

# **BTECH CSE 3<sup>rd</sup> SEM**

## Mathematics - III

ACAM - 16302

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

**Objectives:** To teach computer based Engineering Mathematics to students. After this course the student will be able to solve complex computer-oriented problems.

### Course Outcomes:

|            |  |
|------------|--|
| <b>CO1</b> | To enable the students to use the concept of Fourier Series and different wave forms.  |
| <b>CO2</b> | Know about Laplace transform and its properties: use of Laplace transform of various standard functions. To enable the students to learn the formation of partial differential equations.                                    |
| <b>CO3</b> | To enable the students how to solve linear system of equations using gauss elimination, Jordan and seidel. Enable the students to learn the properties of Linear Transformation & how to find eigen values and eigen vectors |
| <b>CO4</b> | Apply Numerical Methods to find the solution of equation using different methods like euler method, modified Euler Method, RK Methods.   |
| <b>CO5</b> | To understand how to find probability using Binomial, Poisson, Normal Distribution, how to find mean and variance, knowledge about discrete and continuous random variables.   |
| <b>CO6</b> | Introduction to sampling, Hypothesis, error, level of significance, General awareness of testing of hypothesis using t , f and chi square test.  |

### Part-I

Fourier series: Periodic Functions, Euler's Formula. Even and odd Functions, Half range expansions.

Laplace transformations: Laplace transforms of various standard functions, properties of Laplace transform.

### Part -II

Partial Differential Equations: Formation of Partial Differential Equations, Homogeneous Partial Differential Equations with constant coefficients. Classification of partial differential equations

Linear Systems and Eigen- Values: Gauss - elimination method, gauss- Jordan method, Gauss- Seidel iteration method, Rayleigh's Power method for Eigen values and Eigenvectors.

### Part - III

Differential Equations: Solutions of Initial values problems using Eulers, modified Euler's method and Runge- kutta (upto fourth order) methods.

Probability distribution: Binomial, Poisson and Normal distribution

### Part - IV

Sampling Distribution & testing of Hypothesis: Sampling, Distribution of means and variance, Chi-Square distribution, t-distribution, F- distribution. General concepts of hypothesis, Testing a statistical Hypothesis, One and two tailed tests. Single

and two sample tests on proportion, mean and variance.

**References :**

1. E. Kreyszig, "Advanced Engineering Mathematics", 5th Edition, Wiley Eastern 1985.
2. P. E. Danko, A. G. Popov, T. Y. A. Kaznevnikova, "Higher Mathematics in Problems and Exercise", Part 2, Mir Publishers, 1983.
3. Bali, N. P., "A Text Book on Engineering Mathematics", Luxmi Pub., New Delhi.
4. Peter V.O'Neil, "Advanced Engineering Mathematics", Cengage Learning

## Digital Circuit and Logic Design

ACEC - 16302

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

**Objectives:** Demonstrate the operation of simple digital gates, identify the symbols, develop the truth table for those gates; combine simple gates into more complex circuits; change binary, hexadecimal, octal numbers to their decimal equivalent and vice versa, demonstrate the operation of a flip-flop. Design counters and clear the concept of shift registers. Study different types of memories and their applications. Convert digital signal into analog signal and vice versa.

### Course Outcomes:

|     |   |
|-----|---|
| CO1 | To be well versed with various number systems, conversions, associated algebra and various digital codes.   |
| CO2 | To have understanding of various logic gates along with knowledge of boolean minimization techniques, K - map and Q - method.   |
| CO3 | To be able to design combinational circuits such as adder, subtractor, encoder, decoder, multiplexer, demultiplexer, comparators, code converters and parity checker. |
| CO4 | Knowledge of clocked flip flops, SR, JK, D, T and edge triggered flip flops.  |
| CO5 | To be able to design sequential circuits such as shift registers, counters etc. using various flip flops.   |
| CO6 | To understand various types of A / D and D / A converters and logic families such as RTL, DCTL, DTL, TTL, ECL, CMOS and their characteristics.                        |

### Part-I

**Number System and Binary Code:** Introduction, Binary, Octal and Hexadecimal Number System (Conversion, Addition & Subtractions). Signed and unsigned numbers, Binary Subtractions using 1's and 2's compliment, ASCII code, Excess 3 code, Grey code, BCD code and BCD additions.

### Part-II

**Minimization of logic function:** OR, AND, NOT, NOR, NAND, EX-OR, EX-NOR, Basic theorem of Boolean Algebra, Sum of Products and Product of Sums, canonical form, Minimization using K-map and Q-M method.

### Part-III

**Combinational Circuits:** Introduction, Combinational circuit design, Encoders, decoders, Adders, Sub tractors and Code converters. Parity checker, seven segment display, Magnitude comparators. Multiplexers, De-multiplexer, Implementation of Combinational circuit using MUX.

**Sequential Circuits:** Introduction, flip flops, Clocked flip flops, SR, JK, D, T and edge triggered flip flops. Excitation tables of Flip flops. Shift Registers, Type of Shift Registers, Counter, Counter types, counter design with state equation and state diagrams.

### Part-IV

**D/A and A/D Converters:** Introduction, Weighted register D/A converter, binary ladder D/A converter, steady state accuracy test, D/A accuracy and resolution, parallel A/D converter, Counter type A/D converter Successive approximation A/D converter. Single and dual slope A/D converter, A/D accuracy and resolution.

**Logic Families:** RTL, DCTL, DTL, TTL, ECL, CMOS and its various types, Comparison of logic families.

**References:**

1. Morris Mano, Digital Design, Prentice Hall of India Pvt. Ltd
2. Donald P. Leach and Albert Paul Malvino, Digital Principles and Applications, 5 ed., Tata McGraw Hill Publishing Company Limited, New Delhi, 2003.
3. R.P. Jain, Modern Digital Electronics, 3 ed., Tata McGraw–Hill publishing company limited, New Delhi, 2003.
4. Thomas L. Floyd, Digital Fundamentals, Pearson Education, Inc, New Delhi, 2003

## Data Structures

ACCS – 16301

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

**Objectives:** This course should provide the students with a fairly good concept of the fundamentals of different types of data structures and also the ways to implement them. Algorithm for solving problems like sorting, searching, insertion & deletion of data etc. related to data structures should also be discussed. After completion of this subject student should be able to choose an appropriate data structure for a particular problem.

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | Understand the concept of Dynamic memory management, data types, algorithms, Big O notation.   |
| CO2 | Implementation of Data Structure like Arrays, Linked List, Stacks, Queues, Graphs.             |
| CO3 | Develop the logic for problem solution identification with algorithms.                         |
| CO4 | Describe the hash function and concepts of collision and its resolution methods.               |
| CO5 | Apply Algorithm for solving problems like sorting, searching, insertion and deletion of data.  |
| CO6 | Implementation and analysis of algorithms with consideration to their respective complexities. |

### Part - I

**Introduction:** Concept of data type, definition and brief description of various data structures, data structures versus data types, operations on data structures, algorithm complexity, Asymptotic notations.

### Part - II

**Arrays & Linked List:** Linear and multi-dimensional arrays and their representation, operations on arrays, sparse matrices and their storage. Linear linked list, operations on linear linked list, header and circular linked list, doubly linked list, operations on doubly linked list, applications of linked lists, Comparing arrays with linked lists, advantages and disadvantages of linked lists

**Stacks & Queues:** Sequential and linked representations, operations on stacks, application of stacks such as parenthesis checker, evaluation of postfix expressions, conversion from infix to postfix representation, implementing recursive functions. Sequential representation of queue, linear queue, circular queue, operations on linear and circular queue, linked representation of a queue and operations on it, deque, priority queue, applications of queues.

### Part – III

**Trees:** Basic terminology, sequential and linked representations of trees, traversing a binary tree using recursive and non-recursive procedures, inserting a node, deleting a node, brief introduction to binary search trees with its operations like searching, insertion, deletion. AVL trees and B-trees, insertion and deletion in a heap.

**Graphs:** Basic terminology, representation of graphs (adjacency matrix, adjacency list), traversal of a graph (breadth-first search and depth-first search), Warshall's algorithm and applications of graphs.

## Part - IV

**Hashing & Hash Tables:** Introduction to hashing, hash functions, concept of collision and its resolution using open addressing and separate chaining, double hashing, rehashing.

**Searching & Sorting:** Searching an element using linear search and binary search techniques, Sorting arrays using bubble sort, selection sort, insertion sort, quick sort, merge sort, heap sort, shell sort and radix sort, complexities of searching & sorting algorithms.

### References :

1. Sartaj Sahni, **Data Structures, Algorithms and Applications in C++**, Tata McGraw Hill.
2. Tenenbaum, Augenstein, & Langsam, **Data Structures using C and C++**, Prentice Hall of India.
3. R. S. Salaria, **Data Structures & Algorithms Using C++**, Khanna Book Publishing Co. (P) Ltd.
4. Seymour Lipschutz, **Data Structures**, Schaum's Outline Series, Tata McGraw Hill

## Object Oriented Programming using C++

ACCS - 16302

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

**Objectives:** To understand the basic concepts of object oriented programming languages and to learn the techniques of software development in C++.

### Course Outcomes:

|            |   |
|------------|---|
| <b>CO1</b> | Understand the concepts of structures and classes and differentiate between them and to design and develop programs with classes.         |
| <b>CO2</b> | Understand the principles of the object-oriented programming paradigm specifically including abstraction, encapsulation and polymorphism. |
| <b>CO3</b> | Reuse the code using concept of inheritance.  |
| <b>CO4</b> | Implement the concept of generic programming using class and function templates.  |
| <b>CO5</b> | Implement the concept of file handling to store the contents of a program into the secondary storage.                                     |
| <b>CO6</b> | Clarify the logic for developing a program and to be able to discuss different data structures to represent real world problems.          |

### Part - I

**Introduction , Basic terminologies & Control structure:** Introduction, comparison between procedural programming paradigm and object-oriented programming paradigm, Application areas, Different compilers. Basic concepts of object-oriented programming concepts of an object and a class, interface and implementation of a class, operations on objects, relationship among objects, abstraction, encapsulation, data hiding, inheritance, overloading, polymorphism, messaging. Tokens- keywords, identifier, constant, operators, special characters and strings, control statements- conditional, loop, branch, data types- basic, user, & derived, manipulators, Concept of streams, input/output using overloaded operators >> and << and members functions of i/o stream classes, formatting output.

### Part -II

**Function, Array & Structure:** Types of functions-user & pre (standard) defined, Advantages and disadvantages of using functions, Types of calling, inline function, difference between inline and macros, default valued function, function overloading, array definition and types, uses, advantages and disadvantages of using array, passing an array to a function. Defining structure, role of structure, self referential structure, bit level field

**Pointers and dynamic memory management:** Declaring and initializing pointers, accessing data through pointers, pointer arithmetic, memory allocation (static and dynamic), dynamic memory management using new and delete operators, pointer to an object, void pointer, pointer related problems - dangling/wild pointers, null pointer assignment, memory leak and allocation failures.



### **Part - III**

**Classes and Constructors :** Specifying a class, creating class objects, accessing class members, access specifiers, static data members and member functions, use of const keyword, friends of a class, friend with multiple classes, empty class, nested classes, container classes, difference between class and structure. Definition of constructor , characteristics, Need for constructors and destructors, Types of constructor- default, parameterized, default valued, copy constructor ,constructor overloading, dynamic constructors, explicit constructor calling and implicit constructor calling, destructors.

**Inheritance:** Introduction, defining derived classes, forms of inheritance, types of derivation, virtual base class, abstract class, object slicing, ambiguity, overriding member functions, order of execution of constructors and destructors.

**Polymorphism:** Concept of binding - early binding and late binding, Operator overloading, rules for operator overloading, type conversions-(user defined to pre-defined, user to user defined, pre to user defined and pre to pre-defined) , virtual functions, pure virtual functions, abstract class, virtual destructors.

### **Part - IV**

**Templates and Generic Programming & File Handling:** Template concepts, Function templates, class templates, illustrative examples. File streams, hierarchy of file stream classes, error handling during file operations, reading/writing of files, accessing records randomly, updating files.

#### **References**

1. Lafore R., Object Oriented Programming in C++, Waite Group.
2. E. Balagurusamy, Object Oriented Programming with C++, Tata McGraw Hill.
3. R. S. Salaria, Mastering Object-Oriented Programming with C++, Salaria Publishing House.
4. Bjarne Stroustrup, The C++ Programming Language, Addison Wesley.

## Computer Organization and Assembly Language Programming (COALP)

ACCS - 16303

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

**Objectives:** This course offers a good understanding of the various functional units of a computer system and prepares the student to be in a position to design a basic computer system

### Course Outcomes:

|            |  |
|------------|--|
| <b>CO1</b> | <b>Understand the organization of basic computer, its design and the design of control unit.</b>                             |
| <b>CO2</b> | Understand the bus structure and the various micro-operations.   |
| <b>CO3</b> | Demonstrate the working of central processing unit and RISC and CISC Architecture.   |
| <b>CO4</b> | Analyze instruction formats and general register organization.   |
| <b>CO5</b> | Understand the organization of memory and memory hardware.   |
| <b>CO6</b> | Elaborate advanced concepts of computer architecture, Parallel Processing, inter-processor communication and synchronization |

### Part - I

**Register Transfer and Microoperations:** Register transfer language & operations, Bus and Memory Transfer, arithmetic microoperations, logic microoperations, shift microoperations, arithmetic logic shift unit.

### Part – II

**Basic Computer Organisation and Design:** Registers ,Buses , Instruction Formats, Instruction Set , Instruction Cycle, Timing and control ,Input/ Output and Interrupt with respect to 8085. Instruction codes, Computer Instructions, Control memory, design of control unit – microprogrammed, hardwired, and their comparative study.

### Part – III

**Central Processing Unit:** Stack Organisation, Addressing Modes, Program control with respect to 8085 ,RISC and CISC architecture. Input-Output Organisation: Peripheral devices, I/O Interface, asynchronous data transfer, modes of transfer, priority interrupt, DMA ,Architectures 8237A, I/O processor, serial communication

### Part – IV

**Memory Organisation & Advanced concepts of Computer Architecture:** Associative memory, cache memory, Virtual memory. Concept of pipeline , Arithmetic and instruction Pipeline

### References :

1. M. Moris Mano, Computer System Architecture, Pearson Education.
2. William Stallings, Computer Organization and Architecture, Pearson Education.
3. David A Patterson, Computer Architecture, Pearson Education.
4. P. Pal Choudhri, Computer Organization and Design, PHI.

## Digital Circuit and Logic Design Lab

ACEC-16305

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | To have practical understanding of logic gates IC's their input and output pins and logic levels.  |
| CO2 | To be able to implement combinational logic circuits such as half / full adders and subtractors.   |
| CO3 | To practically design the various combinational circuits such as comparators, encoders, code convertors (binary to gray, gray to binary etc.) using logic gate IC's. |
| CO4 | To verify practically the truth table and working schematic of various sequential circuits such as RS, JK, D, T, JK master - slave flip flops.                       |
| CO5 | To implement sequential circuits such as counters using discrete logic.  |
| CO6 | To verify theoretical details with practical observations.   |

### PART-A

1. Study of Logic Gates: Truth-table verification of OR, AND, NOT, XOR, NAND and NOR gates.
2. Realization Half Adder / Full Adder , Half Subtractor / Full Subtractor using Logic gates.
3. Design 4-Bit Binary-to-Gray & Gray-to-Binary Code Converter.
4. Multiplexer: Truth-table verification and realization of Half adder and Full adder using MUX.
5. Flip Flops: Truth-table verification of RS, JK , D, JK Master Slave Flip Flops.

### PART - B

Do any Five live projects from the list below:

- I. Musical Bell
- II. IR Remote Tester
- III. sStatic Electricity Detector
- IV. Ticking Bomb
- V. The Fading LED
- VI. Light Activated LED
- VII. Dark activated LED
- VIII. LED Dimmer
- IX. Single Chip Electronic Dice
- X. Manual counter

## Data Structures Lab

ACCS – 16304

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Implement basic data structures such as arrays and linked list.  |
| CO2 | Programs to demonstrate fundamental algorithmic problems including Tree Traversals, Graph traversals, and shortest paths.                      |
| CO3 | Implement various searching and sorting algorithms.  |
| CO4 | To verify practically the truth table and working schematic of various sequential circuits such as RS, JK, D, T, JK master - slave flip flops. |
| CO5 | Programs to demonstrate the implementation of various operations on stack and queue data structure.  |
| CO6 | Implementation and analysis of algorithms with consideration to their respective complexities.   |

### Part- A

1. Write a menu driven program that implement following operations (using separate functions) on a linear array:

- Insert a new element at end as well as at a given position
- Delete an element from a given whose value is given or whose position is given
- To find the location of a given element
- To display the elements of the linear array

2. Write a menu driven program that maintains a linear linked list whose elements are stored in on ascending order and implements the following operations (using separate functions):

- Insert a new element
- Delete an existing element
- Search an element
- Display all the elements

3. Write a program to demonstrate the use of stack (implemented using linear array) in converting arithmetic expression from infix notation to postfix notation.

4. Program to demonstrate the use of stack (implemented using linear linked lists) in evaluating arithmetic expression in postfix notation.

5. Program to demonstration the implementation of various operations on a linear queue represented using a linear array.

6. Program to demonstration the implementation of various operations on a circular queue represented using a linear array.

7. Program to demonstration the implementation of various operations on a queue represented using a linear linked list (linked queue).

8. Program to illustrate the implementation of different operations on a binary search tree.

9. Program to illustrate the traversal of graph using breadth-first search.

10. Program to illustrate the traversal of graph using depth-first search.
11. Program to sort an array of integers in ascending order using bubble sort.
12. Program to sort an array of integers in ascending order using selection sort.
13. Program to sort an array of integers in ascending order using insertion sort.
14. Program to sort an array of integers in ascending order using radix sort.
15. Program to sort an array of integers in ascending order using merge sort.
16. Program to sort an array of integers in ascending order using quick sort.
17. Program to sort an array of integers in ascending order using heap sort.
18. Program to sort an array of integers in ascending order using shell sort.
19. Program to demonstrate the use of linear search to search a given element in an array.
20. Program to demonstrate the use of binary search to search a given element in a sorted array in ascending order

**Part - B**

1. Implementing Hashing based application.
2. Implement Shortest path in graphs ( Travelling Salesman ).

## Object Oriented Programming Using C++ Lab

ACCS – 16305

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Develop solutions for a range of problems using object oriented programming.  |
| CO2 | Understand the principles of the object oriented programming paradigm specifically including abstraction, encapsulation and polymorphism and reuse the code using concept of inheritance. |
| CO3 | Develop scenarios to explain behavior and demonstrate correctness of programs.  |
| CO4 | Familiarization with the critical thinking skills and creativity to solve the problems.   |
| CO5 | Implement divide and conquer strategy to searching and sorting problems using iterative and/or recursive solutions.   |
| CO6 | Store the contents of a program into the secondary storage as a file using file handling.   |

### PART-A

- 1.[Control statements] Write programs to implement basics of control structures
- 2.[Function Array & Structure] Write a programs to implement the concepts of function types, array and structures
- 3.[Pointer] Write the programs to implement the concept of pointer.
4. [Classes and Objects] Write a program that uses a class where the member functions are defined inside a class.
5. [Classes and Objects] Write a program that uses a class where the member functions are defined outside a class.
6. [Classes and Objects] Write a program to demonstrate the use of static data members.
7. [Classes and Objects] Write a program to demonstrate the use of const data members.
8. [Constructors and Destructors] Write a program to demonstrate the use of zero argument and parameterized constructors.
9. [Constructors and Destructors] Write a program to demonstrate the use of dynamic constructor.
10. [Constructors and Destructors] Write a program to demonstrate the use of explicit constructor.
11. [Inheritance] Write a program to demonstrate the multilevel inheritance.
12. [Inheritance] Write a program to demonstrate the multiple inheritance.
13. [Inheritance] Write a program to demonstrate the virtual derivation of a class.
14. [Operator Overloading] Write a program to demonstrate the overloading of increment an decrement operators.
15. [Operator Overloading] Write a program to demonstrate the overloading of binary arithmetic operators.
16. [Operator Overloading] Write a program to demonstrate the overloading of memory management operators.
17. [Typecasting] Write a program to demonstrate the typecasting of basic type to class type.
18. [Typecasting] Write a program to demonstrate the typecasting of class type to basic type.
19. [Typecasting] Write a program to demonstrate the typecasting of class type to class type.
20. [Polymorphism] Write a program to demonstrate the runtime polymorphism.
21. [Templates and Generic Programming] Write a program to demonstrate the use of function template.
22. [Templates and Generic Programming] Write a program to demonstrate the use of class template.

**23. [File Handling]** Write a program to copy the contents of a file to another file byte by byte. The name of the source file and destination file should be taken as command-line arguments,

**24. [File Handling]** Write a program to demonstrate the reading and writing of mixed type of data.

**25. [File Handling]** Write a program to demonstrate the reading and writing of objects.

#### **PART-B**

**[Application Development]** Based on file handling develop an application which can perform store, search, display, delete and update data file operations

**Computer Organization and Assembly Language Programming (COALP) Lab**

**ACCS - 16306**

**Internal Marks : 30**

**L T P**

**External Marks : 20**

**- - 2**

**Total Marks : 50**

**Course Outcomes:**

|            |   |
|------------|---|
| <b>CO1</b> | Understand the microprocessor operations.   |
| <b>CO2</b> | Understand the architecture of microprocessor.  |
| <b>CO3</b> | Understand the instructions of 8085.  |
| <b>CO4</b> | Understand and design an assembly language programs.  |
| <b>CO5</b> | Design and implement microprocessor-based systems.  |
| <b>CO6</b> | Interface microprocessor with different peripheral devices through interfacing chips and can handle data transfer in different ways for different applications. |

**Part-A**

1. Introduction to 8085 kit.
2. Addition and subtraction of two 8 bit numbers, result 8 bit
3. Find 1's and 2's complement of 8 bit number.
4. Find Largest among an array of ten numbers (8 bit).
5. Sum of series of 8 bit numbers.
6. WAP to generate Fibonacci series.
7. Find square of 8-bit number
8. Addition and subtraction of two 16 bit numbers, result 16 bit.
9. Find 1's and 2's complement of 16 bit number.
10. To arrange the 8-bit numbers in ascending order.

**Part-B**

11. To perform interfacing of Stepper Motor with 8085.
12. To perform interfacing of Traffic Light System with 8085
13. To perform interfacing of 7 segment LED display.



# **BTECH CSE 4<sup>th</sup> SEM**

## Discrete Structures

ACDS – 16402

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

### Objectives:

The objective of this course is to provide the necessary back ground of discrete structures with particular reference to the relationships between discrete structures and their data structure counterparts including algorithm development.

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | To gain knowledge about the concept and real implementation of sets.To cultivate analytical thinking and creative problem solving skills. Apply the operations on sets and venn diagrams.              |
| CO2 | Understand the concept of relations and functions. determine the domain and range of functions   |
| CO3 | To introduce mathematical notations and concepts in discrete mathematics that is essential for computing. Understanding of Inclusion exclusion principle, recurrence relation and generating function. |
| CO4 | To train on mathematical reasoning and proof strategies. Introduce the concept of rings and Boolean ring.  |
| CO5 | To understand group theory. Distinction between various types of groups.   |
| CO6 | Clarity about graphs. How to use them in computer.   |

### Part -I

**Sets, relations and functions:** Introduction, Combination of Sets, ordered pairs, proofs of general identities of sets, relations, operations on relations, properties of relations and functions, equivalence relations, compatibility relations, partial order relations.

**Rings and Boolean algebra:** Rings, Sub rings, Euclidean domains Integral domains and fields Boolean sub-algebra Boolean Rings Application of Boolean algebra

### Part -II

**Combinatorial Mathematics:** Basic counting principles Inclusion and Exclusion Principle Recurrence relations, Generating Function, Application.

### Part -III

**Monoids and Groups:** Groups Semigroups and monoids Cyclic semigroups and submonoids, Subgroups and Cosets. Morphisms. Normal subgroups.

### Part -IV

**Graph Theory:** Graph- Directed and undirected, Eulerian chains and cycles, Hamiltonian chains and cycles Trees, Chromatic number Connectivity, Graph coloring, Plane and connected graphs, Isomorphism and Homomorphism. Applications.

### References :

1. Discrete Mathematics (Schaum series) by Lipschutz (McGraw Hill).
2. Applied Discrete Structures for Computer Science by Alan Doerr and Kenneth Levarseur.
3. Discrete Mathematics by N Ch SN Iyengar, VM Chandrasekaran.
4. Discrete Mathematics and Graph Theory(Cengage Learning) by Sartha

## Operating Systems

ACCS – 16402

**Internal Marks : 40**

**L T P**

**External Marks : 60**

**3 1 -**

**Total Marks : 100**

**Objectives:** This course should provide the students with good understanding of Operating System including its architecture and all its components. Good conceptions on all the subjects like processes, inter-process communication, semaphore, message passing, classical IPC problems, scheduling, memory management, file systems, security and protection mechanism, I/O hardware and software, deadlocks, etc. should be provided.

**Course Outcomes:**

|            |  |
|------------|--|
| <b>CO1</b> | Gain knowledge about concept of process and thread their creation and their resource management. |
| <b>CO2</b> | Understand basics functionality of operating system, scheduling of CPU, process management.      |
| <b>CO3</b> | Understand the knowledge of deadlocks and its recovery.  |
| <b>CO4</b> | Gain knowledge of paging, page replacement algorithms.   |
| <b>CO5</b> | Gain knowledge of multiprocessor and distributed system.   |
| <b>CO6</b> | Understand the difference between physical and logical file system.                              |
| <b>CO7</b> | Gain the knowledge of device management, device scheduling.                                      |
| <b>CO8</b> | Be familiar with protection and security mechanism.  |
| <b>CO9</b> | Mastering various process management concepts including scheduling, synchronization, deadlocks.  |

Gain knowledge about concept of process and thread their creation and their resource management.

Understand basics functionality of operating system, scheduling of CPU, process management.

Understand the knowledge of deadlocks and its recovery.

Gain knowledge of paging, page replacement algorithms.

Gain knowledge of multiprocessor and distributed system.

Understand the difference between physical and logical file system.

Gain the knowledge of device management, device scheduling.

Be familiar with protection and security mechanism.

Mastering various process management concepts including scheduling, synchronization, deadlocks.

### Part - I

**Introduction:** Operating System and its Classification -Batch, Interactive, Multiprogramming, Time sharing, Real Time System, Multiprocessor Systems, Multithreaded Systems, System Protection, System Calls, Monolithic and Microkernel Systems, Operating System Components and Views, Operating System Functions and Services.

### Part - II

**Processes & Process Synchronization:** Process Concept, Process States, Process State Transition Diagram, Process Control Block (PCB), Process Scheduling Concepts, Threads and its types, Principle of Concurrency, Producer / Consumer Problem, Critical Part Problem, Semaphores, Classical Problem in Concurrency: Readers Writers Problem.

**Process Scheduling:** Definition , Scheduling objectives ,Types of Schedulers ,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) , Scheduling algorithms : Pre emptive and Non , pre emptive , FCFS ,SJF ,RR , Multiprocessor scheduling : Types , Performance evaluation of the scheduling.

**Deadlocks:** Definition, Deadlock characteristics, Deadlock Prevention , Deadlock Avoidance :banker’s algorithm, Deadlock detection and Recovery.

### **Part - III**

**Memory Management :** Definition ,Logical and Physical address map , Memory allocation : Contiguous and noncontiguous Memory allocation Fixed and variable partition ,Internal and External fragmentation and compaction , Paging : Principle of operation ,Page allocation, Hardware support for paging ,Protection and sharing ,Disadvantages of paging, Segmentation, Basics of Virtual Memory ,Hardware and control structures ,Locality of reference, Page fault , Dirty page/Dirty bit ,Demand paging ( Concepts only) ,Page Replacement policies : Optimal (OPT) , First in First Out (FIFO) and Least Recently used (LRU),Thrashing

### **Part - IV**

**Device Management & File System:** Secondary Storage Structure, Disk Scheduling :FCFS,SCAN,C-SCAN,LOOK,C-LOOK,SSTF , File concept, File organization and access mechanism, File directories, File system implementation issues, File system protection and security.

**Protection and Security:** Goals and Domain of Protection, Access Matrix, Program Threats: Virus, Worms, Trojan Horse, TrapDoor, Denial of Service Attacks

### **Introduction to Unix/Linux**

#### **References:**

1. A Silberschatz and Peter B. Galvin, “Operating System Concepts” Addison Wesley Publishing Company
2. Dhamdhere, —Systems Programming & Operating Systems” Tata McGraw Hill
3. Gary Nutt, “Operating Systems Concepts”, Pearson Education Ltd. 3rd Edition
4. Operating System by Madnick Donovan

## Computer Networks

ACCS – 16403

**Internal Marks : 40**

**L T P**

**External Marks : 60**

**3 1 -**

**Total Marks : 100**

**Objectives:** This course provides knowledge about computer network related hardware and software using a layered architecture.

**Course Outcomes:**

|            |  |
|------------|--|
| <b>CO1</b> | Clarity about various protocols, models in networks.   |
| <b>CO2</b> | Design, implement and analyze simple computer networks.  |
| <b>CO3</b> | Assemble the components of a PC and install one or more operating systems resulting in a functioning PC that is appropriate for a particular end user. |
| <b>CO4</b> | Understand the concepts of network security and various network security standards.  |
| <b>CO5</b> | Implement basic tasks expected of a Network Administrator including management of user accounts, shared resources, and network security.               |
| <b>CO6</b> | Understand difference between Adhoc and cellular networks.   |

### Part-I

#### Introduction to Computer Networks:

Data Communication System and its components, Data Flow, Computer network and its goals, Types of computer networks: LAN, MAN, WAN, Wireless and wired networks, broadcast and point to point networks, Network topologies, Network software: concept of layers, protocols, interfaces and services, ISO-OSI reference model, TCP/IP reference model.

### Part-II

#### Physical Layer:

Concept of Analog & Digital Signal, Bandwidth, Encoding methods, Transmission Impairments: Attenuation, Distortion, Noise, Data rate limits : Nyquist formula, Shannon Formula, Multiplexing : Frequency Division, Time Division, Wavelength Division, Introduction to Transmission Media : Twisted pair, Coaxial cable, Fiber optics, Wireless transmission (radio, microwave, infrared), Switching: Circuit Switching, Message Switching ,Packet Switching & their comparisons.

#### Data Link Layer:

Design issues, Framing, Error detection and correction codes: checksum, CRC, hamming code, Data link protocols for noisy and noiseless channels, Sliding Window Protocols: Stop & Wait ARQ, Go-back-N ARQ, Selective repeat ARQ, Data link protocols: HDLC and PPP.

#### Medium Access Sub-Layer:

Static and dynamic channel allocation, Random Access: ALOHA, CSMA protocols, Controlled Access: Polling, Token Passing, IEEE 802.3 frame format, Ethernet cabling, collision detection in 802.3, Binary exponential back off algorithm.

### Part-III

#### Network Layer:

Design issues, IPv4 classful and classless addressing, subnetting, Routing algorithms: distance vector and link state routing, Congestion control: Principles of Congestion Control, Congestion prevention policies, Leaky bucket and token bucket algorithms.

### **Transport Layer & Application Layer**

Introduction to TCP/UDP protocols and their comparison.

World Wide Web (WWW), Domain Name System (DNS), E-mail, File Transfer Protocol (FTP),

Introduction to Network security, Introduction to protocols like SMTP,TFTP,RPC, ICMP,IGMP,TELNET,DHCP,ARP,RARP,HTTP,HTTPS.

### **Part-IV**

#### **Introduction to Wifi**

Wifi introduction, Its Components and layered architecture.

#### **References :**

1. Computer Networks, 4th Edition, Pearson Education by Andrew S. Tanenbaum
2. Data Communication & Networking, 2<sup>nd</sup> Edition, Tata McGraw Hill. By Behrouz A. Forouzan.
3. Computer Networking, 3rd Edition, Pearson Education by James F. Kurose and Keith W. Ross

## Programming in Python

ACCS – 16404

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

**Objectives :** This course provides knowledge about the basics of python, its various constructs and concepts

**Course Outcomes:**

|     |   |
|-----|---|
| CO1 | To Learn Syntax and Semantics and create Functions in Python.                     |
| CO2 | To Handle Strings and Files in Python.  |
| CO3 | To Understand Lists, Dictionaries in Python.                                      |
| CO4 | To Implement Object Oriented Programming concepts in Python.                      |
| CO5 | To learn how to use exception handling in Python applications for error handling. |
| CO6 | To Build GUI applications.  |

### Part- I

Introduction to Python language, Advantages of Python in comparison with other Languages , Different methods of using python: Using python as a calculator, Setting up the Python development environment, Basic syntax, interactive shell, editing, saving, and running a script, Concept of data types, Random number, Real numbers, immutable variables, Python console Input / Output using input and print statements. Arithmetic operators and expressions, Conditions, Comparison operators, Logical Operators, Is and In operators, Control statements: If , If- else ,Nested if-else, Break and Continue, Loops: For ,While ,Nested loops

### Part-II

Function and Methods, Defining a function ,Calling a function ,Types of functions ,Function Arguments ,Anonymous functions , Recursion, Global and local variables Modules: Importing modules: Math module ,Random module , Tuples ,Arrays and Matrices, Sets ,Lists, Accessing list ,Operations ,Working with lists , Dictionaries: Introduction ,Accessing values in dictionaries , Data Frames, Date and Time Value Manipulation , String Handling, Unicode strings, Strings Manipulation:- compare strings, concatenation of strings, Slicing strings in python, converting strings to numbers and vice versa.

### Part- III

Classes and Object-oriented Programming: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding, Graphics, Search Algorithms, Sorting Algorithms, Hashtables, Plotting using PyLab, Plotting mortgages and extended examples,

### Part-IV

Exceptions and Assertions: Errors and Formatting, Handling exceptions, Exceptions as a control flow mechanism, Assertions File handling: Strings and text files; manipulating files and directories, os and sys modules; text files: reading/writing text and numbers from/to a file; creating and reading a formatted file (csv or tab-separated).

**References :**



1. Computers Today by Sanders.
2. Fundamentals of Computers TTTI Publication.
3. Learning Python by Mark Lutz, 5th Edition
4. Python Cookbook, by David Beazley , 3rd Edition

# Relational Database Management System

ACCS – 16405

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

**Objectives :** The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

**Course Outcomes:**

|            |   |
|------------|---|
| <b>CO1</b> | Understand the concept of Database Management system and its various applications in real life. |
| <b>CO2</b> | Understand the concept of E-R diagrams for conceptual modeling.                                 |
| <b>CO3</b> | Understand the concept of normalizing tables for effective database design.                     |
| <b>CO4</b> | Understand the different database languages i.e., (DDL, DML, DCL, and TCL).                     |
| <b>CO5</b> | Understand the concept of concurrent transactions and handling deadlocks effectively.           |
| <b>CO6</b> | Understand the concept of database security and various ways to counter threats to vital data.  |

## Part - I

**Introduction to Database Systems:**

File Systems Versus a DBMS, Components of a DBMS, Advantages of a DBMS, Describing and Storing Data in a DBMS, Database System Architecture, Data independence.

**Relational Query Languages:**

SQL: Basic SQL Query, SQL Data types, Creating Tables and Views, Integrity Constraints in SQL, SQL as DML, DDL and DCL, SQL Functions: Numeric, character, date and general functions, Aggregate Functions, Nested Queries.

## Part - II

**Data Models:**

Relational Model, Network Model, Hierarchical Model, ER Model: Entities, Attributes and Entity Sets, Relationships among entities, Strong and Weak Entities, Conceptual Database Design with the ER Model.

**The Relational Model:**

Introduction to the Relational Model, Difference between DBMS and RDBMS, Codd 's Rules, ER to Relational Model Conversion, Keys in relational Algebra, SET operators and Relational Algebra operators:, Relational Algebra queries.

**PL/SQL:** PL/SQL: Advantages, Anonymous block, control statements, Cursors and its various types: Implicit and Explicit, Exception handling, Functions and Procedures, Packages, Triggers.

(Programs/Applications relating primarily to table data to be covered.)

## Part -III

**Database Design:**

Functional Dependencies ,Normalization & its need, Normal Forms, First, Second and Third Normal Forms, BCNF, Multi-valued Dependency, Join Dependency, Fourth and Fifth Normal Forms.

**Transaction Management and Concurrency Control:**

ACID Properties of a transaction, Life cycle of a transaction, Schedules: Types of schedules, Serializability, Concurrent Transactions, Advantages, Lock Management, Lost Update Problem, Inconsistent Read Problem , Read-Write Locks, 2 Phase Locking protocol,

**Part - IV****Distributed Databases:**

Distributed Database Concepts, Advantages and Disadvantages, Data Fragmentation, Replication and Allocation Techniques for Distributed Database Design.

**Database Protection and Recovery:**

Threats to a database and its prevention, Privileges and its types: Grant and Revoke, Roles and Role Based Security.

**Backup and Recovery:**

Types of Database Recovery, Recovery Techniques: Deferred Update, Immediate Update, Shadow Paging, Checkpoints, Buffer Management.

**References :**

1. Ramez Elmasri, Shamkant Navathe ,Fundamentals of Database Systems, Fifth Edition, Pearson Education, 2007.
2. C.J. Date , An Introduction to Database Systems, Eighth Edition, Pearson Education
3. Alexis Leon, Mathews Leon , Database Management Systems, Leon Press.
4. S. K. Singh, Database Systems Concepts, Design and Applications, Pearson Education.

## Operating Systems Lab

ACCS – 16406

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | Installation of operating system.  |
| CO2 | Learn the general structure and any non-obvious aspects of different Operating system. |
| CO3 | Understand various aspects of different Operating system.                              |
| CO4 | Implement various LINUX commands.  |
| CO5 | Understand the basics of shell programming.  |
| CO6 | Understand shell programming in conditional and loop statement.                        |

### Part A

1. Installation Process of various operating systems
2. Concept of Virtualization, Installation of Virtual Machine Software and Installation of Operating System on Virtual Machine.
3. Introduction to UNIX: Architecture, Features.  
Introductory Commands: date, cal, banner, write, mesg, who, passwd etc.  
Files and directories: pwd, mkdir, cd, ls, rmdir, chmod, chgrp, chown, cat, cp, mv, rm, cmp.  
Pipes, Filters and Redirection: Pipes, Filters, Redirection, Tees, head, tail, wc, sort, grep etc.  
Processes: ps, kill etc.
4. Vi editor: Introduction, entering text, deleting text, modifying text.

### Part B

5. Shell Programming-I: Features of the shell, Shell as a programming language, Creating and executing shell scripts, shell variables, arithmetic and logical operators, tests. Decision making: if...fi, if...else...fi.
6. Shell programming-II: Looping structure: for loop, while loop, until loop, continue break loop, case.....esac construct.
7. Write a C/C++ program to simulate the following non-preemptive CPU scheduling algorithms to find turnaround time and waiting time.  
a. FCFS                      b. SJF                      c. Round Robin                      d. Priority
8. Write a C/C++ program to simulate page replacement algorithms  
a. FIFO                      b. Optimal                      c. LRU

## Computer Networks Lab

ACCS - 16407

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | Understand the practical base in computer network issues.  |
| CO2 | Install and configure domain-based local area networks.  |
| CO3 | Students are expected to know the implementation of IPv4 address scheme on LAN.  |
| CO4 | Students will be able to install open source packet capture software.  |
| CO5 | Implement basic tasks expected of a Network Administrator including management of user accounts, shared resources, and network security. |
| CO6 | Students are able to configure Adhoc networks.   |

### Part A

1. Write specifications of latest desktops and laptops.
2. Familiarization with Networking Components and devices: LAN Adapters, Hubs, Switches, Routers etc.
3. Familiarization with Transmission media and Tools: Co-axial cable, UTP Cable, Crimping Tool, Connectors etc.
4. Preparing straight and cross cables.
5. Study of various LAN topologies and their creation using network devices, cables and computers.
6. Configuration of TCP/IP Protocols in Windows and Linux.
7. Implementation of file and printer sharing.
8. Designing and implementing Class A, B, C Networks
9. Subnet planning and its implementation
10. Installation of ftp server and client
11. Remote Access and Monitoring
12. Generating IP addresses range using Subnet-mask calculator
13. Implementing Who-is Domain tools

### Part B

1. Implementing encryption techniques using C++.
2. Application for sharing files through Wi-Fi

## Relational Database Management System Lab

ACCS – 16408

**Internal Marks : 30**

**L T P**

**External Marks : 20**

**- - 2**

**Total Marks : 50**

### Course Outcomes:

|            |   |
|------------|---|
| <b>CO1</b> | Understand the setting up of a client server network Understand different database languages i.e., (DDL, DML, DCL). |
| <b>CO2</b> | Understand the data mining concepts.  |
| <b>CO3</b> | Implement various commands of SQL and PL/SQL.   |
| <b>CO4</b> | Understand the concept of triggers, cursors, procedures in PL/SQL.  |
| <b>CO5</b> | Connecting the database with a front end application.   |
| <b>CO6</b> | Understand the setting up of a client server network Understand different database languages i.e., (DDL, DML, DCL). |

### List of Practical

1. Introduction to SQL and installation of SQL Server / Oracle.
2. Creating Tables, Retrieval of Rows using Select Statement, Conditional Retrieval of Rows, Alter and Drop Statements. Update and Delete Statements.
3. Working with Null Values, Matching a Pattern from a Table, Ordering the Result of a Query, Functions: Character, Number, Date, and General Functions, Aggregate Functions, Grouping the Result of a Query, Set Operators, Nested Queries, Joins, Sequences.
4. Views, Database Security and Privileges: Grant and Revoke Commands, Commit and Rollback Commands.
5. PL/SQL Anonymous block, control statements
6. Cursors and its various types: Implicit and Explicit,
7. Exception handling, Functions and Procedures,
8. Packages, Triggers

## Programming in Python Lab

ACCS – 16409

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Describe the Numbers, Math functions, Strings, List, Tuples and Dictionaries in Python      |
| CO2 | Express different Decision Making statements and Functions                                  |
| CO3 | Interpret Object oriented programming in Python   |
| CO4 | Implementation of Data Structures in python.  |
| CO5 | Understand and summarize different File handling operations                                 |
| CO6 | Explain how to design GUI Applications in Python and evaluate different database operations |

### Part A

Machine Exercises based on:

1. Use of Data Types, Integer Arithmetic, Variables and Assignment
2. Use of Print Function, Branching programs, Strings and Input, Iteration
3. Implementation of Functions and Recursion
4. Application of Global variables
5. Functions as Objects
6. Implementation of Tuples, List and Dictionaries.
7. Implementation of Modules, Files and Dictionaries
8. Implementation of Array and Matrices
9. Use of Exception Handling Mechanisms
10. Applications of Classes and Object-oriented Programming
11. File I/O, Reading CSV and Excel Files, Reading Text Files, Writing and Saving to Files

### Part B

Statistical Analysis using Python(Application of python in Big Data Analytics).

# **BTECH CSE 5<sup>th</sup> SEM**



## Programming In Java

ACCS-16501

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Understand object oriented programming constructs, bytecodes and basics of java console.           |
| CO2 | Implementation of simple java programs using Classes, Inheritance, Exception handling and applets. |
| CO3 | Developing logic for problem solving with programming concepts.                                    |
| CO4 | Developing simple java applications with JDBC connectivity.  |
| CO5 | Understand and utilize Java Graphical User Interface in the program writing.                       |
| CO6 | Understand object oriented programming constructs, bytecodes and basics of java console.           |

### Part-I

**Overview of Java:** Object oriented programming concepts, OOPS features, Java class libraries.

**Data types and Variables:** Integers, floating-point types, characters, Boolean, Variable, Data types and casting, automatic type promotion in expressions.

**Operators, Control Statements and arrays:** Arithmetic operators, bit wise operators, relational operators, Boolean logical operators, ? : Operators, operator precedence, Java's selection statements, iteration statements, jump statements, arrays in Java (1 D and 2 D).

**String Handling:** The string constructors, string length, special string operations, character extraction, string comparison, searching string, modifying string, data conversion, changing the case of characters, string buffer class.

### Part-II

**Introduction to Classes:** Class fundamentals, declaring object reference variable, introducing methods, constructors, this keyword, garbage collection, finalize () method.

**Methods and Classes:** Overloading methods, using objects as parameters, recursion.

**Inheritance:** Inheritance basics, using super, method overriding, dynamic method dispatch, Abstract Classes, using keyword final, Package and Interfaces.

**Exception Handling:** Exception handling fundamentals, Exception types, Uncaught Exceptions Using try and catch, multiple catch clauses, nested try statements, throw, finally Java 's built-in exceptions, creating your own exception.

### Part-III

**Multithreaded Programming:** The Java thread model, the main thread, creating thread, creating multiple threads, using is alive () and join (), Thread priorities, synchronization; inter thread communications, suspending resuming and stopping threads.

**Applets:** Applet Fundamentals, Applet Architecture, The HTML Applet tag, Passing parameters to Applets.

**Networking:** Networking basics, Java and the Net, TCP/IP Client Sockets URL, URL Connection, TCP/IP Server Sockets

### Part-IV

**Event Handling:** Delegation Event Model, Event Listener Interfaces, Adapter Classes, Swings controls (JFrame, JTextField, JButton) & Layout Managers

**Database Connectivity**

JDBC drivers, DriverManager Class, Connection interface, Statement interface, ResultSet interface, Query Execution

**Suggested Readings/Books**

1. Herbert Schildt, The Complete Reference Java 2, McGraw-Hill.
2. Joycee Farrell, Java For Beginners, Cengage Learning
3. Deital and Deital, Java: How to Program, 6<sup>th</sup> Edition, Pearson Education

## Design and Analysis of Algorithms

ACCS-16502

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Understand the concept of asymptotic notations and average, best and worst case complexities and to analyze the algorithm.  |
| CO2 | Understand the methods for analyzing the efficiency and correctness of algorithms (such as exchange arguments, recurrence, induction and average case analysis)   |
| CO3 | Design algorithms using the dynamic programming, greedy method, Backtracking strategy, and recite algorithms that employ this strategy.   |
| CO4 | Compare, contrast, and choose appropriate algorithmic design techniques to present an algorithm that solves a given problem and can identify and analyze criteria and specifications appropriate to new problems. |
| CO5 | Develop the efficient algorithms for the new problem with suitable designing techniques.  |
| CO6 | To classify the problem into class P or NP and to design the Non Deterministic algorithms   |

### Part I

**Introduction:** What is an algorithm, Time and space complexity of an algorithm, comparing the performance of different algorithms for the same problem, Different orders of growth using Insertion Sort, Asymptotic notations, Polynomial vs. Exponential running time.

**Basic Algorithm Design Techniques:** Divide-and-conquer: Merge Sort, Quick Sort, Randomized Quick Sort, Recurrence Relations.

### Part II

**Sorting and searching:** Linear and Binary search in an ordered array, Hashing.

**Sorting algorithms:** Heap sort, Counting Sort, Radix Sort, Bucket Sort and Bubble sort with analysis of their running times.

**Dynamic programming:** Matrix Chain Multiplication, Longest Common Subsequence, 0/1 Knapsack Problem.

### Part III

**Greedy Strategy:** Minimum spanning trees using Kruskal's and Prim's technique. 0/1 Knapsack, Fractional Knapsack problem, Travelling salesman problem.

**Backtracking:** 0/1 Knapsack, N Queens problem, Graph Colouring problem.

**Graph Algorithms: Graph traversals:** Breadth-first search (BFS) and Depth-first search (DFS), Applications of BFS and DFS, Topological sorting, Single Source Shortest paths in graphs: Dijkstra and Bellman-Ford, All pair Shortest path in graphs: Floyd Warshall's Algorithm

### Part IV

**NP-Completeness:** Definition of class NP, NP-hard and NP-complete problems, 3SAT is NP complete, proving a problem to be NP-complete using polynomial-time reductions, Examples of NP Complete, problems. Approximation algorithms for various NP complete problems.

**Pattern matching algorithms:** Naive String Matcher, Knuth-Morris-Pratt algorithm, Rabin Karp Algorithm

**Suggested Readings/Books:**

1. Introduction to Algorithms 2<sup>nd</sup> Edition by Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, and Clifford Stein, The MIT Press Cambridge, McGraw-Hill Book Company.
2. Fundamentals of Computer Algorithms 2<sup>nd</sup> Edition by Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, Silicon Press, 2008.
3. The Design and Analysis of Algorithms by Nitin Upadhyay, S. K. Kataria & Sons, 2008.
4. The Design and Analysis of Algorithms, 3<sup>rd</sup> Edition by Gajendra Sharma, Khanna Book Publishing Company, Delhi

## Big Data Analytics

ACCS-16503

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | To provide an overview of an exciting growing field of big data analytics.  |
| CO2 | To introduce the tools required to manage and analyze big data like Hadoop, Map Reduce and Pig.                               |
| CO3 | To teach the fundamental techniques and principles in achieving big data analytics with scalability and streaming capability. |
| CO4 | To enable students to have skills to solve complex real world problems in Data Analytics.                                     |
| CO5 | To equip students with skills to analyze and design parallel and distributed applications.                                    |
| CO6 | To analyze the data, identify the problems, and choose the relevant models and algorithms to apply.                           |

### Part-I

An Overview of Big Data and Big Data Analytics, Big Data sources, Application areas of Big Data. Understanding Hadoop and its Ecosystem. Brief intro to Hadoop Ecosystem components: Hadoop Distributed File System, MapReduce, YARN, HBase, Hive, Pig, Sqoop, ZooKeeper, Flume, Oozie, Ambari. Understanding a Hadoop cluster. Introduction to NoSQL. Types of NoSQL Data Models, Schema-Less Databases

### Part-II

Overview of HDFS. Architecture of HDFS, Advantages and disadvantages of HDFS, HDFS Daemons, HDFS Blocks, HDFS file write and read, NameNode as SPOF, Hadoop HA, heartbeats, block reports and re replication, Safemode of Namenode, Hadoopfs commands: cat, ls, put, get, rm, df, count, fsck, balancer, mkdir, du, copyfromlocal, copytolocal.

### Part-III

Hadoopfs commands: expunge, chmod, chown, chgrp, setrep, stat. Hadoopdfsadmin commands. Introduction to Apache Pig, Need of Pig, Installation of Pig, Execution modes of Pig, Pig – Architecture, Grunt shell and basic utility commands, Data types and Operators in Pig, Analysing data stored in HDFS using Pig, Pig operators for Data analysis: Dump, Describe, Explanation, Illustration, Store.

### Part-IV

Group, cogroup, join, split, filter, distinct, foreach, order by, limit operators. Functions in Pig: Eval functions, Load and store functions, Bag and tuple functions, String functions, Data time functions, Math functions, Case Studies: Analyzing various datasets with Pig.

References:

1. Big Data, Black Book by DT Editorial Services, Dreamtech Press.
2. Hadoop – The Definitive Guide 3<sup>rd</sup> Edition, Tom White/ OReilly-Yahoo press

3. Hadoop in Action, Chuck Lam/Manning
4. Hadoop – Beginner’s Guide, Garry Turkington/Packt Publishing

## Software Engineering

ACCS-16504

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Describe the processes and models involved in SDLC lifecycle.   |
| CO2 | Understand software requirements and the SRS document.  |
| CO3 | Implementation of different coding standards and software testing approaches such as unit testing and integration testing.  |
| CO4 | Understand the role of project management including planning, scheduling, risk management and some ethical and professional issues that are important for software engineers. |
| CO5 | Learn the basic software quality strategy.  |
| CO6 | Describe the processes and models involved in SDLC lifecycle.   |

### Part-I

Evolution and impact of Software engineering, introduction to agile software development, software life cycle models: Waterfall, prototyping, Evolutionary, and Spiral models. Feasibility study, Functional and Non-functional requirements, Requirements gathering, Requirements analysis and specification. Basic issues in software design, modularity, cohesion, coupling and layering.

### Part-II

Function-oriented software design: DFD and Structure chart, Object modeling using UML, Object-oriented software development, user interface design, Coding standards and Code review techniques. Software project management, Project planning and control, size and cost estimation, project scheduling using PERT and Gantt chart.

### Part-III

Fundamentals of testing, White-box, and black-box testing, test case design techniques, mutation testing, Tool: Selenium. Static and dynamic analysis, verification and validation, Software reliability metrics, reliability growth modeling. Software quality assurance: quality concepts, quality control, quality assurance, SQA activities, Software reviews, Formal Technical Reviews, Review guidelines. Quality Assurance Standards: ISO 9000, 9001:2000, CMM, TQM and Six Sigma.

### Part-IV

Introduction to SCM, Version Control and Change Management, Risk Mitigation, Monitoring and Management (RMM), Computer aided software engineering, software maintenance, Integrated Change Control, software reuse, Component-based software development.

Suggested Readings/ Books:

1. Roger Pressman, "Software Engineering: A Practitioners Approach,(6th Edition), McGraw Hill,1997.
2. Sommerville,"Software Engineering, 7th edition", Adison Wesley, 1996.
3. Watts Humphrey," Managing software process", Pearson education, 2003.
4. James F. Peters and WitoldPedrycz, "Software Engineering – An Engineering Approach", Wiley.
5. Mouratidis and Giorgini. "Integrating Security and Software Engineering–Advances and Future", IGP. ISBN – 1-59904-148-0.
6. PankajJalote, "An integrated approach to Software Engineering", Springer/Narosa.



## Information Security

ACCS-16505

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Able to define what information is & appreciate the value of information to the modern organization. |
| CO2 | Understand the CIA triad of Confidentiality, Integrity and Availability.                             |
| CO3 | Appreciate the difficulties that arise when valuable information needs to be shared.                 |
| CO4 | Understands the various authentication protocols used for the protection of information.             |
| CO5 | Compare and contrast symmetric and asymmetric encryption systems and their vulnerability to attack.  |
| CO6 | Ability to apply security based on IP, network, web & system.  |

### Part I

Symmetric Ciphers - Overview: Services, Mechanisms and Attacks, The OSI Security Architecture, A Model of Network Security. Classical Encryption Techniques: Symmetric Cipher Model, Substitution Techniques, Transposition Techniques, Rotor Machines, Steganography. Block Cipher and the Data Encryption Standard: Simplified DES, Block Cipher Principles, The DES, The Strength of DES, Differential and Linear Cryptanalysis. Symmetric Ciphers: Triple DES, Blowfish. Confidentiality using Conventional Encryption: Placement of Encryption Function, Traffic Confidentiality, Key Distribution, Random Number Generation.

### Part II

Public Key Encryption, Digital Signatures - Number Theory, Prime Numbers Formats and Eulers Theorems, Testing for Primality. Public Key Cryptography and RSA: Principles of Public Key Cryptosystems, The RSA Algorithm, Key Management,

### Part III

Authentication Protocols - Message Authentication: Authentication Requirements, Authentication Functions, Message Authentication Codes, MD5 Message Digest Algorithms, Digital Signatures and Authentication Protocols: Digital Signatures, Authentication Protocols, Digital Signature Standards.

### Part IV

Network Security - Authentication Applications: Kerberos, X.509 Directory Authentication Service. IP Security: Overview, IP Security Architecture, Authentication Header, Encapsulation Security Payload. Web Security: Web Security Requirements, Secure Sockets Layer and Transport Layer Security, Secure Electronic Transaction.

System Security- Intruders, Malicious Software, Viruses and Related Threats, Counter Measures, Firewalls and its Design Principles.

**Suggested Readings/Books:**

1. William Stallings, Network Security Essentials, Applications and Standards Pearson Education.
2. William Stallings, Cryptography and Network Security Principles and practice. 2<sup>nd</sup> Edition, Pearson Education.
3. Bishop, Matt, Introduction to Computer Security. Addison-Wesley, Pearson Education, Inc. ISBN: 0-321-24744-2. (2005)
4. Michael. E. Whitman and Herbert J. Mattord Principles of Information Security, Cengage Learning.

## Programming in Java Lab

ACCS-16506

Internal Marks : 30

L T P

External Marks : 20

- - 4

Total Marks : 50

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Implement and develop logics for different OOPS concept using basic syntaxes of control Structures, strings, arrays and function. |
| CO2 | Implementation of classes, objects and the relationships among them to solve specific problem.                                    |
| CO3 | Develop and achieve reusability using inheritance, interfaces and packages for efficient application development.                 |
| CO4 | Understanding different exception handling mechanisms and concept of multithreading for developing robust application.            |
| CO5 | Implementing connectivity of java applications with different databases like SQL, oracle etc.                                     |

### Part -A

1. Machine Exercise 1 based on simple java programs.
2. Machine Exercise 2 based on classes and constructors.
3. Machine Exercise 3 based on packages, interfaces.
4. Machine Exercise 4 based on exception handling.
5. Machine Exercise 5 based on threads.
6. Machine Exercise 6 based implementing basic file reading and writing methods.
7. Machine Exercise 7 based on applets.
8. Machine Exercise 8 based on networking
9. Machine Exercise 9 based on swings.
10. Machine Exercise 10 based on swings and Database connectivity using JDBC.

### Part-B

#### Project based on

- Small application based on Swings and Database Connectivity
- Student Database Management System
- Railway Reservation System
- Chat Server
- File Sharing
- Notepad
- Paint Brush etc.

## Design and Analysis of Algorithms Lab

ACCS-16507

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Analyze the complexities of various problems in different domains.  |
| CO2 | Analyze the running time of the basic algorithms for those classic problems in various domains.   |
| CO3 | Implement methods for analyzing the efficiency and correctness of algorithms (such as exchange arguments, recurrence, induction, and average case analysis) |
| CO4 | Design algorithms using the dynamic programming, greedy method and recite algorithms that employ this strategy  |
| CO5 | Compare, contrast, and choose appropriate algorithmic design techniques to present an algorithm that solves a given problem.                                |
| CO6 | Identify and analyze criteria and specifications appropriate to new problems.   |

Software to be used: C/C++ Language Compiler

### Part A

1. Code and analyse Insertion Sort for Best and Worst case as an implementation for algorithm analysis.
2. Code and analyse Merge Sort as an implementation for Divide and Conquer strategy.
3. Code and analyse Quick Sort as an implementation for Divide and Conquer strategy.
4. Code and analyse Randomized Quick Sort as an implementation for Divide and Conquer strategy.
5. Code and analyse Heap Sort.
6. Code and analyse Counting Sort.
7. Code and analyse Radix Sort.
8. Code and analyse optimal Matrix Chain Multiplication as an implementation for Dynamic Programming.
9. Code and analyse to find the Longest Common Subsequence of a pattern between strings as an implementation for Dynamic Programming.
10. Code and analyse Kruskal's technique for finding a Minimum spanning tree as an implementation for Greedy Strategy.
11. Code and analyse Prim's technique for finding a Minimum spanning tree as an implementation for Greedy Strategy.
12. Code and analyse for finding occurrences of pattern in a string using Brute Force approach.
13. Code and analyse for finding occurrences of pattern in a string using Rabin Karp approach.

### Part B

Implementation of BST

## Big Data Analytics Lab

ACCS-16508

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | To install the relevant software for setting up a hadoop cluster.                              |
| CO2 | To introduce the tools required to manage and analyze big data like Hadoop, MapReduce and Pig. |
| CO3 | To learn the concepts required for working with distributed file systems.                      |
| CO4 | To enable students to have skills to solve complex real world problems in Data Analytics.      |
| CO5 | To equip students with skills to analyze and design parallel and distributed applications.     |
| CO6 | To enable students to learn and apply Predictive Analytics in real time environment.           |

### Part- A (Installation and commands in HDFS and Pig)

- ✓ Installation of Hadoop
- ✓ Installation of HDFS, Pig, Hive etc
- ✓ Running HDFS Daemons
- ✓ Safemode and other Hadoop DFS Admin commands
- ✓ Hadoopfs commands
- ✓ Pig operators and functions

### Part- B (Case Studies)

- ✓ Accessing files in HDFS using Pig
- ✓ Storing the processed files back to HDFS
- ✓ Analysing datasets using Pig

**Software Engineering Lab**  
**ACCS-16509**

**Internal Marks : 30**

**L T P**

**External Marks : 20**

**- - 2**

**Total Marks : 50**

**Course Outcomes:**

|            |  |
|------------|--|
| <b>CO1</b> | Preparation of SRS document, design document, test cases and software configuration management and risk management related document. |
| <b>CO2</b> | Designing of object oriented and function oriented design using Microsoft Visio.   |
| <b>CO3</b> | Able to perform unit testing and integration testing.  |
| <b>CO4</b> | Apply various website testing techniques   |
| <b>CO5</b> | Usage of Openproj tool to track the progress of project.   |

**Part A**

**I. Tool used: Open Proj**

1. Study and usage of OpenProj or similar software to draft a project plan
2. Study and usage of OpenProj or similar software to track the progress of a project
3. Preparation of Software Requirement Specification Document, Design Documents and Testing Phase related documents for some problems

**II. Tool used: Microsoft Visio**

4. Study and usage of any Design phase CASE tool (UML Diagrams, DFD)

**III. Tool Used: Selenium, Jmeter etc.**

5. To perform unit testing and integration testing
6. To perform various white box and black box testing techniques
7. Testing of a web site

**Tool Used: Risk Register related tools like Clearrisk etc.**

8. Preparation of Software Configuration Management and Risk Management related documents

**Part-B**

**Project: Real time project report based on all tools discussed above .The project are**

- **University Management System**
- **Hospital Management System**
- **Hotel Management System**
- **Restaurant Management System etc.**

# **BTECH CSE 6<sup>th</sup> SEM**

## Web Technologies

ACCS-16601

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Understanding the working of web page development.   |
| CO2 | Understand design principles in CSS for dynamic changes.   |
| CO3 | Understanding the form development and events related to them.   |
| CO4 | Understanding the scripting language for developing the web page.  |
| CO5 | Understanding the server side scripting language and its connectivity with database for storing the data into it |

### Part-I

**Internet and World Wide Web:** Introduction, Internet Addressing, ISP, types of Internet Connections, Introduction to WWW, WEB Browsers, WEB Servers, URLs, HTTP, WEB Applications, Tools for web site creation.

**HTML5:** Introduction to HTML5, Lists, adding graphics to HTML5 page, creating tables, linking documents, forms, iframes.

### Part-II

**CSS:** Introduction and types, CSS color, margin, border.

**Java Script:** Introduction, programming constructs: variables, operators and expressions, conditional checking, functions and dialog boxes, Event Handler.

**DOM:** Document Object- Finding HTML Elements ,Changing HTML Elements, Adding and deleting Elements ,Window object ,History Object, Location object, Navigation object , Changing HTML Styles and form validations.

### Part-III

**Cookies:** Introduction, Creation and deletion.

**Jquery:** Introduction, Syntax ,Selectors, Events, Effects.

**AJAX:** Introduction, HTTP Request, XMLHttpRequest, AJAX Server Script

### Part-IV

**PHP:** Introduction, syntax, statements, operators, function, array. PHP and MySQL connectivity.

### Suggested Readings/Books

1. Ivan Bayross, Web Enabled Commercial Application Development using HTML, DHTML, JavaScript, Perl CGI, BPB.
2. Steven M. Schafer, HTML, CSS, JavaScript, Perl, Python and PHP, Wiley India Textbooks.
3. Paul S. Wang, G. Keller, S. Katila, An Introduction to Web Design + Programming, Cengage Learning.
4. Jeffery C. Jackson, Web Technologies: A Computer Science Perspective, Pearson Education.
5. Robin Nixon, Learning PHP, MySQL, and JavaScript, Shroff/O'Reilly



## Mobile Application Development

ACCS-16602

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Demonstrate their understanding of the fundamentals of Android operating systems              |
| CO2 | Demonstrate their skills of using Android software development tools ·                        |
| CO3 | Demonstrate their ability to develop software with reasonable complexity on mobile platform · |
| CO4 | Demonstrate their ability to deploy software to mobile devices ·                              |
| CO5 | Demonstrate their ability to debug programs running on mobile devices                         |

### Part-I

**INTRODUCTION:-** Android, Android Versions, Features of Android, Architecture of Android, Obtaining the Required Tools , Android SDK , Installing the Android SDK Tools , Configuring the Android SDK Manager – Eclipse , Android Development Tools (ADT) , Creating Android Virtual Devices (AVDs) , Creating Your First Android Application – Types of Android Application , Anatomy of an Android Application

### Part-II

**ACTIVITIES, FRAGMENTS AND INTENTS:** Understanding Activities , Creating Activities Linking Activities Using Intents – Resolving Intent Filter Collision , Returning Results from an Intent , Passing Data Using an Intent Object , Fragments , Adding Fragments Dynamically , Life Cycle of a Fragment , Interactions between Fragments , Calling Built, In Applications Using Intents , Understanding the Intent Object , Using Intent Filters , Adding Categories , Displaying Notifications.

### Part-III

**ANDROID USER INTERFACE:** -Understanding the Components of a Screen , Adapting to Display Orientation , Managing Changes to Screen Orientation , Utilizing the Action Bar , Creating the User Interface Programmatically , Listening for UI Notifications , Designing Your User Interface With Views , Using Basic Views , Using Picker Views , Using List Views to Display Long Lists , Understanding Specialized Fragments , Displaying Pictures And Menus With Views , Using Image Views to Display Pictures , Using Menus with Views , Additional Views.

### Part-IV

**DATABASES, CONTENT PROVIDERS AND MESSAGING:-** Saving and Loading User Preferences , Persisting Data to Files , Creating and Using Databases , Content Providers , Sharing Data in Android , Using a Content Provider , Creating Your Own Content Providers , Using the Content Provider – Messaging , SMS Messaging , Sending E,mail. Location, Based Services , Displaying Maps , Getting Location Data , Monitoring a Location , Project — Building a Location Tracker – Networking , Consuming Web Services Using HTTP , Consuming JSON Services , Sockets Programming , Developing

Android Services , Creating Your Own Services , Establishing Communication between a Service and an Activity , Binding Activities

**Suggested Books**

1. Wei - Meng Lee, "*Beginning Android 4 Application Development*" , John Wiley & Sons, Inc, 2012.
2. Reto Meier, "*Professional Android 4 Application Development*" , John Wiley & Sons, Inc, 2012.

## Machine Learning

ACCS-16603

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Recognize the characteristics of machine learning that make it useful to real-world problems. |
| CO2 | Characterize machine learning algorithms as supervised, semi-supervised, and unsupervised.    |
| CO3 | Be able to use support vector machines.   |
| CO4 | Be able to use regularized regression algorithms.   |
| CO5 | Understand algorithms for learning Bayesian networks.   |
| CO6 | Understand Back propagation algorithms.   |

### Part-I

**Introduction :** Why Machine learning, Examples of Machine Learning Problems, Applications of Machine Learning, Structure of Learning, Supervised vs. Unsupervised Learning, Statistical Learning: Bayesian Method, The Naive Bayes Classifier Learning versus Designing, Training versus Testing, Characteristics of Machine learning tasks, Predictive and descriptive tasks, Machine learning Models: Geometric Models, Logical Models, Probabilistic Models

### Part-II

**Classification:** Binary Classification: - Assessing Classification performance, Multiclass Classification

**Linear Regression :** Prediction using Linear Regression, Gradient Descent, Linear Regression with one variable, Linear Regression with multiple variables, Polynomial Regression, Feature Scaling/Selection, Support Vector Machines.

### Part-III

**Logistic Regression :** **Logistic Regression :** Classification using Logistic Regression, Logistic Regression vs. Linear Regression, Logistic Regression with one variable and with multiple variables.

**Regularization: Regularization** and its utility: The problem of Overfitting, Application of Regularization in Linear and Logistic Regression, Regularization and Bias/Variance.

### Part-IV

**Neural Networks (10 lectures):** Introduction, Model Representation, Gradient Descent vs. Perceptron Training, Stochastic Gradient Descent, Multilayer Perceptrons, Multiclass Representation, Backpropagation Algorithm.

**Trends in machine learning** -Model and Symbols- Bagging and Boosting, Multitask learning, Online learning and Sequence Prediction, Data Streams and Active Learning, Deep Learning, Reinforcement Learning.

### Recommended Books

1. Ethem Alpaydin, "Introduction to Machine Learning" 2nd Edition, The MIT Press, 2009.
2. Tom M. Mitchell, "Machine Learning", First Edition by Tata McGraw-Hill Education, 2013.

3. Christopher M. Bishop, "Pattern Recognition and Machine Learning" by Springer, 2007.
4. Mevin P. Murphy, "Machine Learning: A Probabilistic Perspective" by The MIT Press, 2012.

## Simulation and Modeling

ACCS-16607

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Define the basics of simulation modeling and replicating the practical situations in organizations |
| CO2 | Generate random numbers and random variates using different techniques.                            |
| CO3 | Develop simulation model using heuristic methods.  |
| CO4 | Analysis of Simulation models using input analyzer, and output analyzer                            |
| CO5 | Explain Verification and Validation of simulation model.   |

### Part-I

**INTRODUCTION:** - Modeling and simulation, System analysis, Application areas, Advantages and disadvantages of simulation, Classification of system, Model and types of models, Introduction to discrete and continuous system simulation, steps in a simulation study.

**SIMULATION METHODS :-** Simulation Methods: Discrete-event Simulation, Time advance Mechanisms, Components and organization of Discrete-event simulation, Flowchart of next-event time advance approach, Continuous Simulation.

### Part-II

**SIMULATION SOFTWARES :-** Review of some existing software popular and useful in the industry, e.g., Arena, Matlab, Simulink, Cloudsim etc., Simulation using languages and environments like C++/GPSS etc.

**QUEUEING MODELS :-** Single server queueing system, Basic structure of Queueing models, Input source(Calling population), introduction to arrival and departure time, flowcharts for arrival and departure routine, Determining the events and variables, Notations and relationships between L, W, Lq, Wq, Little's Formula.

### Part-III

**RANDOM NUMBERGENERATION :-** Introduction to Random Numbers, Importance of Random Numbers in Simulation, Mid-Square random number generator, Residue method, Arithmetic Congruential generator, Testing Numbers for Randomness, Chi-Square Test, Distributions: Poisson, Exponential, Normal, Binomial.

**INPUT MODELING AND OUTPUT ANALYSIS OF A SINGLE MODEL :-** Data collection, Identifying the Distribution with Data: Histograms, Selection of the Appropriate Family of Distributions, Verification and Validation of Simulation Models- Verification and Validation of Simulation Models, Calibration and Validation: Face Validity, Validation of Assumptions.

### Part-IV

**COMPARISON AND EVALUATION OF ALTERNATIVE SYSTEM DESIGNS:** - Sampling with Equal and Unequal Variances, common random numbers, confidence intervals with specified precision.

**SIMULATION LANGUAGES:** - Basic Introduction to Special Simulation Languages:-GPSS/ MATLAB/ Network Simulators.

**Suggested Readings/ Books:**

1. Jerry Banks, John S. Carson II, Barry L. Nelson and David M. Nicol, Discrete-Event System and Simulation, Prentice Hall of India, New Delhi, 2005
2. Averill M. Law, Simulation modeling and analysis (SIE), Tata McGraw Hill India, 2007
3. David Cloud, Larry Rainey, Applied Modeling and Simulation, Tata McGraw Hill, India.
4. Gabriel A. Wainer, Discrete-event modeling and simulation: a practitioner's approach, CRC Press, 2009.

## Multimedia and its Applications

ACCS-16608

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Define multimedia to potential clients.  |
| CO2 | Identify and describe the function of the general skill sets in the multimedia industry.       |
| CO3 | Identify the basic components of a multimedia project.   |
| CO4 | Identify the basic hardware and software requirements for multimedia development and playback. |

### Part-I

Multimedia an overview :-Digital representation, Visual Display Systems, Multimedia Input and output Technologies. Text, Image and Graphics Text: Introduction, Types of Text Unicode Standard , Font, Insertion of Text, Text compression, File Formats. Image: Image types, Seeing color, Color Models , Basic Steps for image processing ,Scanner ,Digital Camera , Specifications of digital images:- Color Management Systems ,Image processing Software , File Formats: – Image output on monitor ,Image output on printer, Graphics

### Part-II

Audio: Introduction: – Acoustics , Nature of sound waves , Characteristics of Sound , Elements of Audio Systems, Microphone, Amplifier, Audio Mixer, Digital Audio – Synthesizer ,MIDI , Audio Transmission – Audio recording Devices , File Formats, Video, animation. Image compression.

### Part-III

Basic Software Tools: Text, Image and Sound Editing tools: Painting and Drawing tools. Animation tools:FLASH MX:Getting started, Managing window & panels , Creating objects using the primary drawing tools, choosing & applying colors, Working with text , modifying graphics , Using symbols and instances , creating animation and effects & techniques, frames & layers, Integrating media files with flash, adding sound, importing artwork embedding video, working with 3D Graphics.

### Part-IV

Dreamweaverx Getting started: Working with tools, working with text , inserting images, using basic HTML in dream weaver , Adding text to web pages , inserting images to web pages, setting up tables using frame & forms, adding multimedia elements to dream weaver, building style sheets using web page working with layers , working with timelines , Enhancing web site management and workflow in dream weaver.

### TEXT BOOKS

1. Ranjan Parekh, “Principles Of Multimedia”, The McGraw , Hills Company, Twelfth Reprint 2011.
2. Prabhat K. Andleigh, Kiran Thakrar, “Multimedia System Design”, PHI. REFERENCES Ralf Steinmetz, Klara Nahrstedt, “Multimedia Systems”, Springer, 2009. SE1122 – MULTIMEDIA SYSTEM

## Computer Graphics

ACCS-16609

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Understand the basics of computer graphics, different graphics systems and applications of computer graphics. |
| CO2 | Discuss various algorithms for scan conversion and filling of basic objects and their comparative analysis.   |
| CO3 | Use of geometric transformations on graphics objects and their application in composite form.                 |
| CO4 | Extract scene with different clipping methods and its transformation to graphics display device.              |
| CO5 | Explore projections and visible surface detection techniques for display of 3D scene on 2D screen.            |
| CO6 | Render projected objects to naturalize the scene in 2D view and use of illumination models for this.          |

### Part-I

**Introduction:** Computer Graphics and its applications, Elements of a Graphics, Graphics Systems: Video Display Devices, Raster Scan Systems, Random Scan Systems, Input devices.

**Basic Raster Graphics:** Scan conversion- Point plot technique, Line drawing, Circle generating and Ellipse generating algorithms.

### Part-II

**Two-dimensional Geometric Transformations:** Basic Transformations-Translation, Rotation and Scalling, Matrix Representation and Homogeneous Coordinates, Composite Transformations, Reflection and Shearing transformations.

**Clipping:** Window to viewport transformation, Clipping Operations- Point Clipping, Line Clipping, Polygon Clipping and Text Clipping.

### Part-III

**Filling Techniques:** Scan line algorithms, Boundary-fill algorithm, Flood-fill algorithm, Edge fill and fence fill algorithms,

**Elementary 3D Graphics:** Plane projections and its types, Vanishing points, Specification of a 3D view.

### Part-IV

**Visibility:** Image and object precision, Hidden edge/surface removal or visible edge/surface determination techniques; z buffer algorithms, Depth sort algorithm, Scan line algorithm.

**Advance Topics:** Introduction of Rendering, Raytracing, Antialiasing, Fractals, Gourard and Phong shading.

**Suggested Readings/Books:**

1. Donald Hearn and M.Pauline Baker, “**Computer Graphics**”, **Second Edition**, PHI/Pearson Education.
2. Zhigandxiang, Roy Plastock, Schaum’s outlines, “**Computer Graphics Second Edition**”, Tata Mc-Grawhill edition.
3. C. Foley, VanDam, Feiner and Hughes, “**Computer Graphics Principles & Practice**”, **Second Edition**, Pearson Education
4. Erik Reinhard, Kelvin Sung, Michael Ashikhmin, Michael Gleicher, “**Fundamentals of Computer Graphics**” third edition.



## Cyber Security

ACIT-16501

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | To gain knowledge about securing both clean and corrupted systems, protect personal data, and secure computer networks.                           |
| CO2 | Understanding of online as well as offline application security, application threats & its mitigations and application security service provider. |
| CO3 | Demonstrate knowledge of security threats to computer systems, and perform countermeasures to secure a computer.                                  |
| CO4 | An ability to apply security principles and practices to the environment, hardware, software, and human aspects of a system.                      |
| CO5 | The learner will understand key terms and concepts in cyber law, intellectual property and cyber crimes, trademarks and domain theft.             |

### Part-I

Introduction to networks, types of network, Network threats, introduction to information system, its components, categories of information system, individual in the information system, development of information system, information security and its importance, threats to information system, cyber security and security risk analysis.

### Part-II

Application Security: Introduction to database, email, internet security, data security consideration, firewall, VPN, Intrusion detection, access control and its models,

Security threats: introduction to various security threats, network and services attack, security threats to e commerce.

### Part-III

Development of secure information system: Introduction, why information system security is important, developing secure information system, key elements of the information security policies, information system development life cycle, application security and its various aspects, risk management, security architecture and design.

### Part-IV

Security policies: introduction to computer security policy categories and its type, why do we need security policies, email security policies, cooperates policies, Information security standards(ISO), IT ACT2000, copyright, patent, IPR, cyber laws in India, software licenses and its types.

### Reference

1. "Fundamentals of cyber security" by mayankbhushan (bpb publishers).
2. "cyber security" by phillipferaro.

## Web Technologies Lab

ACCS-16604

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |   |
|-----|---|
| CO1 | Understanding the working of web page development.  |
| CO2 | Understand design principles in CSS for dynamic changes.  |
| CO3 | Understanding the form development and events related to them.  |
| CO4 | Understanding the scripting language for developing the web page.   |
| CO5 | Understanding the server side scripting language and its connectivity with database for storing the data into it. |

### PART – A

#### 1. Creation of Web pages using HTML, DHTML

- Basic HTML tags (font, heading, bold, italic, underline etc.)
- HTML Ordered List tags
- HTML Unordered List tags
- HTML Definition List tags
- HTML List tags to create nested list
- Insert images in webpages
- Creating an image map
- HTML Table tag and its attributes
- HTML form tags and its attributes
- HTML frame tags
- Webpages with CSS (inline, internal and external)

#### 2. Creation of Web pages using JavaScript

- Embedding of JavaScript into a webpage (Internal and external)
- Using various Dialog boxes
- Changing webpage background
- Changing text of HTML element
- Event handling
- Create a calculator utility
- Create Image rollover effect
- Validating user input
- Using DOM objects
- Setting & retrieving Cookie values

### **3. Creation of Web pages using JQuery**

- Event handling
- Applying various effects to HTML elements

### **4. Creation of Web pages using AJAX**

- To retrieve text from a file and update a part of webpage.

### **5. Creating web pages using PHP**

- Embedding PHP script in a webpage
- Processing HTML form input
- Performing insertion, deletion, updation and selection operation on a database table

## **PART – B**

1. Create a web-based application for student management.
2. Create a web-based application for faculty management.
3. Create a web-based application for College Stock Management.

## Mobile Application Development Lab

ACCS-16605

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Demonstrate and Understanding anatomy of an Android application   |
| CO2 | Able to work with Intents, Intent Filter Collision, Fragments and Notification.                             |
| CO3 | Develop various Android applications related to layouts & rich uses interactive interfaces                  |
| CO4 | Able to work with different Views including List View and Custom views                                      |
| CO5 | Able to work with different Storage Options available in Android System.                                    |
| CO6 | Develop and Deploy various Android applications related to Mobile Phones programs running on mobile devices |

### Part-A

1. Introduction
2. Installing Android Studio
  - 2.1 Installing Android Studio on ubuntu
  - 2.2 Installing Android Studio on windows
3. Creating New Project on Android Studio
4. Open, Re,open and Close existing project on Android studio
5. Creating Android Virtual Devices
6. Android Applications
  - 6.1 Create Hello World application
  - 6.2 Linking Activities using Intent
  - 6.3 Passing Data Using an Intent Object
  - 6.4 Implicit intents Familiarization
  - 6.5 Understanding different layouts in android
  - 6.6 Create a simple listview
  - 6.7 Create a listview with image and text
  - 6.8 Integrate a website inside the application using Webview

6.9 Saving Data Using the SharedPreferences Object

6.10 Saving Data to Internal Storage as files

6.11 SQLite program for database operations

6.12 Student database using SQLite

6.13 Create a hello world html5 application

6.14 Digital Bio Data Application using HTML

### **Part-B**

7. Installing an application on a mobile device

## Machine Learning Lab

ACCS-16606

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Gain knowledge about basic concepts of Machine Learning           |
| CO2 | Identify machine learning techniques suitable for a given problem |
| CO3 | Solve the problems using various machine learning techniques      |
| CO4 | Implement various machine learning techniques.                    |
| CO5 | Design application using machine learning techniques              |

### Part-A

1. Perform elementary mathematical operations in Octave/MATLAB like addition, multiplication, division and exponentiation.
2. Perform elementary logical operations in Octave/MATLAB (like OR, AND, Checking for Equality, NOT, XOR).
3. Create, initialize and display simple variables and simple strings and use simple formatting for variable.
4. Create/Define single dimension / multi-dimension arrays, and arrays with specific values like array of all ones, all zeros, array with random values within a range, or a diagonal matrix.
5. Use command to compute the size of a matrix, size/length of a particular row/column, load data from a text file, store matrix data to a text file, finding out variables and their features in the current scope.
6. Generate different subplots from a given plot and color plot data.
7. Perform vectorized implementation of simple matrix operation like finding the transpose of a matrix, adding, subtracting or multiplying two matrices.
8. Implement Linear Regression problem. For example, based on a dataset comprising of existing set of prices and area/size of the houses, predict the estimated price of a given house.
9. Based on multiple features/variables perform Linear Regression. For example, based on a number of additional features like number of bedrooms, servant room, number of balconies, number of houses of years a house has been built – predict the price of a house.

### Part-B

Implementation of Support Vector Machine

## Simulation & Modeling Lab

ACCS-16610

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Ability to implement queuing model using C++64 .                                      |
| CO2 | Use network simulators to analyze various network parameters                          |
| CO3 | Understand how to use MATLAB and its Functionality.                                   |
| CO4 | Use the concepts like branching statements,loops, functions and additional datatypes. |

### Part-A

1. Study of MATLAB,its features and components
2. Write a MATLAB program find the length of third side & area of the triangle
3. Write a MATLAB program to obtain the sum of all even no. from 0 to 20,using for loop
4. Write a MATLAB program to add the first 10 digits using While loop
5. Write a MATLAB program to check whether a given no. is greater than or equal to 50, using if else
6. Write a MATLAB program for solving higher order equation in octave
7. Write a MATLAB program to plot the curve given by equation  $y = x^2$
8. Introduction regarding usage of any Network Simulator.
9. Write a MATLAB program to display of Matrix

### Part-B

Implement calculator on MATLAB using GUI tool.



## Multimedia and its Application Lab

ACCS-16611

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |   |
|-----|---|
| CO1 | To identify the basic multimedia content types and outline the formats for the multimedia types.  |
| CO2 | To prepare and compile Flash Movie programs that uses the multimedia content types using Action Script.   |
| CO3 | To identify and apply different statement constructs such as data type checking, inheritance and event handling techniques for the Action Script. |

### Part-A

1. Introduction to various Multimedia Tools
2. Introduction to Corel Draw
3. Drawing Posters and Designing Brochures, Letterhead and data merge
4. Introduction to Photoshop: Image Editing Techniques , The image Editing tool Workspace-navigation, the tools, palettes, arranging document windows. All about pixels, resolution, and color Depth. Understanding and using color modes- RGB, CMYK and Grayscale. •
5. Basic techniques :Using brushes, Choosing colors ,• Sampling colors from an image,• Using Pantone colors. • Multiple undo and taking snapshots ,Using the History palette.
6. Cropping and rotating images,• Changing image size and resolution, Retouching ,Fixing images using the Clone ,Stamp Tool and the Healing tools .The history brush, The Red –Eye and color ,replacement tools ,Selection techniques ,the marquee and the lasso tools.
7. The quick selection tool, Working in quick mask mode ,Adding and subtracting selections, Saving a selection, Composition and design techniques
8. Working with layers-moving content to new layer , Transforming layers,Creating reflection and other effects,• Transformation-Scaling and rotating. Using colour fill layers ,Using gradients and patterns, Combing images with layer masks , Applying a Mask to an adjustments layer.
9. Color correction :-Using the levels command histogram, Curves and exposure ,Using the color balance command to modify color casts. Adjusting vibrance, Hue and Saturation: general and specific color range adjustment, colorising, Working with type , Working with type layers ,Formatting type , Converting type to pixels ,Effects and Filters ,• Working with layers Styles-Drop ,shadows, glows, bevels etc. Using filters-corrective and creative filtering technique, using the filter gallery.
10. Introduction to Adobe Flash, Tools in Adobe Flash, Shape Tween and Motion Tween Frame Animation, Creating Flash Banners, Basics of Action Scripting.
11. WireFraming, Introduction to Balsamiq, & Tools, Efficient design, Prototyping transitions, Creating a responsive website

## **Part-B**

1. Project 1: Photo Composite
2. Project 2: Poster Design
3. Project 3: Website Elements
4. Project 4: Landing page for Website

## Computer Graphics Lab

ACCS-16612

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | Understand the basic concepts of computer graphics.  |
| CO2 | Design scan conversion problems using C++ programming.   |
| CO3 | Apply clipping and filling techniques for modifying an object.                                 |
| CO4 | Understand the concepts of different type of geometric transformation of objects in 2D and 3D. |
| CO5 | Understand the practical implementation of modeling, rendering, viewing of objects in 2D       |

### Part-A

1. To plot a point (pixel) on the screen.
2. To draw a hut or other geometrical figures.
3. To draw a straight line using DDA Algorithm.
4. To draw a straight line using Bresenham's Algorithm.
5. Implementation of mid-point circle generating Algorithm.
6. Implementation of ellipse generating Algorithm.
7. To translate an object with translation parameters in X and Y directions.
8. To scale an object with scaling factors along X and Y directions.
9. To rotate an object with a certain angle about origin.
10. Perform the rotation of an object with certain angle about an arbitrary point.
11. To perform the reflection of an object about major axis.
12. To perform composite transformations of an object
13. To clip line segments against windows using line clipping.
14. Perform the clipping against windows using polygon clipping.
15. Implementation of flood-fill and boundary-fill algorithms

### Part-B

To study of any graphics animation software.

To create visual effects, motion graphics, and animation with any graphics software. (SYNFIG STUDIO or AFTER EFFECT etc...)

## Cyber Security Lab

ACIT-16502

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Students are expected to know the implementation of wired and wireless network |
| CO2 | Students are able to implement cyber attacks like DOS, Phishing.               |
| CO3 | Students are expected to know packet filtering technique.                      |
| CO4 | Students are able to implement reverse engineering.                            |
| CO5 | Students are able to perform Brute Force Attack.                               |
| CO6 | Students are expected to perform cryptography and steganography techniques.    |

### Part-A

1. To wireless network and implementation of Ad-hoc network.
2. Configuration of access point.
3. Implementation of Telnet.
4. Implementation of DoS/ DDoS attacks.
5. Implementation of SQL injecting and phishing attack.
6. Different software use for packet filtering like (wireshark).
7. Implementation of netbus, prorot and killerrat tool.
8. Implementation of reverse engineering (hex editor).
9. Implementation of bruteforce attack.

### Part-B

Implementation of RSA algorithm in any language (C, C++, Python )

# **BTECH CSE 7<sup>th</sup> /8<sup>th</sup> SEM**

## Theory of Computations

ACCS-16706

Internal Marks : 40

L T P

External Marks : 60

3 1 -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Understand the basic concepts of formal languages, automata and grammar types, as well as the use of formal languages and reduction in normal forms. |
| CO2 | Demonstrate the relation between regular expressions, automata, languages and grammar with formal mathematical methods                               |
| CO3 | Understand the principal models of computation such as finite automata, pushdown automata and Turing machines.                                       |
| CO4 | Understand the correspondence of the different language classes to the models of computation.  |
| CO5 | Design push down automata and Turing machines performing tasks of moderate complexity.   |
| CO6 | Analyze the syntax and formal properties of LL (k) and LR (k) grammars.  |

### Part-I

**Basics of Strings and Alphabets-** Definition of String, alphabets, languages, Grammar, Problem.

**Finite Automata** – DFA, Transition Diagram, Transition table, String acceptability by FA, non-deterministic FA, Conversion of N DFA to DFA, Comparison of DFA & N DFA, Design of Finite Automata, Mealy & Moore Machines & its conversion, Comparison of Mealy & Moore Machine, 2 way Finite automata (2DFA), Definition of dead state & unreachable state, Minimization of FA, Applications of FA.

### Part-II

**Formal Languages-** Definition of grammar, Derivation & language generated by grammar, Chomsky Hierarchy, Languages & automata.

**Regular Sets & Regular Grammar-** Definition of Regular expressions & regular sets, properties of regular expressions, Finite Automata & Regular Expression, Definition of pumping lemma for regular sets, Regular sets & regular grammar.

### Part-III

**Context Free Languages** – Derivation tree, Leftmost and Rightmost derivation, ambiguity in grammar, definition of pumping lemma for CFL, Simplification of CFG (Reduction, Null & Unit Productions), Normal forms-CNF, GNF, KNF.

**Pushdown Automata** – Definition of PDA, Acceptance by PDA, PDA with two stacks, context free languages and PDA.

### Part-IV

**Turing Machines** -Basic Model, Definition of TM, types of TM, String acceptability by Turing Machine, Representation of Turing Machine, Design of Turing Machine, Post Correspondence Problem.

Definition of LL(k) Grammar, LR(k) Grammar, Properties, Difference between LL(k) & LR(k) grammar, Decidability and Recursively Enumerable Languages.

**Suggested Readings/Books**

1. K.L.P. Mishra and N. Chandrasekaran, **“Theory of Computer Science, Third Edition”**, PHI Learning Private Limited, 2011.
2. John E. Hopcroft, Rajeev Motwani, Jeffrey D. Ullman, **“Introduction to Automata Theory”**, Languages and Computation, Pearson Education.
3. M. Sipser, **“Introduction to the Theory of Computation”**, Second Edition, Cengage Learning.
4. K. V. N. Sunitha , N. Kalyani, **“Formal Languages and Automata Theory”**, McGraw-Hill, 2010.

## Artificial Intelligence

ACCS-16707

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Identify problems from multidisciplinary fields that are amenable to solution by AI methods, and which AI methods may be suited to solving a given problem.                |
| CO2 | Formalize a given problem in the language/framework of different AI methods (e.g., as a search problem, as a constraint satisfaction problem, as a planning problem, etc). |
| CO3 | Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).   |
| CO4 | Inference and reason out from the given facts that helps in decision making.   |
| CO5 | Design and carry out an empirical evaluation of different algorithms on a problem formalization, and state the conclusions that the evaluation supports.                   |

### Part-I

**Introduction to AI:** Definition of Intelligence, Definition and Importance of Artificial Intelligence, Turing Test, Recent AI Applications

**Problem Solving-** Definition & Characteristics of problem, formulating problems, problem types, states and operators, state space search

**Heuristic Based Search :** search strategies, uninformed and informed search, Heuristic Search, Heuristic function , Generate and Test, Best first search, A\* algorithm, Problem Reduction, AO\* Search, Hill Climbing, Constraint Satisfaction Problem, Crypt arithmetic problems, Means End Analysis

### Part-II

**Game Playing -** Perfect decision game, imperfect decision game, evaluation function, MiniMax Algorithm, alpha-beta pruning

**Inferencing & Reasoning:** logical reasoning, Modus Ponens Rule, Modus Tollens Rule, inductive reasoning, deductive reasoning, formal reasoning, analogical reasoning, mono tonic and non monotonic reasoning, probabilistic reasoning, forward chaining, backward chaining, resolution, unification

**AI languages –** Features of LISP, CLIPS

### Part-III

**Planning-** Definition, linear & non linear planning, reactive & non reactive systems, Components of planning, planning in the blocks world, partial order planning, hierarchical planning, conditional planning, resource constraints, temporal constraints

**Uncertainty -** Basic probability, Bayes rule, Belief networks

**Fuzzy Set and Fuzzy System :** Fuzzy logic, Crisp Sets, Fuzzy Sets, Fuzzy Membership and Fuzzy Operations, Properties of Fuzzy Sets, Fuzzy System, Inference in Fuzzy Logic , Fuzzy Rule Based System, Applications of Fuzzy Logic



## **Part- IV**

**Neural Networks and Learning:** Fundamentals of Artificial Neural Network(ANN), Architectures of ANN (Feed Forward and Feedback N/W), Supervised, unsupervised and reinforcement learning

**Genetic Algorithm:** Introduction, Representation, initialization and selection, operators, mutation.

**Natural Language Processing:** Introduction to Natural language processing, Syntactic processing, Semantic processing, Pragmatic processing.

### **Suggested / Readings & Books**

1. Stuart Russell and Peter Norvig. Artificial Intelligence – A Modern Approach, Pearson Education Press, 2001.
2. Kevin Knight, Elaine Rich, B. Nair, Artificial Intelligence, McGraw Hill, 2008.
3. George F. Luger, Artificial Intelligence, Pearson Education, 2001.
4. Nils J. Nilsson, Artificial Intelligence: A New Synthesis, Morgan Kauffman, 2002.

## Cloud Computing

ACCS-16708

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing.  |
| CO2 | Apply fundamental concepts in cloud infrastructures to understand the tradeoffs in power, efficiency and cost, and then study how to leverage and manage single and multiple datacenters to build and deploy cloud applications that are resilient, elastic and cost-efficient. |
| CO3 | Discuss system, network and storage virtualization and outline their role in enabling the cloud computing system model. Virtual Machine creation and deployment.  |
| CO4 | Illustrate the fundamental concepts of cloud storage, network, and demonstrate their use in storage systems such as Amazon web services, Azure and Google Cloud.  |
| CO5 | Broadly educate to know the impact of engineering on legal and societal issues involved in addressing the security issues of cloud computing.   |

### Part-I

**INTRODUCTION** :- Overview of Existing Hosting Platforms, Cluster Computing, Grid Computing, Utility Computing, Autonomic Computing, Introduction to Cloud Computing, Cloud Computing history and evolution, practical applications of cloud computing for various industries, economics and benefits of cloud computing, Driving factors towards cloud.

**CLOUD COMPUTING CONCEPTS**: - Concepts of cloud computing, positioning cloud to a grid, infrastructure, Elasticity and scalability, billing and metering of services.

### Part-II

**CLOUD COMPUTING ARCHITECTURE** :- Cloud architecture model, Cloud deployment models, Public clouds, Hybrid clouds, Community, Virtual private clouds, Cloud based services:- IAAS, PAAS, SAAS, Selection criteria for cloud deployment

**VIRTUALIZATION**: - Virtualization, Advantages and disadvantages of Virtualization, Types of Virtualization, Resource Virtualization i.e. Server Storage and Network virtualization, hypervisors, multitenancy and types, API.

### Part-III

**SECURITY IN CLOUD COMPUTING** :- Cloud security, Understanding security risks, Threats and Attacks, Internal security breaches, Data corruption or loss, User account and service hijacking, Steps to reduce cloud security breaches, Detection and forensics, Identity management, Benefits of identity,SLA,Resource Management.

### Part-IV

**SECURITY IN CLOUD COMPUTING:** - Encryption techniques, Encryption & Encrypting data, Symmetric key encryption, Asymmetric key encryption, Digital signature, what is SSL

**CASE STUDIES:** - IBM Smart Cloud, Amazon Web Services, Google Cloud platform, Windows Azure platform, a comparison of Cloud Computing Platforms, Common building Blocks.

**Suggested Readings/Books**

1. Raj Kumar Buyya, James Broberg, Andrezej M.Goscinski, Cloud Computing: Principles and paradigms, 2011
2. Judith Hurwitz, Robin Bllor, Marcia Kaufman, Fern Halper, Cloud Computing for dummies, 2009.
3. Barrie Sosinsky, Cloud Computing Bible, Wiley, 2011.
4. Borko Furht, Armando Escalante (Editors), Handbook of Cloud Computing, Springer, 2010.

## Soft Computing

ACCS-16709

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Learn about soft computing techniques and their applications. |
| CO2 | Analyze various neural network architectures.                 |
| CO3 | Understand perceptrons and counter propagation networks.      |
| CO4 | Define the fuzzy systems.                                     |
| CO5 | Analyze the genetic algorithms and their applications.        |

### Part- I

#### INTRODUCTION TO SOFT COMPUTING AND NEURAL NETWORKS:

Evolution of Computing: Soft Computing Constituents, From Conventional AI to Computational Intelligence: Machine Learning Basics.

### Part- II

#### FUZZY LOGIC

Fuzzy Sets, Operations on Fuzzy Sets, Fuzzy Relations, Membership Functions: Fuzzy Rules and Fuzzy Reasoning, Fuzzy Inference Systems, Fuzzy Expert Systems, Fuzzy Decision Making.

### Part- III

#### NEURAL NETWORKS

Machine Learning Using Neural Network, Adaptive Networks, Feed forward Networks, Supervised Learning Neural Networks, , Supervised Learning Unsupervised Learning , Reinforcement Learning Neural Networks, Adaptive Resonance architectures, Advances in Neural networks

### Part- IV

#### GENETIC ALGORITHMS

Introduction to Genetic Algorithms (GA), Applications of GA in Machine Learning, Machine Learning Approach to Knowledge Acquisition.

#### Suggested Readings/Books

- 1.Fuzzy Logic: A Practical approach, F. Martin, , Mc neill, and Ellen Thro, AP Professional, 2000.
- 2.Fuzzy Logic with Engineering Applications (3rd Edn.), Timothy J. Ross, Willey, 2010.
- 3.Foundations of Neural Networks, Fuzzy Systems, and Knowledge Engineering, Nikola K. Kasabov, MIT Press, 1998.
- 4.Fuzzy Logic for Embedded Systems Applications, Ahmed M. Ibrahim, Elsevier Press, 2004.

**Data Analytics**  
**ACCS-16713**

**Internal Marks : 40**

**L T P**

**External Marks : 60**

**3 - -**

**Total Marks : 100**

**Course Outcomes:**

|            |   |
|------------|---|
| <b>CO1</b> | Students can carry out standard data visualization and formal inference procedures and can comment on the results.  |
| <b>CO2</b> | Students can choose appropriately from a wider range of exploratory and inferential methods for analyzing data, and can interpret the results contextually.                                     |
| <b>CO3</b> | In addition to exploratory and inferential analysis, students can construct complex statistical models, assess the fit of such models to the data, and apply the models in real-world contexts. |
| <b>CO4</b> | Students can also compare the performance of multiple methods and models  |

**Part-I**

Regression modeling, Multivariate analysis, Bayesian modeling, inference and Bayesian networks, Support vector and kernel methods, Analysis of time series: linear systems analysis, nonlinear dynamics - Rule induction - Neural networks: learning and generalization, competitive learning, principal component analysis and neural networks; Fuzzy logic: extracting fuzzy models from data, fuzzy decision trees, Stochastic search methods.

**Part-II**

Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments – Counting oneness in a window – Decaying window - Realtime Analytics Platform(RTAP) applications - case studies - real time sentiment analysis, stock market predictions.

**Part-III**

Mining Frequent item sets - Market based model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent itemsets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data – CLIQUE and PROCLUS – Frequent pattern based clustering methods – Clustering in non-euclidean space – Clustering for streams and Parallelism.

**Part-IV**

MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications.

**TEXT BOOKS:**

1. Michael Berthold, David J. Hand, Intelligent Data Analysis, Springer, 2007.
2. Anand Rajaraman and Jeffrey David Ullman, Mining of Massive Datasets, Cambridge University Press, 2012.

**REFERENCES:**

1. Bill Franks, Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with advanced analytics, John Wiley & sons, 2012.
2. Glenn J. Myatt, Making Sense of Data, John Wiley & Sons, 2007 Pete Warden, Big Data Glossary, O' Reilly, 2011.
3. Jiawei Han, Micheline Kamber "Data Mining Concepts and Techniques", Second Edition, Elsevier, Reprinted 2008.

## Software Project Management

ACCS-16710

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |  |
|-----|--|
| CO1 | Identify the different project contexts and suggest an appropriate management strategy.                                      |
| CO2 | Practice the role of professional ethics unsuccessful software development.  |
| CO3 | Identify and describe the key phases of project management.  |
| CO4 | Determine an appropriate project management approach through an evaluation of the business context and scope of the project. |

### Part- I

**Project Management Fundamentals:** Basic Definitions, Project Stakeholders and Organizational, Influences on Project Management, Project Management Processes, Project Initiating Processes.

**Planning and Resourcing a Project:** Identifying Requirements, Creating the Work Breakdown structure, developing the Project Schedule, Developing a Project Cost Estimate, Planning Quality and Organizing the Project Team.

### Part- II

Planning for Potential Risks, Managing Contracts, types of Contracts, Stages in Contract Placement, Typical Terms of a Contract, Contract Management and Acceptance.

**Executing and Managing a Project:** Project Executing Processes- Acquiring and Developing the Project Team, Managing the Project Team, Managing Stakeholder Expectations.

### Part- III

**Project Monitoring and Controlling Processes:** Verifying and controlling Scope, Managing Schedule and Cost, Monitoring and Controlling Risks, Project termination review.

**Software Project Testing Techniques:** Software testing life cycle, Issues in Object Oriented Testing, Fault-Based Testing, Scenario-Based Testing, Random Testing and Partition Testing for Classes, Inter Class Test Case Design.

### Part- IV

Testing Client/Server Systems, Testing Web based Systems, Testing Off the-Shelf Software, Testing in Multiplatform Environment, Testing for Real Time Systems, Testing Security.

**Project Closing Process:** Closing a Project

### Suggested Readings/Books

1. Bob Hughes, Mike Cotterell, "Software Project Management", Tata McGraw Hill. (2009).
2. Software Engineering - Somerville (Addison Wesley)
3. Software Engineering-Pressmen.

# Object Oriented Analysis and Design with UML

ACCS-16711

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Select the basic elements of modeling such as Things, Relationships and Diagrams depending on the views of UML Architecture and SDLC.         |
| CO2 | Apply basic and Advanced Structural Modeling Concepts for designing real time applications.   |
| CO3 | Design Class and Object Diagrams that represent Static Aspects of a Software System.  |
| CO4 | Analyze Dynamic Aspects of a Software System using Use Case, Interaction and Activity Diagrams.   |
| CO5 | Apply techniques of State Chart Diagrams and Implementation Diagrams to model behavioral aspects and Runtime environment of Software Systems. |

## Part- I

Introduction to object oriented systems, Classes, Objects, Abstraction, Inheritance, Polymorphism, Encapsulation, Message Sending, Association, Aggregation, Iterative development and the Unified Process (UP), UP phases: Inception, Elaboration, Construction and Transition, Object-oriented metrics

## Part- II

Introduction to UML, Use Cases and functional requirements, Identifying and writing Use Cases, Decomposition of use cases, Modeling System Workflows using Activity Diagrams, Modeling a System's Logical Structure using Classes and Class Diagrams, Modeling Interactions using Sequence Diagrams and Communication Diagrams, Timing Diagrams, Interaction Overview Diagrams, Component Diagram, Package diagram, State Machine Diagrams, Deployment Diagrams

## Part- III

Introduction to Patterns, GoF Patterns, Creational Patterns, Structural Patterns, Behavioral Patterns, Software Architectural patterns, The Observer Pattern, The Template Method Pattern , Factory Patterns: Factory Method and Abstract Factory , The Singleton Pattern , The Iterator Pattern , The Composite Pattern , The Facade Pattern , The State and Strategy patterns , Command Pattern , The Adapter Pattern , The Proxy Pattern , The Decorator Pattern, The Visitor Pattern , AntiPatterns, Patterns for Assigning Responsibilities: GRASP Patterns

## Part-IV

Domain modeling, assigning responsibility using sequence diagrams, mapping design to code, CASE tools, Unit, Cluster, and System-level testing of Object-oriented programs, Aspect- oriented and Service-oriented software.

## Suggested Readings/Books

1. Grady Booch, James Rumbaugh, Ivar Jacobson ,“The Unified Modeling Language User Guide”, Pearson Education.
2. Hans-Erik Eriksson, Magnus Penker, Brian Lyons, David Fado, “UML 2 Toolkit”, WILEY-Dreamtech India Pvt. Ltd.
3. Meilir Page-Jones,“Fundamentals of Object Oriented Design in UML”, Pearson Education.



4. Pascal Roques, “Modeling Software Systems Using UML2”, WILEY - Dreamtech India Pvt. Ltd.

## HAINA (Routing and Switching Technology)

ACCS-16712

Internal Marks : 40

L T P

External Marks : 60

3 - -

Total Marks : 100

Course Outcomes:

|     |   |
|-----|---|
| CO1 | Understand and describe the devices and services used to support communications in data networks and the Internet.                        |
| CO2 | Understand and describe the role of protocol layers in data networks  |
| CO3 | Understand and describe the importance of addressing and naming schemes at various layers of data networks in IPv4 and IPv6 environments. |
| CO4 | Understand the concepts of network security and various network security standards.   |
| CO5 | Clear HCNA Routing and Switching certification exams.   |

### Part- I

Basic Enterprise Network Architectures, Enterprise Network Constructs, Ethernet Framing, IP Addressing, Internet Control Message Protocol, Address Resolution Protocol, Transport Layer Protocols, Data Forwarding Scenario, Expanding the Huawei Enterprise Network, Navigating The CLI, File System Navigation and Management.

### Part- II

VRP Operating System Image Management, Establishing a Single Switched Network, Spanning Tree Protocol, Rapid Spanning Tree Protocol, Segmenting the IP Network, IP Static Routes, Distance Vector Routing with RIP, Link State Routing with OSPF, DHCP Protocol Principles, FTP Protocol Principles, Telnet Protocol Principles, Advanced Enterprise Solutions Overview.

### Part- III

Link Aggregation, VLAN Principles, GARP and GVRP, VLAN Routing, Wireless LAN Overview, Bridging Enterprise Networks with Serial WAN Technology, Frame Relay Principles Establishing DSL Networks with PPPoE, Network Address Translation, Establishing Enterprise Radio Access Network Solutions, Access Control Lists, AAA.

### Part- IV

Securing Data with IPsec VPN, Generic Routing Encapsulation, Simple Network Management Protocol, eSight Network Management Solutions, Introducing IPv6 Networks, IPv6 Routing Technologies, IPv6 Application Services DHCPv6.

### Suggested Readings/Books

1. Routing and Switching Technology Student Guide Volume I
2. Routing and Switching Technology Lab Guide Volume I
3. Routing and Switching Technology Student Guide Volume II
4. Routing and Switching Technology Lab Guide Volume II

## Artificial Intelligence Lab

ACCS-16702

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |   |
|-----|---|
| CO1 | To provide students with in-depth theoretical and practical base for the development of AI based systems in multidisciplinary fields. |
| CO2 | Formalize a given problem in the language/framework of different AI methods.  |
| CO3 | To learn control structures of functional, logic, and imperative programming language.  |
| CO4 | Implement basic AI algorithms (e.g., standard search algorithms or dynamic programming).  |
| CO5 | To Understand how the basic program evaluation mechanism works by goal satisfaction.  |

### Part- A

#### List of Practical

1. Write a program to implement Breadth first Search
2. Write a program to implement Depth first Search
3. Write a program to implement Best first Search
4. Write a program to implement A\* algorithm
5. Solve the crypt arithmetic problems
6. Write any program to implement heuristic search procedure.
7. Write a program to implement water jug problem.
8. Write a program to implement Tower of Hanoi
9. Write a program for Tic Tac Toe
10. Write a program for 3x3 puzzle

### Part- B

- Analyse and implement code for any two games:
  - Flappy Bird
  - Face the hurdle
  - Forest
  - Marble One
  - Brick Hunter
  - Number puzzle
  - Hangman
  - Ping Pong

- Snake Master
- Dyno
- Battle Tank
- Sudoku
- Car game
- Minesweepers
- T-Rex
- Develop a code for any game of your choice.

## Software Project Management Lab

ACCS-16703

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |   |
|-----|---|
| CO1 | Apply project management concepts and techniques to an IT project.  |
| CO2 | Identify issues that could lead to IT project success or failure.   |
| CO3 | Identify project management in terms of the software development process.   |
| CO4 | Describe the responsibilities of IT project managers.   |
| CO5 | Apply project management concepts through working in a group as team leader or active team member on an IT project. |

### Part- A

#### List of Practical

- Develop Flow-Charts to understand basic problem solving technique by the help of Raptor tool.
- Develop requirements specification for a given problem
- Develop DFD model (level-0, level-1 DFD and Data dictionary) of the project
- Structured design for the developed DFD model
- Develop UML Use case model for a problem
- Develop sequence diagram
- Develop Class diagram
- Develop java programming language code for sample class diagram
- Use of testing tool such as Junit
- Project management using Gantt Project
- Version control using Subversion

### Part-B

#### Case Study of any Website

## Object Oriented Analysis and Design with UML Lab

ACCS-16704

Internal Marks : 30

L T P

External Marks : 20

- - 2

Total Marks : 50

### Course Outcomes:

|     |  |
|-----|--|
| CO1 | Show the importance of systems analysis and design in solving complex problems.  |
| CO2 | Show how the object-oriented approach differs from the traditional approach to systems analysis and design   |
| CO3 | Construct various UML models (including use case diagrams, class diagrams, interaction diagrams, state chart diagrams, activity diagrams, and implementation diagrams) using the appropriate notation. |
| CO4 | Recognize the difference between various object relationships: inheritance, association, whole-part, and dependency relationships.   |
| CO5 | Show the role and function of each UML model in developing object oriented software.   |

### Part-A

#### List of practical

1. To draw the diagrams [usecase, activity, sequence, collaboration, class] for the Passport automation system.
2. To draw the diagrams [usecase, activity, sequence, collaboration, class] for the Book bank registration system.
3. To draw the diagrams [usecase, activity, sequence, collaboration, class] for the Exam registration system.
4. To draw the diagrams [usecase, activity, sequence, collaboration, class] for the Stock maintenance system.
5. To draw the diagrams [usecase, activity, sequence, collaboration, class] for the Online course reservation system.
6. To draw the diagrams [use case, activity, sequence, collaboration, class] for the E-ticketing system.
7. To draw the diagrams [usecase, activity, sequence, collaboration, class] for Credit Card Processing
8. To draw the diagrams [usecase, activity, sequence, collaboration, class] for Software personnel management system
9. To draw the diagrams [usecase, activity, sequence, collaboration, class] for E-book management system
10. To draw the diagrams [usecase, activity, sequence, collaboration, class] for Recruitment system.

### Part – B

Students will be implementing the following small applications

1. ATM System
2. Course Registration System
3. Expert System
4. Online Reservation System
5. Quiz System
6. Student Mark Analysis System
7. Library Management System

8. Course Registration System
9. Payroll system
10. Online Purchase System

**HAINA Lab(Routing and Switching Technology)**

**ACCS-16705**

**Internal Marks : 30**

**L T P**

**External Marks : 20**

**- - 2**

**Total Marks : 50**

**Course Outcomes:**

|            |  |
|------------|--|
| <b>CO1</b> | Identification of Network Fundamentals.                                  |
| <b>CO2</b> | Identification and configuration of LAN switching technologies.          |
| <b>CO3</b> | Description, implementation and verification of IP routing technologies. |
| <b>CO4</b> | Identification and configuration of different protocols.                 |
| <b>CO5</b> | Identification and configuration of infrastructure services.             |

**Part-A**

Module 1 Establishing basic networks with ENSP

Module 2 Basic device navigation and configuration

Module 3 STP and RSTP

**Part-B**

Module 4 Routing configuration

Module 5 FTP and DHCP