% Marks

4. Record / Report   20% Marks

5. IA (C1 & C2)   30% Marks