Master of Computer Application
(MCA)

STRUCTURE & SYLLABUS
(2020-2021)

Department of Computer Science & Engineering and Application

Sambalpur University Institute of Information Technology

(SUIIT)

Sambalpur University, Jyoti Vihar-768019, Burla

PROGRAM OUTCOME

On completion of MCA degree, the graduates will be able to:

PO-1	**Critical Thinking**: Take informed actions after identifying the assumptions that frame our thinking and actions
PO-2	**Effective Communication**: Will be able to speak, read, write and listen clearly in person and through electronic media in English and in one Indian Language
PO-3	**Social Interaction** (Interpersonal Relation): Elicit views of others, mediate disagreements and prepared to work in team
PO-4	**Entrepreneurship Capability**: Demonstrate qualities to be prepared to become an entrepreneurship
PO-5	**Ethics**: Recognize different value systems including your own, understand the moral dimensions and accept responsibility for them
PO-6	**Environment and Sustainability**: Understand the issues of environmental contexts and sustainable development
PO-7	**Life-Long Learning**: Acquire the ability to engage in independent and life-long learning in the context of socio-technological changes

Course Structure
Masters of Computer Applications

Semester – I						
Code	**Course Title**	**Category**	**L**	**P**	**T**	**Credits**
MC 511	Mathematical Foundations of Computer Science	CC	4	0	0	3
MC 512	Database Management Systems	CC	4	0	0	3
MC 513	Programming and Data Structures	CC	3	0	1	3
MC 514	Operating Systems	CC	4	0	0	3
MC 515	Computer Systems Architecture	CC	4	0	0	3
MC 516	Programming and Data Structures Lab.	CL	0	3	0	2
MC 517	Database Management Systems Lab.	CL	0	3	0	2
MC 518	Communicative English Lab.	CL	0	2	0	2
Total Credit:						**21**

Semester – II						
Code	**Course Title**	**Category**	**L**	**P**	**T**	**Credits**
MC 521	Software Engineering	CC	4	0	0	3
MC 522	Object Oriented Programming using Java	CC	3	0	1	3
MC 523	Design and Analysis of Algorithms	CC	3	0	1	3
MC 524	Data Communication and Computer Networks	CC	4	0	0	3
MC 525	Theory of Computation	CC	3	0	0	3
MC 526	Object Oriented Programming using Java Lab.	CL	0	3	0	2
MC 527	Design and Analysis of Algorithms Lab.	CL	0	3	0	2
MC 528	UML Lab.	CL	0	2	0	2
Total Credit:						**21**

Semester – III						
Code	**Course Title**	**Category**	**L**	**P**	**T**	**Credits**
MC 531	Information and Cyber Security	CC	4	0	0	3
MC 532	Artificial Intelligence	CC	4	0	1	3
MC 533	Web Technology	CC	4	0	0	3
MC 534	Elective-I 1. Machine Learning 2. Soft Computing 3. Mobile Computing 4. Computer Graphics 5. Simulation andModeling 6. Compiler Design	MOOC/CE	3	0	0	3
MC 535	Elective-II 1. Data warehousing and Data Mining 2. Cloud Computing 3. Big Data Analytics 4. Wireless Sensor Networks 5. Advanced Databases 6. Management Support Systems	CE	3	0	0	3
MC 536	Open Source Lab	CL	0	3	0	2
MC 537	Web Technology Lab	CL	0	3	0	2
MC 538	Technical Seminar	TS	0	2	0	2

Total Credit:						21
Semester – IV						
Code	**Course Title**	**Category**	**L**	**P**	**T**	**Credits**
MC 561	Project Work	PW				12
MC 564	Comprehensive Viva – Voce	CV				6
Total Credit:						**18**

SEMESTER WISE CREDIT DISTRIBUTION					
Semester	**I**	**II**	**III**	**IV**	**TOTAL**
Total Credit	**21**	**21**	**21**	**18**	**81**

SPECIAL INSTRUCTION FOR SEMINAR:

- For technical seminar, students shall choose a topic from the latest technological developments / research in Computer Science and Application or in allied fields in consultation with the faculty. They shall submit synopsis for the presentation in an approved format on the day of presentation.
- Project work and Comprehensive Viva-Voce shall be as per Academic & Examination Guidelines of SUIIT.

Semester – I						
Code	**Course Title**	**Category**	**L**	**P**	**T**	**Credits**
MC 511	Mathematical Foundations of Computer Science	FC	4	0	0	3
MC 512	Database Management Systems	CC	4	0	0	3
MC 513	Programming and Data Structures	CC	3	0	1	3
MC 514	Operating Systems	CC	4	0	0	3
MC 515	Computer Systems Architecture	CC	4	0	0	3
MC 516	Programming and Data Structures Lab.	LC	0	3	0	2
MC 517	Database Management Systems Lab.	LC	0	3	0	2
MC 518	Communicative English Lab.	LC	0	2	0	2
					Total Credit:	**21**

Mathematical Foundations of Computer Science

Course Code	**MC 511**	**L-P-T-Cr.:**	**4**	**0**	**0**	**3**	**Semester:**		**I**

Category: Core Course

Prerequisite: NA

Objective:

- To introduce the concepts of mathematical logic.
- To introduce the concepts of sets, relations, and functions.
- To perform the operations associated with sets, functions, and relations.
- To relate practical examples to the appropriate set, function, or relation model, and interpret the associated operations and terminology in context.
- To introduce generating functions and recurrence relations.
- To use Graph Theory for solving problems.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Mathematical Foundations of Computer Science
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: Logic **(12 Hours)**

Propositional logic, predicate calculus, Theory of inference, modus pones, resolution, clause system, (CNF, DNF, PDNF, PCNF, NNF), completeness, soundness, network applications. Fuzzy logic: fuzzy relation, pattern classification, fuzzy analysis, distance between fuzzy sets, area perimeter, height, width of fuzzy subsets.

UNIT – II: Number System **(12 Hours)**

Introduction to number system, residue arithmetic, application of residue arithmetic to computers, binary operation of residue numbers, Fermat's theorem, Euler Theorem, Text Coding, RSA.

UNIT – III: Combinatorics Graph Theory **(12 Hours)**

Basic concept of graph theory, directed and undirected graph, matrix representation, graph manipulation, Dijkstra algorithm, all pair shortest path problem, Centre of graph, Tree and Text coding. Counting principle, Pigeon- hole principle, principle of inclusion and exclusion, recurrence relations, Method of proofs.

UNIT – IV: Algebraic Structure **(12 Hours)**

Semi groups and monodies, Group, subgroup, homomorphism, co-sets, normal subgroup, Lagrange's theorem , algebraic system of two binary operation, lattices, partial order set, properties of lattices, special lattices, Boolean algebra, Boolean function and simplification, group codes, parity check, single error correcting code.

TEXT BOOKS:

C. L. Liu, Elements of Discrete Mathematics, McGraw-Hill.
K. H. Rosen, Discrete Mathematics and applications, Tata Mc Graw Hill

REFERENCE BOOKS:

J .L. Mott, A. Kandel, T.P .Baker, Discrete Mathematics for Computer Scientists and Mathematicians, second edition 1986, Prentice Hall of India.

R. Grimaldi and B V Ramana, Discrete and combinatorial mathematics: An applied introduction, Pearson education.

Database Management Systems

Course Code	**MC 512**	**L-P-T-Cr.:**	**4**	**0**	**0**	**3**	**Semester:**		**I**

Category: Programme Core Course

Prerequisite: Basic Knowledge of Computer Programming and data structures

Objective

- Classify modern and futuristic database applications based on size and complexity.
- Design a database from understanding an Universe of Discourse, using ER diagrams.
- Map ER model into Relational model and to normalize the relations.
- Create a physical database from a design using DDL statements with appropriate key, domain and referential integrity constraints;
- Analyze different ways of writing a query and justify which is the effective and efficient way.
- Compare and contrast various indexing strategies in different database systems and list key challenges in advanced database systems and to critique how they differ from traditional database systems.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Database Management Systems of Computer Science.
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I:INTRODUCTION TO DATABASE SYSTEMS (10 Hours)

Data - Database Applications - Evolution of DB & DBMS - Need for data management – Data models & Database Schema Architecture - components of DBMS - Key issues and challenges in Database Systems

E/R Model - Conceptual data modeling -E/R diagram notation, ER Diagrams - Relational Model - ER to Relational Mapping - Constraints - Keys – Dependencies examples.

UNIT –II: DATABASE LANGUAGE AND DATABASE DESIGN (10 Hours)

Introduction to Database Languages: Relational Algebra, Relational Calculus, SQL - Introduction, data definition in SQL, table, key and foreign key definitions, update behaviors. Querying in SQL, notion of aggregation, aggregation functions group by and having clauses, embedded SQL.

Database Design: Introduction to Functional Dependency and Normalization – Concept of functional dependency, First, Second, Third & Fourth Normal Forms - BCNF – Join Dependencies-other Normal forms

UNIT –III: TRANSACTIONS & CONCURRENCY AND PHYSICAL DATABASE DESIGN (10 Hours)

Introduction to Transactions: Transaction Systems - ACID Properties - System & Media Recovery - Two Phase Commit Protocol - Recovery with SQL - Need for Concurrency Locking Protocols - Deadlocks & Managing Deadlocks - SQL Support for Concurrency.

Storage Strategies: Indices, B-Trees, Hashing, Indexing.

UNIT –IV: QUERY PROCESSING AND ADVANCES IN DATABASES (10 Hours)

Query Processing and Optimization: Query Tree, Evaluation of Relational Algebra Expressions, Query Equivalence, Join strategies, Query Optimization Algorithms.

Introduction to Special Topics : Spatial & Temporal Databases – Data Mining & Warehousing - Data Visualization - Mobile Databases - OODB & XML Databases - Multimedia & Web Databases.

TEXT BOOKS:

1. Elmaski & Navathe -Fundamentals of Database Systems, 4th Edition, Pearson Education

REFERENCE BOOKS:

1. Database Systems, Thomas Connolly, Carolyn Begg
2. C.J. Date - An introduction to Database Systems, Pearson Education
3. Avi Silberschatz, Henry F. Korth , S. Sudarshan,Database System Concepts
4. Bipin Desai -An introduction to Database System, Galgotia Publication.
5. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2002.

WEB REFERENCES

1. http://cs.stanford.edu/people/widom/cs346/ioannidis.pdf
2. http://nptel.ac.in/courses/106106093/

PROGRAMMING AND DATA STRUCTURES

Course Code	**MC 513**	**L-P-T-Cr.:**	**3**	**0**	**1**	**3**	**Semester:**		**I**

Category: Core Course

Prerequisite: Concept of C programming, Basics of Computer Architecture (Primary and Secondary storage structure)

Objective:

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To make students understand simple sorting and searching methods.
- To get clear understanding about the basic data structures and their operations, the concepts of algorithms, basic search and sort algorithms. Students will also gain adequate knowledge to choose appropriate data structure and algorithm to solveproblem.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Programming and data structures
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(12 Hours)**

Computer Fundamentals and Introduction to C: Role of computer and programming languages, compiler, interpreter, loader and linker, classification of programming languages, structured programming, concepts, algorithms and flowcharts.
Basics of C: Developing programs in C, a simple C program, structure of a C program, concept of a variable, data types in C, variables, program statement, declaration. All tokens, literals, operators and expressions, type conversions in C. Non-formatted input and output, formatted input and output.

UNIT – II: **(12 Hours)**

Control Statements: Introduction, conditional execution (if, if-else, nested if), selection (switch), unconditional types (break, continue, goto). **Loops:** Iteration and repetitive execution (for, while, do-while) nested loops.
Arrays and Strings: Introduction, definition, one dimensional array, two dimensional arrays, accessing elements and storing elements. **String**: Introduction, C characters and strings, character handling library, string conversion functions, standard input output library functions, comparison functions of string handling, string manipulation functions, search and memory functions of string handling library. **Searching:** Sequential Search, Binary Search. **Sorting:** Insertion sort, Bubble Sort, Selection Sort. **Pointers:** Introduction, Pointer variable definition and initialization.

UNIT – III: **(12 Hours)**

Functions: Designing structured programs, functions, basics, parameter passing, call by value and call by reference mechanism to working with functions-example programs. **Storage classes:** extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions and passing arrays to functions. Dynamic memory allocation. **Structures:** Declaring structures and structure variables, accessing members of a structure, arrays of structures, array within a structure. Structures and functions, pointers to structures. **Union:** Declaring union and its members, accessing and initializing members of a union, structure versus union.

UNIT – IV: (12 Hours)

Stack, application of Stack, Queue, Applications of Queue, Linked List, Tree, Definitions and Terminology, Binary tree and its types, Graph, Representation and Terminology.

TEXT BOOKS

1. Pradip Dey and Manas Ghosh, Programming in C, 2/e, Oxford University Press, 2013.
2. A Structured Programming Approach Using C, B.A. Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
3. Horowitz and Sahani, "Fundamentals of data structures", Galgotia.
4. Data Management and File Structures, Mary E. S. Loomis, PHI.

REFERENCE BOOKS

1. K.R.Venugopal and S.K.Prasad, Mastering C, McGraw Hill, 2009.
2. Ashok N. Kamthane, Programming with ANSI and Turbo C, Pearson Education, India.
3. Richard F. Gilberg & Behrouz A. Forouzan, Data Structures: A pseudo code approach with C, CENGAGE Learning.

OPERATING SYSTEM

Course Code	**MC 514**	**L-P-T-Cr.:**	**4**	**0**	**0**	**3**	**Semester:**		**I**

Category: Programme core course

Prerequisite: A course on "Computer Programming and Data Structures"
A course on "Computer Organization and Architecture"

Objective:

- Provide an introduction to operating system concepts (i.e., processes, threads, scheduling, synchronization, deadlocks, memory management, file and I/O subsystems and protection)Introduce the issues to be considered in the design and development of operating system.
- Introduce basic Unix commands, system call interface for process management, inter process communication and I/O in Unix

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Operating system
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: INTRODUCTION AND PROCESS MANAGEMENT (10 Hours)

Operating System Overview: -Introduction, The Need of Operating Systems, Evolution of Operating Systems, Types of Operating Systems, Simple Batch, Multiprogrammed, Time-shared, Personal Computer, Parallel, Distributed Systems, Real-Time Systems, System components, Operating System services, System Calls, Virtual Machines, System Design and Implementation.
Process Management – Process concepts, Life cycle, PCB, Schedulers, Process Scheduling, Threads, Scheduling Levels, CPU Scheduling: Scheduling-Criteria, Algorithms, Algorithm Evaluation, interprocess communication.

UNIT – II: CONCURRENCY CONTROL AND MEMORY MANAGEMENT (10 Hours)

Concurrency:-Process synchronization, The Critical- Section Problem, Peterson's Solution, synchronization Hardware, Semaphores, Classic problems of synchronization, Monitors
Memory Management:- Swapping, Contiguous Memory Allocation, Paging, Structure of the Page Table, Segmentation, Virtual memory, Demand Paging, Page-Replacement, Algorithms, Allocation of frames, thrashing.

UNIT – III: DEAD LOCK, FILE SYSTEMS (10 Hours)

Deadlocks:- System Model, Deadlock Characterization, Deadlock Prevention, Deadlock Detection and Avoidance, Recovery from Deadlock.
File system Interface: Concept of a File, Access Methods, Directory structure, File System Mounting, File sharing, Protection.
File System Implementation: File -system structure, File- system Implementation, Directory Implementation, Allocation methods, Free-Space Management, Efficiency and Performance,

UNIT – IV: MASS STORAGE, PROTECTION, SECURITY (10Hours)

Secondary Storage Structure: Overview of Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, Disk Formatting, Swap-Space Management, RAID structure.

Protection: Domain of Protection, Access Control, Access Matrix, Access Control Lists, Capability Lists.

Security: Security Objectives, Security Problems, Intruders, Inside System Attacks, Outside System Attacks, Cryptography as a Security Tool, Intrusion Detection System.

TEXT BOOKS:

1. Operating System Concepts- Abraham Silberchatz, Peter B. Galvin, Greg Gagne 7th Edition, John Wiley.
2. Principles of Operating systems- Naresh Chauhan,Oxford Higher Education.

REFERENCE BOOKS:

1. Operating Systems – Internal and Design Principles Stallings, Fifth Edition–2005, Pearson education.
2. Operating System A Design Approach-Crowley, TMH.

Modern Operating Systems, Andrew S Tanenbaum Pearson/PHI.

COMPUTER SYSTEMS ARCHITECTURE

Course Code **MC 515** **L-P-T-Cr.:** **4 0 0 3** **Semester:** **I**

Category: Programme Core Course

Prerequisite: **Digital Electronic Circuit**

Objective:

- To understand how computers are constructed out of set of functional units.
- To understand concrete representation of data at the machine level.
- To understand how these functional units operate, interact and communicate.
- Understand the design of processors, the structure and operation of memory, pipelining, system integration and peripherals.
- To understand the system interconnection and the different I/O techniques.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Computer systems architecture
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(12 hours)**

Digital logic Circuits: Digital Computers, Logic gates, Boolean algebra, Map Simplification, Combinational, Flip-flops and Sequential Circuits. decoders, Encoders, Multiplexers, Half and Full adders, Shift registers,Binary counter and memory unit.
DataRepresentation: Data types, complements, Fixed point representation, Floating point representation, Gray code and BCD codes.

UNIT – II: **(12 hours)**

Register Transfer and Micro operations: Register transfer language, register transfer, bus and memory transfers, arithmetic micro-operations, logic micro-operations, shift micro-operations, arithmetic logic and shift unit.
Basic Computer Organization and Design: instruction Codes, computer registers, computer Instructions, timing and control, instruction cycle, memory-references instructions, input-output and interrupt, design of the basic computer, design of accumulator logic.

UNIT – III: **(12 hours)**

Central Processing Unit: General register organization, stack organization, instruction formats, addressing modes, Data transfer and manipulation, Program control.
Computer Arithmetic: Introduction, addition and subtraction, decimal arithmetic unit, booth multiplication algorithm.

UNIT – IV: **(12 hours)**

Input/Output Organization: Peripheral devices,Input-Output Interface, Asynchronous data transfer, Modes of transfer, Priority Interrupt and DMA.
The Memory System: Some basic concepts, Memory Hierarchy, Auxiliary memory, Associative memory, Cache memories, cache memory techniques, Virtual memories.

TEXT BOOKS

1. M.Morris Mano, Computer System Architecture, 3/e, Pearson education, 2008.

REFERENCE BOOKS:

1. Carl Hamacher, ZvonkoVranesic, SafwatZaky, Computer Organization, 5/e, McGraw Hill, 2001.
2. John P. Hayes, Computer Architecture and Organization, 3/e, McGraw Hill, 1998.
3. William Stallings, Computer Organization and Architecture, 6/e, Pearson, PHI, 2012.

Other References: (Web)

PROGRAMMING AND DATA STRUCTURES LAB

Course Code	**MC 516**	**L-P-T-Cr.:**	**0**	**3**	**0**	**2**	**Semester:**		**I**

Category: Laboratory Course

Prerequisite: Programming & Data Structure

Objective: The student should be made to:

- Learn the algorithm analysis techniques.
- To get clear understanding about the basic data structures and their operations, the concepts of algorithms, basic search and sort algorithms. Student will also gain adequate knowledge to choose appropriate data structure and algorithm to solve a problem.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Programming and data structures lab
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

List of topics for writing programs:

1. Print statements, variables and simple arithmetic operations, mathematical series…etc.
2. Conditional statements (if, if…else, if…else if…else, switch case statement)
3. Loops: while(…){…}, do{…}while(…), for(…,…,…){}). Some other experiments related to like printing a pattern on the screen…etc.
4. Arrays: One dimensional, multi directional.
5. Strings
6. Pointers
7. User defined Functions
8. Structures and Unions
9. Sorting and Searching algorithms: Basic searching and sorting techniques on linear array.
10. Write a program to create an array dynamically, accept its members and sort the array using following sorting algorithm. Also count the total number of swaps.
    i. Bubble sort
    ii. Selection sort
    iii. Insertion sort
    iv. Quick sort
    v. Merge sort
11. Write a function search an element from the array using following searching techniques:
    i. Linear search
    ii. Recursive linear search
    iii. Binary search
    iv. Recursive binary search
    v. Ternary search
12. Write a structure for an integer stack, implement **push, pop, and peek, IsEmpty** and **IsFull** function. Write a main function and call the functions based on user's choice.

```
typedef struct stack{

int top;

int data[max];
```

}Stack;

13. Write a structure for an integer queue, implement **enqueue, dequeue, and traverse, IsEmpty** and **IsFull** function. Write a main function and call the functions based on user's choice.

```
typedef struct queue{

intfront,rear;

int data[max];

}Queue;
```

14. Write a program to implement queue using two stacks. Include mystack.h and do the program.
15. Write a structure for an integer circular queue, implement**enqueue, dequeue, and traverse, IsEmpty** and **IsFull** function. Write a main function and call the functions based on user's choice.

```
typedef struct circularQueue{

intfront,rear;

int data[max];

}Queue;
```

16. Create a singly linked list of integers, write functions to add elements at different places (beginning, end, at a specified position), delete a node from different positions (beginning, end, at a specified position) and traverse the linked list based on user's choice.
17. Write a program to implement stack using linked list.
18. Write a program to implement Queue using linked list.
19. Create a singly circular linked list of integers, write functions to add elements at different places (beginning, end, at a specified position), delete a node from different positions (beginning, end, at a specified position) and traverse the linked list based on user's choice.
20. Create a doubly linked list of characters, write functions to add elements at different places (beginning, end, at a specified position), delete a node from different positions (beginning, end, at a specified position) and traverse the linked list in both directions based on user's choice.
21. Declare a binary search tree (BST) where information at each node would be a single integer. Write recursive and non recursive (use mystack.h) functions for
    i. Inserting a key
    ii. Deleting a key from the tree.
    iii. Searching an element
    iv. Inorder , Preorder and Postorder traversal
    v. Finding height of the tree
    vi. Count number of nodes
    vii. Display leaf nodes
22. Declare an AVL Tree where information at each node would be a single integer. Write recursive functions for
    i. Inserting a key
    ii. Deleting a key from the tree.
    iii. Searching an element
23. Write a program to implement single threaded binary tree and perform the following functions.
    i. Inserting a key
    ii. Deletion of a key
    iii. In-order traversal using the thread
    iv. Maximum depth of the tree

24. Write a program for Breadth First Traversal of a graph.
25. Write a program for Depth First Traversal of a graph.

The above Laboratory exercises are to be carried out in 45 Hours (15 Laboratory classes)

DATABASE MANAGEMENT SYSTEMS LAB

Course Code **MC 517** **L-P-T-Cr.:** **0 3 0 2** **Semester:** **I**

Category: Laboratory Course

Prerequisite: RDBMS and computer programming language

Objective:

- Understand basic concepts of how a database stores information via tables. Understanding of SQL syntax used with MySQL.
- Learn how to retrieve and manipulate data from one or more tables. Know how to filter data based upon multiple conditions.
- Updating and inserting data into existing tables.
- Learning how the relationships between tables will affect the SQL.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Database management systems lab
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

LIST OF TOPICS FOR EXPERIMENTS:

PART A : SQL :

1. DDL Statements (Create, Alter, Drop)
2. DML Statements (Insert, Update, Delete)
3. SELECT Statement : Information retrieval
4. Use of In-built functions (e.g. aggregate functions like Min, Max, Average… etc, time date functions…)
5. TCL statements (COMMIT, ROLL BACK, CHECK POINT)
6. Views, Sequence, Types (ORDBMS)
7. Security Management Commands (like GRANT and REVOKE)

PART B : PL/ SQL:

1. Un-named block
2. Named Blocks (FUNCTIONS, PROCEDURES)
3. Active Database Concepts (TRIGGERS)
4. PACKAGES

REFERENCE BOOKS:

1. ORACLE PL/SQL by example. Benjamin Rosenzweig, Elena Silvestrova, Pearson Education 3rd Edition
2. ORACLE DATA BASE LOG PL/SQL Programming SCOTT URMAN, Tata Mc- Graw Hill.
3. SQL & PL/SQL for Oracle 10g, Black Book, Dr.P.S. Deshpande.

COMMUNICATIVE ENGLISH LAB

Course Code	**MC 518**	**L-P-T-Cr.:**	**0**	**2**	**0**	**2**	**Semester:**		**I**

Category: Laboratory Course

Prerequisite: Concept of C programming, Basics of Computer Architecture (Primary and Secondary storage structure)

Objective:

- To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency in spoken English and neutralize mother tongue influence
- To train students to use language appropriately for interviews, group discussion and public speaking

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Communicative English
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: Listening **(8 Hours)**

Listening to pre-recorded short episodes, conversations, passages, stories, news bulletin, speeches by famous personalities – Listening for general and specific information etc.,

UNIT – II: Reading **(8 Hours)**

Reading aloud – by students individually – reading rhymes – proverbs – passages on various topics of interest – Newspaper reading – Reading humorous passages – Anecdotes – Stories – tricky sounds (conditioners) – Reading manuals – Reading individual sentences with articulation, pronunciation, Tones, Punctuation, pauses etc…- Reading the titles of popular books, movies and poems.

UNIT – III: Speaking **(8 Hours)**

Self-introduction – introducing oneself, one's family – one's friends and relatives, one's country etc…
Welcome Address, Vote of thanks
Extempore speeches.
Short speech on simple topics on simpler themes for about one minute.
Role play – Group Discussion – Debate – Seminars – Machine Descriptions (depending upon branches) – Compering – Interviewing others by Asking Questions – Interview Techniques – Conversational Practice – Telephonic Conversation – Telephonic Interviews – How to establish conversation / dialogues – Entry Attempts/Admissions

UNIT – IV: Writing **(8 Hours)**

Writing Resume, preparing Curriculum Vitae.

Converting newspaper headlines into sentences.
Formation of Sentences – Using the table of Sentence-making and producing multiple sentences.
Framing Questions for the responses given
Tips for better performance in interviews.
Describing Objects
Describing Situations

UNIT – V: Professional Ethics & Organizational Behavior (8 Hours)

Different kinds of Ethics – Ethics in different fields – Engineering Ethics – Senses of Engineering Ethics – Moral Values – Integrity & Loyalty – Work Ethics – Respect for others and authority – Empathy – Caring and Sharing – Honesty – Courage and Commitment – Valuing Time – Co-operation & Teamwork – Safety and Risk – Right Action – Professional ideals and virtues – Individual's Ambition – Conflict Resolution – Self-Confidence – Customs and Manners – General Behaviour – Etiquettes to be followed – Professional Responsibility – Accountability – Leadership Quality – Effective Communication skills.

UNIT – VI: Project Report Writing (Outline) (8 Hours)

Significant features of Project Report Writing – Organization – Presentation – Use of Impersonal Passives – Acknowledgements.

REFERENCE BOOKS:

A Course of English Pronunciation - J D O'Connor – BBC
Linguaphone - UK
World Great Speeches - Balaji's – Famous Speeches
Short story Books (Indian Writing – Panchathanthra)
Reading Illustrated Books (Gokulam – Wisdom – Chandamama Amarchitrakatha)
Guided composition in English Language Teaching – Alexander L.G. Longman, 1971.
The Language Laboratory and Language Learning – Dahim Longman, London, 1967.
Grellet. F.: Developing Reading Skills. Cambridge University Press, 1981.
Reading & Thinking in English. Four Volumes, (Vol.1 for the lower level, Vol.4 for the higher level). The British Oxford University Press, 1979-1981.
Marin J.R.: Factual Writing: Exploring and Challenging Social reality. Oxford University Press. 1990
Hamp-Lyons L. & Heasley B.: Study Writing. A course in written English for Academic and Professional Purposes. Cambridge University Press, 1987.
Doughty P.P., Thomton J.G.: Language in use. Edward Arrold, 1973.
Bhasker W.W.S & Prabhu N.S.: English through Reading. Vols. 1 and 2. Macmilian, 1975.
Freeman, Sarah: Written Communication. Orient Longman, 1977
Freeman, Sarah: Study Strategies. Oxford University Press, 1979.

Semester – II						
Code	**Course Title**	**Category**	**L**	**P**	**T**	**Credits**
MC 521	Software Engineering	CC	4	0	0	3
MC 522	Object Oriented Programming using Java	CC	3	0	1	3

MC 523	Design and Analysis of Algorithms	CC	3	0	1	3
MC 524	Data Communication and Computer Networks	CC	4	0	0	3
MC 525	Theory of Computation	CC	3	0	0	3
MC 526	Object Oriented Programming using Java Lab.	CL	0	3	0	2
MC 527	Design and Analysis of Algorithms Lab.	CL	0	3	0	2
MC 528	UML Lab.	CL	0	2	0	2
MC 529	Financial Accounting (MOOCs-1)		3	0	0	3
					Total Credit:	**24**

SOFTWARE ENGINEERING

Course Code	MC 521	L-P-T-Cr.:	4	0	0	3	Semester:	II

Category: Program Core Course

Prerequisites: Knowledge on programming and data structure

Objectives:

- To understand common cycle process life processes.
- To understand the basic concepts in Requirement engineering, software design, coding, testing and maintenance
- To learn about the role of project management including scheduling, planning, risk management etc.
- To have a basic knowledge about software quality, how to ensure good quality software.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Software engineering
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(10 Hours)**

Introduction to software and software engineering, various software process modules, capability, maturity, module and KPAs.Project planning, project introduction, team organization, scheduling and management, constructive cost model. Software measures, indicators and metrics, software risk analysis and management.

UNIT – II: **(10 Hours)**

Software requirement analysis and specifications, applicability to small, medium, and large-scale systems.Software design, technical design, objectives of design, design metrics, modularity, module coupling and cohesion, relation between cohesion and coupling; Design strategies: Bottom up design, top down design, functional oriented design, object oriented design; IEEE recommended practice for software design description

UNIT – III: **(10 Hours)**

Software testing, testability, testing process, structural testing, unit testing and integrated testing, debugging, testing tools, software maintenance, maintenance process, maintenance cost, reverse engineering and reengineering.

UNIT – IV: **(10 Hours)**

Configuration management, Software Quality:Evolution of software quality,assessing and controlling software quality.softwarereliability:Hardwarevs Software reliability,Reliability metrics. CASE tools and workbenches.

TEXT BOOKS

1. Pressman R., "Software Engineering", McGraw-Hill.

REFERENCE BOOKS:

2. Sommerville, I., "Software Engineering", Pearson Education.
3. Dfleeger, S. L., "Software Engineering", Pearson Education.
4. Rajib Mall, Software Engineering

OBJECT ORIENTED PROGRAMMING USING JAVA

Course Code	**MC 522**	**L-P-T-Cr.:**	**3**	**0**	**1**	**3**	**Semester:**	**II**

Category: Core Course

Prerequisite: Programming in C, Object Oriented Paradigm

Objective:

- Understand the basic object-oriented programming concepts and apply them in problem solving.
- Illustrate inheritance concepts for reusing the program.
- Demonstrate on the multi-tasking by using multiple threads.
- Develop data-centric applications using JDBC.

Course outcome:

- Understand the basics of java console and GUI based programming.

CO-1	Remember and understand the basic concepts/Principles of Object oriented programming using java
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT- I **(10 hours)**

Java Evolution and Environment: Java evolution, overview of java language, java history, features of java, how java differs from C and C++, java and World Wide Web, web browser.

Java Environment: Java Development Kit(JDK), Application Programming Interface(API), java programming structure, java tokens, constants, variables, expressions, decision making statements and looping, java statements, overview of arrays and strings, machine neutral, Java Virtual Machine(JVM), Command Line Arguments.

Arrays and Strings: One-dimensional arrays, creating an array, declaration of arrays, initialization of arrays, two-dimensional arrays, string arrays, string methods, string buffer class, vectors, wrapper classes, Basic I/O Streams: Scanner, buffered reader.

UNIT-II **(10 hours)**

Classes, Objects and Methods: Introduction, defining a class, creating objects, accessing class members, constructors, method overloading, static members.

Inheritance: Defining a sub-class, sub-class constructor, multi-level variables, final classes and finalize methods, abstract methods and classes, visibility control.

Managing Errors and Exceptions: Introduction, types of errors: compile time and run-time errors, exceptions, types of exceptions, syntax of exception handling code, multiple catch statements, using finally statement, throwing our own exceptions.

UNIT- III **(10 hours)**

Interfaces, Package and Multi-threaded Programming: Introduction, defining interfaces, extended interfaces, implementing interfaces.

Package: Creation, importing a package and user-defined package.

Threads: Introduction to threads, creating threads, extending the thread class, implementing the 'runnable' interface, life-cycle of a thread, priority of a thread, synchronization, and deadlock.

UNIT- IV **(10 hours)**

Applet programming: Introduction, how applets differ from applications, building applet code, applet life cycle, about HTML, designing a web page, passing parameters to applets, getting input from the user.

Graphics Programming: Introduction, abstract window toolkit class hierarchy, frames, event-driven programming, layout managers, panels, canvases, drawing geometric figures.Introduction to Swings: **Introduction to Swings, overview of Swing components**: Jbutton, JCheckBox, JRadioButton, JLabel, JTextField, JTextArea, JList.

Introduction to Networking: InetAddress class, socket class, URL class.

Text Book:

1. Herbert Schildt, The Java Complete References, 9/e, Tata McGraw Hill, 2014.

References:

1. Y.Daniel Liang, An Introduction to JAVA Programming, Tata McGraw Hill, 2009.
2. Kathy Sierra, Head First java, 2/e, Shroff Publishers, 2012.
3. E. Balaguruswamy, Programming with JAVA, 2/e, Tata McGraw Hill, 2014.

DESIGN AND ANALYSIS OF ALGORITHMS

Course Code	**MC 523**	**L-P-T-Cr.:**	**3**	**0**	**1**	**3**	**Semester:**	**II**

Category: Programme Core Course

Prerequisite: Data Structure

Objective:

- The student should be made to:
- Learn the algorithm analysis techniques.
- Become familiar with the different algorithm design techniques.
- Understand the limitations of Algorithm power.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Design and analysis of algorithms
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT- I **(12 Hours)**

Introduction, Definition, Chrematistics of algorithm, Growth of Functions, Asymptoticanalysis, Amortized analysis, standard notations and common functions, Recurrences, solution of recurrences by substitution, recursion tree, induction method, and Mastermethods, Algorithm design techniques, worst case analysis of Merge sort, Quick sort andBinary search, Design & Analysis of Divide and conquer algorithms.

UNIT – II **(12 Hours)**

Heapsort mechanism, Heaps, Building a heap, Theheapsort algorithm, Priority Queue,Lower bounds for sorting. Dynamic programming methodology, Elements of dynamicprogramming, Matrix-chain multiplication, Longest common subsequence, GreedyAlgorithms, Elements of Greedy strategy, Assembly-line scheduling, Activity selectionProblem, Fractional knapsack problem, Huffman codes).

UNIT – III **(12 Hours)**

Data structure for disjoint sets, Disjoint set operations, Linked list representation, B and B + tree, connected components and bi connected components. Breadth first search and depth-first search, Minimum Spanning Trees, Kruskal algorithm and Prim's algorithms, single- source shortest paths (Bellman-ford algorithm and Dijkstra'salgorithms), All-pairs shortest paths (Floyd – Warshall Algorithm).

UNIT – IV **(12Hours)**

Back tracking, Branch and Bound, Eight Queen problem, Travelling sales person problem, 0/1 knapsack problem, NP - Completeness (Polynomial time, Polynomial time verification, NP -Completeness and reducibility, NP-Complete problems (without Proofs), Approximation algorithmscharacteristics, Traveling Salesman Problem.

Text Book:

1. T.H. Cormen, C.E. Leiserson, R.L. Rivest, C.Stein : Introduction to Algorithms, 2nd

Edition, PHI Learning Pvt. Ltd.
2. H. Bhasin: Algorithms, Design and Analysis, First Edition, Oxford Higher Education.

Reference Books:

1. Sanjay Dasgupta, UmeshVazirani: Algorithms, McGraw-Hill Education.
2. Horowitz &Sahani: Fundamentals of Algorithm, 2nd Edition, Universities Press.
3. Goodrich, Tamassia: Algorithm Design, Wiley India.

DATA COMMUNICATION AND COMPUTER NETWORKS

Course Code **MC 524** **L-P-T-Cr.:** **4 0 0 3** **Semester: II**

Category: Programme Core Course

Prerequisite: **Basics of Computer**

Objective:

- The objective of the course is to provide an overview of communication network functions and a good foundation for further studies in the subject.
- It involves understanding and application of design principles and methods for systems development and review of the underlying systems, and communications technologies and significant standardized systems.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Data communication and computer networks
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(12 hours)**

Introduction: Data Communications, Networks, The Internet, Protocols and Standards, Network Models, Layered Tasks, The OSI Model, Layers in the OSI Model, TCP/IP Protocol Suite, Addressing, Physical Layer and Media, Data and Signals, Analog and Digital, Periodic Analog Signals, Digital Signals, Transmission impairment, Data Rate Limits, Performance. Switching, Circuit-Switched Networks, Datagram Networks, Virtual-Circuit Networks.

UNIT – II: **(12 hours)**

Error Detection and Correction, Introduction, Block Coding, Liner Block Codes, Cyclic Codes, Checksum, Data Link Control, Framing, Flow and Error Control, Protocols (ARQ), HDLC, Point-to-Point Protocol (PPP), Multiple Access, Random Access, Aloha, Controlled Access, Channelization, IEEE Standards, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.11, Bluetooth.Virtual-Circuit Networks: Frame Relay and ATM, Frame Relay.

UNIT – III: **(12 hours)**

Network Layer: Logical Addressing, IPv4 Addresses, IPv6 Addresses, Network Layer: Internet Protocol, Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6, Network Layer: Adress Mapping, Error Reporting and Multicasting, Address Mapping, ICMP, IGMP,
Network Layer: Delivery, Forwarding and Routing, Delivery, Forwarding, Unicast Routing Protocols (RIP, OSPF), Multicast Routing Protocols (BGP).Transport Layer: Process-Process Delivery: UDP, TCP and SCTP, Process-to-Process Delivery, User Datagram Protocol (UDP), TCP, SCTP.

UNIT – IV: **(12 hours)**

Congestion Control and Quality of Service, Congestion, Congestion Control, Quality Service, Techniques to improve QoS, Integrated Services, Differentiated Services, QoS in Switched Networks.Application Layer: Domain Name Systems (DNS), Remote Logging, Electronic Mail and File Transfer, Telnet.WWW

and HTTP: Architecture, Web Documents, HTTP, Network Management: SNMP, RTP, RTCP, Voice over IPIntroduction to Network Security and Cryptography.

TEXT BOOKS

1. Data Communications and Networking, Fourth Edition by BehrouzaA.Forouzan,TMH.

REFERENCE BOOKS:

1. Computer Networks : A system Approach, Larry L. Peterson, Bruce S Davie
2. Computer Networks, A.S.Tanenbaum,4thedition,Pearson education.
3. Data and Computer Communication, W. Stallings, Prentice- Hall
4. Kurose, J.F. and Ross, K.W., "Computer Networking: A Top-Down Approach Featuring the Internet", Addison Wesley.

THEORY OF COMPUTATION

Course Code **MC 525** **L-P-T-Cr.:** **3 0 0 3** **Semester:** **II**

Category: Programme Core Course

Prerequisite: Fundamental of computer science and mathematics

Objective:

- To introduce concepts in automata theory and theory of computation.
- To identify different formal language classes and their relationships.
- To design grammars and recognizers for different formal languages

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Theory of computation
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I: INTRODUCTION **(12 Hours)**

Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

UNIT –II: REGULAR EXPRESSION **(12 Hours)**

Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Regular expression to FA, DFA to Regular expression, Arden Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages,

UNIT –III: CONTEXT FREE GRAMMAR **(12 Hours)**

Definition, Examples, Derivation, Derivation trees, Ambiguity in Grammar, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification of CFGs, Normal forms for CFGs: CNF and GNF, Closure proper ties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs

Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG, PDA with two stacks.

UNIT –IV: TURING MACHINES **(12 Hours)**

Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Recursive and recursively enumerable languages, Halting problem, Introduction to Undecidability, Undecidable problems about TMs. Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory

TEXT BOOKS:

1. John E. Hopcroft, Rajeev Motwani and Jeffery D. Ullman, Automata Theory, Languages, and Computation (3rd. Edition), Pearson Education, 2008.
2. Peter Linz ,An Introduction to Formal Languages and Automata, Paperback – 2011

REFERENCE BOOKS:

1. K. L. P. Mishra and N. Chandrashekaran, Theory of Computer Science: Automata, Languages and Computation, Indian3rd Edition 2006.
2. H.R.Lewis and C.H.Papadimitriou, Elements of The theory of Computation, Second Edition, Pearson Education/PHI, 2003
3. Michael Sipser, Introduction to the Theory of Computation, Books/Cole Thomson Learning, 2001.

OBJECT ORIENTED PROGRAMMING USING JAVA LAB

Course Code **MC 526** **L-P-T-Cr.:** **0 3 0 2** **Semester:** **II**

Category: Laboratory Course

Prerequisite: Object Oriented Programming using C++.

Objective:

- This subject will help to improve the analytical skills of object oriented programming Overall development of problem solving and critical analysis
- Formal introduction to Java programming language

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Object oriented programming using java lab
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

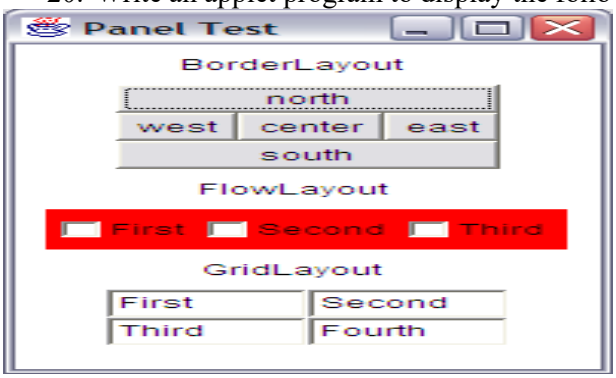
1. Write a java program to read three numeric values (integer) from user and find the largest number among them.
2. Write a program to print the Fibonacci series up to a given number taken from user through command line.
3. Write a statistical computation program that to find out the maximum, minimum and mean value. Read input through command line.
4. WAP to create a class Rectangle (length, breadth), with zero argument constructor (default value is 5.0), one argument constructor(length = breadth), and two argument constructor, and define the methods area and perimeter of the rectangle. Create different objects with the help of three different constructorsand print the area (length x breadth) and perimeter (2 x (length + breadth)) of those objects.
5. Define a class called Room with the follwing attributes 1.length, 2.breadth, 3.height, 4.floor_area, 5.Wall_area, 6.No.of_fans, 7.No.of_windows, 8.no.of_doors. Define a suitable constructor and a method to display details of a room. Assume that 20% of the total wall area is occupied by doors and windows and calculate accordingly. All data must be taken from user.
6. Define a class point, inherit class line from point, rectangle from line, and cube from rectangle. Write no argument constructor in each class. Write a print statement in these constructors mentioning which class it is. Create an object of the cube class in the main method of a separate class called test and show the output.
7. WAP to create a Person class having name, age and gender as instance variables. Write three constructors for constructor overloading like,
   a) First with no-argument.
   b) Second with three arguments for passing name, age and gender.
   c) Third with object as parameter to create a new copy of an existing Person object.

   Display the properties of Person class object with suitable methods.

8. Create an abstract class Shape with methods calc_area and calc_volume. Derive four classes Sphere(radius) , Cone(radius, height) and Cylinder(radius, height), Box(length, breadth, height) from it. Calculate area and volume of all. (Use Method overriding).
9. Define an abstract class “Staff” with members name and address. Define two subclasses of this class – “FullTimeStaff” (department, salary) and “PartTimeStaff” (numberof- hours, rate-per-

hour). Define appropriate constructors. Create n objects which could be of either FullTimeStaff or PartTimeStaff class by asking the user's choice. Display details of all "FullTimeStaff" objects and all "PartTimeStaff" objects.

10. Define an interface "StackOperations" which declares methods for a static stack. Define a class "MyStack" which contains an array and top as data members and implements the above interface. Initialize the stack using a constructor. Write a menu driven program to perform operations on a stack object.
11. Define an interface "QueueOperations" which declares methods for a static queue. Define a class "MyQueue" which contains an array and front and rear as data members and implements the above interface. Initialize the queue using a constructor. Write a menu driven program to perform operations on a queue object.
12. Write a java program to create n objects of the Student class. Assign roll numbers in the ascending order using static method. Accept name and percentage from the user for each object. Define a method "sort Student" which sorts the array on the basis of percentage
13. Write a program to enter the student's name, Rollno. Marks, in any no. of subjects as command line argument and find the percentage and grade of the student and thrown a NumberFormatException if required.
14. WAP having multiple catch and finally blocks where the catch blocks should handle the exceptions like, ArrayIndexOutOfBoundsException, NumberFormatException and ArithmeticException or any other exception.
15. Write a java program to creates ten threads, each of which do some work(search for the maximum value of a large matrix .Each thread searches one portion of the matrix.) It waits for them all to finish, then gathers the results.
16. Write a java program to show the use of synchronized method ().
17. Write a program to remove common characters from two strings.
18. Write a program to print all the palindrome words of a given string.
19. Input some strings through command line. Half of which will be stored in a String array and rest will be stored in a StringBuffer array. Write a program that will concatenate each element of this array of String objects with each element of StringBuffer objects. And the result will be stored in an array of StringBuffer.
20. Write an applet program to display the following by using different layouts.



DESIGN AND ANALYSIS OF ALGORITHMS LAB

Course Code	**MC 527**	**L-P-T-Cr.:**	**0**	**3**	**0**	**2**	**Semester:**	**II**

Category: Laboratory Course

Prerequisite: Concept of C programming, Basics of Computer Architecture (Primary and Secondary storage structure)

Objective:

- To get clear understanding about the basic data structures and their operations, the concepts of algorithms, basic search and sort algorithms. Student will also gain adequate knowledge to choose appropriate data structure and algorithm to solve a problem.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Design and analysis of algorithms lab
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

LIST OF TOPICS FOR EXPERIMENTS

1. Apply the divide and Conquer technique to arrange a set of numbers using merge sort method.
2. Write programs to implement the following:
   a) Prim's algorithm.

   b) Kruskal's algorithm.

3. Write a program to find optimal ordering of matrix multiplication.

   (Note: Use Dynamic programming method).

4. Perform graph traversals.
5. Implement the 8-Queens Problem using backtracking.
6. Implement Quick sort algorithm.
6. Write a program to implement dynamic programming algorithm to solve all pairsshortest path problem.

7. Write a program to solve knapsack problem using the following:

   a) Greedy algorithm.

   b) Dynamic programming algorithm.

   c) Backtracking algorithm.

   d) Branch and bound algorithm.

8. Write a program that uses dynamic programming algorithm to solve the optimal binary search tree problem.

9. Write a program for solving traveling sales persons problem using the following:

   a) Dynamic programming algorithm.

   b) The back tracking algorithm.

   c) Branch and Bound.

UML LAB

Course Code	**MC 528**	**L-P-T-Cr.:**	**0**	**2**	**0**	**2**	**Semester:**	**II**

Category: Foundation Course

Prerequisite: Object Oriented Analysis and Design concepts of Software Engineering.

Objective:

- Understand the importance and basic concepts and of object oriented modeling,
- Specify, analyze and design the use case driven requirements for a particular system.
- Model the different usecase diagrams, class diagrams, sequence diagrams etc

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of UML LAB
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

List Of Experiments:

1. Develop Class diagram for a given scenario
2. Develop Sequence diagram for a given scenario
3. Develop Collaboration diagram for a given scenario
4. Develop Usecase diagram for a given scenario
5. Develop Component diagram for a given scenario
6. Develop Deployment diagram for a given scenario
7. Develop Activity diagram for a given scenario

Semester – III						
Code	**Course Title**	**Category**	**L**	**P**	**T**	**Credits**
MC 531	Information and Cyber Security	CC	4	0	0	3
MC 532	Artificial Intelligence	CC	4	0	1	3
MC 533	Web Technology	CC	4	0	0	3
MC 534	Elective-I 1. Machine Learning 2. Soft Computing 3. Mobile Computing 4. Computer Graphics 5. Simulation and Modeling 6. Compiler Design	CC	3	0	0	3
MC 535	Elective-II 1. Data warehousing and Data Mining 2. Cloud Computing 3. Big Data Analytics 4. Wireless Sensor Networks 5. Advanced Databases 6. Management Support Systems	CC	3	0	0	3
MC 536	Open Source Lab	CL	0	3	0	2
MC 537	Web Technology Lab	CL	0	3	0	2
MC 538	Technical Seminar	TS	0	2	0	2
MC 539	Soft Skills and Personality Development(MOOCs-2)		3	0	0	3
					Total Credit:	**24**

INFORMATION AND CYBER SECURITY

Course Code	**MC 531**	**L-P-T-Cr.:**	**4**	**0**	**0**	**3**	**Semester:**	**III**

Category: Core Course

Prerequisite: Fundamental of computer science and mathematics

Objective:

- Explain the objectives of information security
- Explain the importance and application of each of confidentiality, integrity, authentication and availability
- Understand various cryptographic algorithms.
- Understand the basic categories of threats to computers and networks
- Describe public-key cryptosystem.
- Describe the enhancements made to lPv4 by IPSec
- Understand Intrusions and intrusion detection
- Discuss the fundamental ideas of public-key cryptography.
- Generate and distribute a PGP key pair and use the PGP package to send an encrypted e-mail message.
- Discuss Web security and Firewalls

Course outcome:

CO-1	Remember and understand the basic concepts/Principles of Information and cyber security
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT I : Classical Encryption Techniques (12 Hours)

Introduction: Cryptography, cryptanalysis, Security attacks, services & mechanisms, Symmetric Cipher Model, Substitution Techniques, Transportation Techniques, Cyber threats and their defense (Phishing Defensive measures), web based attacks, SQL injection & Defense techniques, Buffer overflow & format string vulnerabilities, TCP session hijacking (ARP attacks, route table modification) UDP hijacking (man-in-the-middle attacks).

UNIT II: Block Ciphers , Symmetric Key Cryptography & Asymmetric Key Cryptography (12Hours)

Traditional Block Cipher Structure, DES,Triple DES, Block Cipher Design Principles, AES-Structure, Transformation functions, Key Expansion, Blowfish, IDEA, Block Cipher Modes of Operations. Public Key Cryptography: Principles, public key cryptography algorithms, RSA Algorithms, Diffie Hellman Key Exchange, Elliptic Curve Cryptography

UNIT III : Cryptographic Hash Functions & Digital Signatures (12 Hours)

Message authentication and Hash Functions, Authentication Requirements and Functions, Message Authentication, Hash Functions and MACs Hash and MAC Algorithms SHA-512, HMAC, Digital

Signatures, NIST Digital Signature Algorithm. Key management & distribution. User Authentication: Remote user authentication principles, Kerberos

UNIT IV: User Authentication, Transport Layer Security & Email Security IP Security & Intrusion Detection Systems (12 Hours)

Transport Level Security: Web Security Requirements, Secure Socket Layer (SSL) and Transport Layer Security (TLS), Secure Shell(SSH) Electronic Mail Security: Pretty Good Privacy (PGP) and S/MIME. **IP Security:** IP Security Overview, IP Security Architecture, Authentication Header, Encapsulating Security Payload, Combining Security Associations and Key Management. Firewalls:Need for Fire wall,Types of Firewall , Firewall Designing principle

TEXT BOOKS

1. Cryptography & Network Security: Principles and Practices, William Stallings, PEA, Sixth edition.
2. Introduction to Computer Networks & Cyber Security, Chwan Hwa Wu, J.David Irwin, CRC press
3. Hack Proofing your Network, Russell, Kaminsky, Forest Puppy, Wiley Dreamtech.

REFERENCE BOOKS

1. Everyday Cryptography, Fundamental Principles & Applications, Keith Martin, Oxford
2. Network Security & Cryptography, Bernard Menezes, Cengage,2010

ARTIFICIAL INTELLIGENCE

Course Code	**MC 532**	**L-P-T-Cr.:**	**4**	**0**	**1**	**3**	**Semester:**		**III**

Category: Programme Core Course

Prerequisite: Fundamental of computer science and mathematics

Objective:

- To learn the difference between optimal reasoning Vs. human like reasoning.
- To understand the notions of state space representation and heuristic search.
- To learn different knowledge representation techniques.
- To understand the applications of AI: namely Game playing, Theorem Proving. Expert systems, machine learning and Natural language Processing.

Course outcome:

CO-1	Remember and understand the basic concepts/Principles ofArtificial intelligence
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT- I Introduction to AI and Production system (12 Hours)

Introduction to Artificial Intelligence, AI Problems, AI Techniques,Problems ,Problem Space and Search, Defining the problem as a state space search, Production system, Problem characteristics, Heuristic search Technologies**:** Generate and Test, Hill Climbing, Best First Search, Problem Reduction, means-end-analysis, optimal and A*,AND-OR Graphs, AO* Algorithms.

UNIT- II Knowledge Representation (12 Hours)

Representation Knowledge using Predicate Logic, Representing simple facts in logic, Representing Instance and ISA relationships, Computable functions and Predicates, Resolution, Representing Knowledge using Rules, Forward Vs Backward Reasoning, Matching , Control Knowledge, , Weak slot and Filter structures, Semantic nets, Frames.

UNIT-III Reasoning Techniques: (12 Hours)

Strong slot and Filter structures, Conceptual Dependencies, Scripts. Introduction to Non monotonic reasoning ,Logics for Non monotonic reasoning, Implementation : Depth First Search, Dependency-Directed Back Tracking, Justification based Truth Maintenance Logic based Truth Maintenance systems,Statistical Reasoning, Probability and Bayes Theorem,Certainty factors, Rule based Systems, Beyesian Networks, Dempster-Shaffer Theory

UNIT -IV Game Playing and learning (12 Hours)

Minmax search, alpha-beta cutoffs, Planning system, Goal stack planning, Hierarchical Planning, Natural Language Processing., Syntactic Analysis, Semantic Analysis, Discuses and Pragmatic Processing. Introduction and Fundamentals of Artificial Neural Networks, Biological Prototype,

Artificial Neuron, Single Layer Artificial Neural Networks, Multilayer Artificial Neural Networks, Training of Artificial Neural Networks

TEXT BOOKS:

1. Elaine Rich, Kevin Knight and ShivashankarB . Nair, Artificial Intelligence, 3/e, McGraw Hill Education, 2008.
2. Neural Computing: Theory and practice- Waserman.

REFERENCES:

1. Artificial Intelligence Structures and Strategies complex problem solving-George F. Lugar Pearson Education
2. Stuart Russell and Peter Norvig, Artificial Intelligence: A Modern Approach, 2/e, Pearson Education, 2010.
3. Dan W. Patterson, Artificial Intelligence and Expert Systems, PHI.
4. Neural Networks: A Comprehensive Foundation 2/e- Symen Pearson Education.

WEB TECHNOLOGY

Course Code	**MC 533**	**L-P-T-Cr.:**	**4**	**0**	**0**	**3**	**Semester:**	**III**

Category: Programme Core Course

Prerequisite: Fundamentals of Programming and Networking

Objective:

- Describe the concepts of WWW including browser and HTTP protocol.
- List the various HTML tags and use them to develop the user friendly web pages.
- Define the CSS with its types and use them to provide the styles to the web pages at various levels.
- Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
- Use the JavaScript to develop the dynamic web pages.
- Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
- Develop the modern Web applications using the client and server side technologies and the web design fundamentals.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Web technology
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I:INTRODUCTION (8 Hours)

Introduction: Concept of WWW, Internet and WWW, HTTP Protocol : Request and Response, Web browser and Web servers, Features of Web 2.0.

Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation

UNIT –II: HTML and CSS (12 Hours)

HTML: Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5.

Style sheets: Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3

UNIT –III: JAVA SCRIPT and XML (10 Hours)

JavaScript: Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: Javascript and objects, JavaScript own objects, the DOM and web browser environments, Manipulation using DOM, forms and validations, DHTML : Combining HTML, CSS and Javascript, Events and buttons.

XML: Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT

UNIT –IV: PHP and MYSQL **(10 Hours)**

PHP: Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP.

PHP and MySQL: Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP my admin and database bugs.

TEXT BOOKS:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India.
2. Web Technologies, Black Book, dreamtech Press
3. HTML 5, Black Book, dreamtech Press

REFERENCE BOOKS:

1. Web Design, Joel Sklar, Cengage Learning
2. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
3. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson

WEB REFERENCES

1. www.w3schools.com

Elective-I

MACHINE LEARNING

Course Code **MC 534** **L-P-T-Cr.:** **3 0 0 3** **Semester:** **III**

Category: Programme Elective Course

Prerequisite: Fundamental of computer science and mathematics

Objective:

- To introduce concepts of machine learning..
- To know decision tree learning and various learning methods.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Machine learning
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(12Hours)**

General Introduction: Learning Problems, Choosing Training experience/Target Function, Representation of the target function, issues in machine learning.
Concept Learning: Concept learning task-Inductive Learning, Concept Learning as search, FIND-S algorithm, version spaces, The List then Eliminate algorithm, Representation of version spaces, The Candidate Elimination algorithm, Inductive bias.

UNIT – II: **(12 Hours)**

Decision Tree Learning: Decision tree representation, ID3 Learning algorithm, Entropy, Information gain, over fitting, reduced error pruning, Rule-post pruning.
Bayesian Learning: Bayes' Theorem and concept Learning, Bayes optimal classifier, Bayesian Belief Network.

UNIT – III: **(12Hours)**

Instance based Learning: Introduction, k-Nearest Neighbour Learning algorithm, distance weighted nearest neighbour learning algorithm, case based reasoning, lazy learner and eager learner.
Learning Set of Rules: Sequential covering algorithm, First Order Inductive Learning (FOIL), Induction as inverted deduction, Inverting resolution (First order resolution), Generalisation, theta-subsumption and entailment, PROGOL.

UNIT – IV: **(12Hours)**

Analytical Learning: Inductive vs Analytical Learning, Prolog-EBG, Combining inductive and analytical learning.

TEXT BOOKS

1. Tom M. Mitchell, Machine Learning, Mac Graw Hill

REFERENCE BOOKS:

2. Christopher M. Bishop, Machine Learning and Pattern Recognition, Springer

SOFT COMPUTING

Course Code	**MC 534**	**L-P-T-Cr.:**	**3**	**0**	**0**	**3**	**Semester:**	**III**

Category: Programme Elective Course

Prerequisite: Probability and Statistics, Vectors, C++/Java/ Matlab programming

Objective:

- To study the techniques of soft computing, especially evolutionary computation, fuzzy logic, GA and neural networks.
- Applying hybrid of multiple techniques and choosing the appropriate technique for the problems that one want to solve.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Soft computing
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I:INTRODUCTION AND ARTIFICIAL NEURAL NETWORK (12 Hours)

Introduction to Soft Computing, Historical Development, Definitions, advantages and disadvantages, solution of complex real life problems.

Artificial Neural Network: Introduction, basic models, Hebb's learning, Adaline, Perceptron, Multilayer feed forward network, Back propagation, Different issues regarding convergence of Multilayer Perceptron, Competitive learning, Self-Organizing Feature Maps, Adaptive Resonance Theory, Associative Memories, Deep Neural Network, Applications.

UNIT –II: FUZZY LOGIC (12 Hours)

Fuzzy Logic: Introduction to Fuzzy Logic, Classical and Fuzzy Sets: Overview of ClassicalSets, Membership Function, Fuzzy rule generation. Operations on Fuzzy Sets: Compliment,Intersections, Unions, Combinations of Operations, Aggregation Operations. FuzzyArithmetic: Fuzzy Numbers, Linguistic Variables, Arithmetic Operations on Intervals &Numbers, Lattice of Fuzzy Numbers, Fuzzy Equations.

UNIT –III: GENETIC ALGORITHMS (12 Hours)

Evolutionary and Stochastic techniques: Genetic Algorithm (GA), different operators of GA, analysis of selection operations, Hypothesis of building blocks, Schema theorem and convergence of Genetic Algorithm, Simulated annealing and Stochastic models, Boltzmann Machine, Applications.

UNIT –IV: HYBRID SYSTEMS (12 Hours)

Hybrid Systems: Neural-Network-Based Fuzzy Systems, Fuzzy Logic-Based Neural Networks, Genetic Algorithm for Neural Network Design and Learning, Fuzzy Logic and Genetic Algorithm for Optimization, Applications.

TEXT BOOKS:

1. Jang, “Neuro-Fuzzy and Soft computing”, Sun, Mizutani, Pearson
2. Haykin, “Neural networks: a comprehensive foundation”,
3. Goldberg, “Genetic Algorithms”,
4. G.J. Klir& B. Yuan, “FuzzySets& Fuzzy Logic”, PHI.

REFERENCE BOOKS:

1. Anderson J.A., "An Introduction to Neural Networks", PHI, 1999
2. Hertz J. Krogh, R.G. Palmer, "Introduction to the Theory of Neural Computation", Addison-Wesley, California,
3. Melanie Mitchell, "An Introduction to Genetic Algorithm", PHI, 1998.
4. "Neural Networks-A Comprehensive Foundations", Prentice-Hall International, New Jersey, 1999.
5. Freeman J.A. & D.M. Skapura, "Neural Networks: Algorithms, Applications and Programming Techniques", Addison Wesley, Reading, Mass, (1992).

MOBILE COMPUTING

Course Code	**MC534**	**L-P-T-Cr.:**	**3**	**0**	**0**	**3**	**Semester:**	**III**

Category: Programme Elective Course

Objective:

- The objective is to learn emerging techniques in GSM, wireless MAC**.**
- Learn mobile network and transport layer.
- Learn mobile database, data dissemination and MANAT protocols

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Mobile computing
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: INTRODUCTION, GSM, WIRELESS MAC (10 Hours)

Introduction to Mobile Communications and Computing: Mobile Computing (MC):Introduction to MC, novel applications, limitations, and architecture. GSM: Mobile services, System architecture, Radio interface, Protocols, Localization andcalling, Handover, Security, and New data services. **Wireless Medium Access Control** : Motivation for a specialized MAC (Hidden and exposed terminals, Near and far terminals), SDMA, FDMA, TDMA, CDMA.

UNIT – II: MOBILE NETWORK AND TRANSPORT LAYER (10 Hours)

Mobile Network Layer: Mobile IP (Goals, assumptions, entities and terminology, IP packetdelivery, agent advertisement and discovery, registration, tunneling and encapsulation, Optimizations), Dynamic Host Configuration Protocol (DHCP).
Mobile Transport Layer : Traditional TCP, Indirect TCP, Snooping TCP, Mobile TCP, Fast retransmit/fast recovery, Transmission /time-out freezing, Selective retransmission, Transaction oriented TCP.

UNIT – III: MOBILE DATABASE AND DATA DISSEMINATION (10 Hours)

Database Issues: Hoarding techniques, caching invalidation mechanisms, client server computing with adaptation, power-aware and context-aware computing, transactional models, query processing, recovery, and quality of service issues.
Data Dissemination: Communications asymmetry, classification of new data delivery mechanisms, push-based mechanisms, pull-based mechanisms, hybrid mechanisms, selective tuning (indexing) techniques.

UNIT – IV: MANAT, PROTOCOLS (10 Hours)

Mobile Ad hoc Networks (MANETs): Overview, Properties of a MANET, spectrum of MANET applications, routing and various routing algorithms, security in MANETs.

Protocols and Tools: Wireless Application Protocol-WAP. (Introduction, protocol architecture, and treatment of protocols of all layers), Bluetooth (User scenarios, physical layer, MAC layer, networking, security, link management) and J2ME.

TEXT BOOKS :

1. Jochen Schiller,"Mobile Communications",Addison-Wesley.
2. Stojmenovic and Cacute, "Handbook of Wireless Networks and Mobile Computing"

REFERENCES:

1. Reza Behravanfar, "Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML", ISBN: 0521817331, Cambridge University Press.
2. Adelstein, Frank, Gupta, Sandeep KS, Richard III, Golden, Schwiebert, Loren, "Fundamentals of Mobile and Pervasive Computing", McGraw-Hill Professional.
3. Hansmann, Merk, Nicklous, Stober, "Principles of Mobile Computing", Springer.
4. Martyn Mallick, "Mobile and Wireless Design Essentials", Wiley DreamTech

COMPUTER GRAPHICS

Course Code **MC 534** **L-P-T-Cr.:** **3 0 0 3** **Semester:** **III**

Category: Programme Elective Course

Prerequisite: **Knowledge on C programming and mathematics**

Objective:

- To identify and understand the core concepts of computer graphics
- To apply graphics programming techniques to design and create computer graphics scenes.
- To learn about the 2D and 3D transformations including translation,scaling,rotation and reflection .
- To understand principle of clipping,basic line-clipping algorithms
- To learn about application of curves in computer graphics

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Computer graphics
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(10 hours)**

Graphics Hardware: Display devices, input devices, Raster Graphics.
Line and Circle drawing algorithms: DDA, Bresenham's line drawing algorithm, midpoint circledrawing algorithm.

UNIT – II: **(14 hours)**

Windowing and Clipping: Viewing and Window coordinate System, Viewport, Window, Zoom-inZoom-out, Cohen Sutherland, Cyrus beck line clipping algorithms
2D and 3D Geometrical Transformations: Homogeneous Coordinate system, Basic transformations: Translation, Scaling, Rotation and Reflection.

UNIT – III: **(12 hours)**

Viewing Transformation: Parallel Projection: Orthographic, Axonometric, Cavalier and Cabinet. **Perspective Projection**: one point, two point, three point perspective projection, vanishing point.

UNIT – IV: **(12 hours)**

Curve and Surfaces: Properties of curves, Blending functions: Cubic Bezier and B-Spline curves.
Parametric Surfaces: Surface of revolution Sweep surfaces, Fractal curves and surfaces,
Hidden line/surface removal: Object space and Image space methods, Inside- outside test, Back
Face detection: Z-buffer, A-Buffer Methods.Introduction to computer animation.

TEXT BOOKS

1. Hearn D. and P. Baker, Computer Graphics C version, Prentice-Hall. (Major Reading)

REFERENCE BOOKS:

1. David F. Rozers, Procedural Elements for Computer Grapihics, TMH.
2. David F. Rozers, Mathematical Elements for Computer graphics, TMH.
3. Foley, J.D. A. Van Dam, Computer Graphics: Principles and Practice, Addison- Wesley.

Other References: (Web)

SIMULATION AND MODELING

Course Code	MC 534	L-P-T-Cr.:	3	0	0	3	Semester:	III

Category: Programme Elective Course

Prerequisite: **Concepts of system and Programming languages**

Objective:

- Introduce computer simulation technologies and techniques, provides the foundations for the student to libraries and programs.
- This course focuses what is needed to build simulation software environments and not just building simulations using preexisting packages.
- Understand computer simulation needs ,and to implement and test a variety of simulation and data analysis.
- Build tools to view and control simulations and their results.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Simulation and modeling
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(10 hours)**

System definition and components, System Environment, Stochastic Activities, Continuous and Discrete Systems, System Modeling, Types of models, Static and Dynamic Physical Models, Static and Dynamic Mathematical Models, Principles used in Modelling, System Studies, Types of system study.

UNIT – II: **(12 hours)**

System simulation, why & when to simulate, nature and techniques of simulation, Monte Carlo Method, Comparison of simulation and analytical methods, Types of system simulation, Numerical Computation Technique for Continuous Models, Numerical Computation Technique for Discrete Models, Single-server queuing system, Distributed Lag models, Cobweb model, Progress of a Simulation study.

UNIT – III: **(14 hours)**

Continuous System Simulation, Analog vs. Digital Simulation, Hybrid Computers, Continuous System Simulation Languages (CSSLs), CSMP-III, Hybrid Simulation, water reservoir system, simulation of an autopilot, Real time Simulation. Discrete system simulation, fixed time-step , generation of random numbers, Simulation of a telephone System, Simulation Programming Tasks, test for randomness, Discrete simulation languages.

UNIT – IV: **(12 hours)**

System dynamics, exponential growth models, exponential decay models, modified exponential growth models, logistic curves, generalization of growth models, system dynamic diagrams. Introduction to GPSS, simulation of Manufacture Shop, Gathering Statistics,Data structure in GPPS, Evaluation of Simulation Algorithm in GPSS. Introduction to SIMSCRIPT:Program, system concepts, origination, and statements, defining the telephone system model, Data structure in SIMSCRIPT, Evaluation of Simulation Algorithm in SIMSCRIPT.

TEXT BOOKS

1. Geoftrey Gordon, " System Simulation",2/e, PHI

REFERENCE BOOKS:

1. Jerry Banks, John S. C Barry L. Nelson David M. Nicol, "Discrete Event System Simulation", Pearson Education.
2. NarsinghDeo, System Simulation with Digital Computer, PHI

3. V P Singh, “System Modeling and simulation”, New Age International.
4. Averill M. Law, W. David Kelton, “System Modeling and simulation and Analysis”, TMH

Other References: (Web)

COMPILER DESIGN

Course Code	MC 534	L-P-T-Cr.:	3	0	0	3	Semester:	III

Category: Programme Core Course

Prerequisite: Theory of Computation / Automata theory

Objective:

- To learn various stages of compilation, design phases of a compiler construction process.
- This course will also introduce open source tool Lex and Yaac.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Compiler design
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I:INTRODUCTION (8 Hours)

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

UNIT –II: PARSING (12 Hours)

Syntax Analysis: Role of a parser, context free grammars and context free languages, parse trees and derivations, ambiguous grammar.
Top Down Parsing: Recursive descent parsing, LL (1) grammars, non-recursive predictive parsing, error reporting and recovery.
Bottom Up Parsing: Handle pruning and shift reduces parsing, SLR parsers and construction of SLR parsing tables, LR(1) parsers and construction of LR(1) parsing tables, LALR parsers and construction of efficient LALR parsing tables, parsing using ambiguous grammars, error reporting and recovery, parser generator

UNIT –III: SDT,SYMBOL TABLE AND INTERMEDIATE CODE GENERATION (10 Hours)

Syntax Directed Translation: Syntax directed definitions (SDD), inherited and synthesized attributes, dependency graphs, evaluation orders for SDD, semantic rules, application of syntax directed translation.
Symbol Table: Structure and features of symbol tables, symbol attributes and scopes.
Intermediate Code Generation: Introduction, benefits and types of intermediate code generation, three address codes - quadruples and triples, DAG for expressions, types and declarations, translation of expressions, translation of Boolean expressions and control flow statements, back patching, intermediate code generation for procedures.

UNIT –IV: REAL-TIME DATABASES AND COMMUNICATION, APPLICATION (10 Hours)
Run Time Environment: storage organizations, static and dynamic storage allocations, stack allocation, Activation of the procedure and the activation record.
Code Generations: Introduction, Major Issues of Code generation, registers allocation, simple code generation using basic blocks.

Elements of Code Optimization: Objective, peephole optimization, redundant and un-reachable codes, concepts of elimination of local common sub-expressions, basics of flow of control optimization.

TEXT BOOKS:

1. Principles of Compiler Design, A.V. Aho .J.D.Ullman; Pearson Education.
2. Modern Compiler Implementation in C- Andrew N. Appel, Cambridge University Press.

REFERENCE BOOKS:

1.Lex&Yacc, John R. Levine, Tony Mason, Doug Brown, O'reilly

2.Modern Compiler Design, Dick Grune, Henry E. Bal, Cariel T. H. Jacobs, Wiley dreamtech.

3.Engineering a Compiler, Cooper & Linda, Elsevier.

4.Compiler Construction, Louden, Thomson

WEB REFERENCES

1http://nptel.ac.in/courses/106108113/

Elective-II

DATA WAREHOUSING AND DATA MINING

Course Code	**MC 535**	**L-P-T-Cr.:**	**3**	**0**	**0**	**3**	**Semester:**	**III**

Category: Elective course

Prerequisite: Data Structure and Algorithm, Linear Algebra, Basics of Web programming

Objective:

- This course deals with evolving multidimensional intelligent model from a typical system, representation of multi dimensional data for a data warehouse, discovering the knowledge imbibed in the high dimensional system, fiding the hidden interesting patterns in data, and gives the idea to evaluate various mining techniques on complex data objects.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Data warehousing and data mining
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I:INTRODUCTION TO DATA WAREHOUSING AND ARCHITECTURE (08 Hours)

Evolution of Decision Support Systems- Data warehousing Components –Building a Data warehouse, Data Warehouse and DBMS, Data marts, Metadata, Multidimensional data model, OLAP vs OLTP, OLAP operations, Data cubes, Schemas for Multidimensional Database: Stars, Snowflkes and Fact constellations

UNIT –II: DATA WAREHOUSE PROCESSAND ARCHITECTURE (08 Hours)

Types of OLAP servers, 3–Tier data warehouse architecture, distributed and virtual data warehouses. Data warehouse implementation, tuning and testing of data warehouse. Data Staging (ETL) Design and Development, data warehouse visualization, Data Warehouse Deployment, Maintenance, Growth, Business Intelligence Overview- Data Warehousing and Business Intelligence Trends - Business Applications

UNIT –III: INTRODUCTION TO DATA MINING AND CLASSIFICATIONS (14 Hours)

Data mining-KDD versus datamining, Stages of the Data Mining Process-task premitives, Data Mining Techniques -Data mining knowledge representation – Data mining query languages, Integration of a Data Mining System with a Data Warehouse – Issues, Data preprocessing – Data cleaning, Data transformation, Feature selection, Dimensionality reduction, Discretization and generating concept hierarchies-Mining frequent patterns-association-correlation.

Decision Tree Induction - Bayesian Classifiation – Rule Based Classifiation –Classifiation by Back propagation – Support Vector Machines – Associative Classifiation – Lazy Learners – Other Classifiation Methods

UNIT –IV: CLUSTERING,ADVANCES IN DATA MINING (10 Hours)

Clustering techniques – , Partitioning methods- k-means Hierarchical Methods - distance-based agglomerative and divisible clustering,

Mining complex data objects, Spatial databases, temporal databases, Multimedia databases, Time series and Sequence data; Text Mining –Graph mining-web mining-Application and trends in data mining

TEXT BOOKS:

1. Jiawei Han and MichelineKamber, Data Mining: Concepts and Techniques, Morgan Kaufmann Publishers, third edition2011, ISBN: 1558604898.
2. Alex Berson and Stephen J. Smith, " Data Warehousing, Data Mining & OLAP", TataMc Graw Hill Edition, Tenth Reprint 2007.
3. G. K. Gupta, "Introduction to Data Min Data Mining with Case Studies", Easter EconomyEdition, Prentice Hall of India, 2006

REFERENCE BOOKS:

1. Mehmedkantardzic,"Dataminingconcepts,models,methods, and lgorithms", Wiley Interscience, 2003.
2. Ian Witten, Eibe Frank, Data Mining; Practical Machine Learning Tools and Techniques, third edition, Morgan Kaufmann, 2011.
3. George M Marakas, Modern Data Warehousing, Mining and Visualization, Prentice Hall, 2003.

WEB REFERENCES

1. http://www.data-miners.com/

CLOUD COMPUTING

Course Code **MC 535** **L-P-T-Cr.:** **3 0 0 3** **Semester:** **III**

Category: Foundation Course

Prerequisite: Basic Computer Network

Objective:

- To develop the understanding of fundamentals and technological aspects of Cloud Computing.
- Management of cloud services.
- Virtualization along with various terminologies and the keywords used in Cloud Computing and virtualization

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Cloud computing
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I:CLOUD COMPUTING FUNDAMENTALS (10 Hours)

Introduction; Distributed Data Processing, Distributed Database System, Promises of DDBSs, Problem areas.Cloud Computing definition, private,public and hybrid cloud. Cloud types; IaaS,PaaS, SaaS. Benefits and challenges of cloud computing, public vs privateclouds, role of virtualization in enabling the cloud; Business Agility: Benefits andChallenges to Cloud architecture. Application availability, performance, securityand disaster recovery

UNIT –II: MANAGEMENT OF CLOUD SERVICES (08 Hours)

Reliability, availability and security of services deployed from the cloud.Performance and scalability of services, tools and technologies used to managecloud services deployment; Cloud Economics: Cloud Computing infrastructuresavailable for implementing cloud based services.

UNIT –III: VIRTUALIZED DATA CENTER ARCHITECTURE & INFORMATION STORAGE SECURITY & DESIGN (12 Hours)

Cloud infrastructures; public, private, hybrid. Service provider interfaces; Saas,Paas, Iaas. VDC environments; concept, planning and design, business continuity and disaster recovery principles. Managing VDC and cloud environments and infrastructures. Storage strategy and governance; security and regulations. Designing secure solutions; the considerations and implementations involved. Securing storage in virtualized and cloud environments.

UNIT –IV: STORAGE NETWORK DESIGN & OPTIMIZATION OF CLOUD STORAGE (10 Hours)

Architecture of storage, analysis and planning. Storage network designconsiderations; NAS and FC SANs, hybrid storage networking technologies(iSCSI, FCIP, FCoE), design for storage virtualization in cloud computing, hostsystem design considerations.Global storage management locations, scalability, operational efficiency. Globalstorage distribution; terabytes to petabytes and greater

TEXT BOOKS:

1. Greg Schulz, “Cloud and Virtual Data Storage Networking”, AuerbachPublications [ISBN: 978-1439851739], 2011.

2 GautamShroff, “Enterprise Cloud Computing Technology ArchitectureApplications”, Cambridge University Press; 1 edition, [ISBN: 978-0521137355], 2010.

REFERENCE BOOKS:

1. Toby Velte, Anthony Velte, Robert Elsenpeter, “Cloud Computing, A PracticalApproach” McGraw-Hill Osborne Media; 1 edition [ISBN: 0071626948], 2009.

2 Dimitris N. Chorafas, “Cloud Computing Strategies” CRC Press; 1 edition[ISBN: 1439834539],2010.

3 EMC, “Information Storage and Management” Wiley; 2 edition [ISBN: 9780470294215],2012.

BIG DATA ANALYTICS

Course Code	MC 535	L-P-T-Cr.:	3	0	0	3	Semester:	III

Category: Elective Course

Prerequisite: Basic Computer Network, Cloud Computing and Database system.

Objective:

- Fundamentals of Big data
- Fundamental of Mapreduce
- Information Management and Data Privacy and Ethics

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Big data analytics
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT – I: **(8 Hours)**

Introduction: Big data and its importance, a flood of mythic "start up"proportions, big data is more than merely big why now? aconvergenceof key trends, a wider variety of data, the expanding universe of unstructureddata, industry examples of big data: Digital marketing and the online world,the right approach, cross channel lifecycle marketing.

UNIT – II: **(12 hours)**

Big Data Technology: The elephant in the room: Hadoop's parallel world, old vs. new approaches. Data discovery: Work the way people's minds work, open source technology for big data analytics, the cloud and big data, predictive analytics moves into the limelight, a brief history of hadoop, apache hadoop and the hadoop ecosystem.

MapReduce: Analyzing the data with hadoop, map and reduce, java mapreduce, scaling out, data flow, combiner functions, running a distributedmapreduce job, hadoop streaming, the hadoop distributed file system, thedesign of HDFS, HDFS concepts, blocks, name nodes and data nodes, HDFS federation, HDFS high, availability, the command, line interface, basic file system operations, hadoop file systems.

UNIT – III: **(12 hours)**

Information Management: The big data foundation, big data computing platforms, big data computation, more on big data storage, big datacomputational limitations, big data emerging technologies.

Business analytics : The last mile in data analysis, geospatial intelligence will make your life better, consumption of analytics, from creation to consumption. Visualizing: How to make it consumable? organizations are using data visualization as a way to take immediate action.

UNIT – IV: **(10 hours)**

Data Privacy and Ethics : The privacy landscape, the great data grabisn't new, preferencess, personalization, and relationships, rights andresponsibility, playing in a global sandbox , conscientious and

conscious responsibility, privacy may be the wrong focus can data be anonymized?balancing for counter intelligence.

TEXT BOOKS

1. MichaelMinelli, Michele Chambers, Big Data,Big Analytics, Wiley Publications, 2013
2. Tom White, Hadoop: The Definitive Guide, 3/e, O'Reilly Publications, 2012.

REFERENCE BOOKS:

1. Bill Franks Taming, The Big Data Tidal Wave, 1/e, Wiley, 2012.
2. Frank J. Ohlhorst, Big Data Analytics, 1/e, Wiley, 2012

Other References: (Web)

- https://onlinecourses.nptel.ac.in/noc15_mg05/preview
- https://wr.informatik.uni-hamburg.de/_media/teaching/wintersemester_2015_2016/bd-1516-einfuehrung.pdf

WIRELESS SENSOR NETWORKS

Course Code **MC 536** **L-P-T-Cr.:** **3 0 0 3** **Semester:** **III**

Category: Elective Course

Prerequisite: Basic Computer Network

Objective:

- The purpose of this course is to introduce students to Obtain a broad understanding about the network architecture of wireless sensor network.
- Understand all basic characteristics of wireless sensor networks and sensor nodes.
- The principles of data transmission, clustering algorithm and routing protocols.
- Design and development of new network architecture and MAC protocols.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Wireless sensor networks
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I: INTRODUCTION (10 Hours)

Networked wireless sensor devices, Applications: Habitat Monitoring, Smart Transportation, Key design challenges. **Network deployment:** Structured versus randomized deployment, Network topology, Connectivity. Introduction to cloud system,Sensor Cloud Systems, Challenges in Sensor Cloud Systems.

UNIT –II: LOCALIZATION AND WIRELESS CHARACTERISTICS (10 Hours)

Localization: issues & approaches, Coarse-grained & Fine-grained node localization, Network-wide localization. Wireless characteristics: Basics, Wireless link quality, Radio energy considerations, SINR capture model for interference.

UNIT –III: MEDIUM-ACCESS AND SLEEP SCHEDULING (10 Hours)

Issues in designing MAC protocol for WSNs, Classification of MAC Protocols, Energy efficiency in MAC protocols, Asynchronous sleep techniques, Sleep-scheduled techniques.

Classification of Energy Management SchemesSleep-based topology control: Constructing topologies for connectivity, constructing topologies for coverage.

UNIT –IV: ROUTING AND INTEGRATION OF SENSOR & CLOUD SYSTEM (10 Hours)

Routing: Metric-based approaches, Routing with diversity, Multi-path routing, Lifetime-maximizing energy-aware routing techniques, Geographic routing. Data-centric routing, Data-gathering with compression, Querying, Data-centric storage and retrieval, The database perspective on sensor networks.

TEXT BOOKS:

1. Wireless Sensor Networks: Technology, Protocols, and Applications: KazemSohraby, Daniel Minoli, TaiebZnati , Wiley Inter Science.
2. Networking Wireless Sensors: BhaskarKrismachari, Cambridge University Press

REFERENCE BOOKS:

1. Wireless Sensor Networks: Architectures and Protocols: Edgar H. Callaway, Jr. Auerbach Publications, CRC Press.
2. Wireless Sensor Networks: Edited by C.S Raghavendra, Krishna M, Sivalingam, TaiebZnati , Springer.

3. Distributed Sensor Networks: A Multiagent Perspective, Victor Lesser, Charles L. Ortiz, and MilindTambe , Kluwer Publications.
4. Wireless Sensor Networks: An Information Processing Approach- by Feng Zhao, Leonidas Guibas , Morgan Kaufmann Series in Networking 2004.

ADVANCED DATABASES

Course Code **MC 535** **L-P-T-Cr.:** **3 0 0 3** **Semester:** **III**

Category: Elective Course

Prerequisite: DBMS, Computer Networks

Objective:

- To know advanced concepts of database in large scale analytics, derive data maintenance, change schema, database update and Benchmark Object Databases, deals with uncertainties in advanced concepts of database, and open issues in database technologies.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Advanced databases
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

UNIT –I: PARALLEL AND DISTRIBUTED DATABASES (08 Hours)

Inter and Intra Query Parallelism – Architecture – Query evaluation – Optimization – Distributed Architect Storage – Catalog Management – Query Processing - Transactions – Recovery - Large-scale Data Analyt the Internet Context – Map Reduce Paradigm - run-time system for supporting scalable and fault-to execution - paradigms: PigLatin and Hive and parallel databases versus Map Reduce

UNIT –II: ACTIVE DATABASES, TEMPORAL AND OBJECT DATABASES (14 Hours)

Syntax and Sematics (Starburst, Oracle, DB2) – Taxonomy – Applications – Integrity Management – Wo Management – Business Rules – Design Principles – Properties – Rule Modularization – Rule Debugging – I methodology – Open Problems.
Overview – Data types – Associating Facts – Temporal Query Language – TSQL2 – Time Ontology – Lang Constructs – Architecture – Temporal Support – Object Database and Change Management – Change of Sc – Implementing Database Updates in O2 – Benchmark Database Updates – Performance Evaluation.

UNIT –III: SPATIAL, TEXT AND MULTIMEDIA DATABASES (08 Hours)

Traditional Indexing Methods (Secondary Keys, Spatial Access Methods) – Text Ret – Multimedia Indexing – 1D Time Series – 2d Color images – Sub pattern Matching – Issues – Uncertainties

UNIT –IV: COMPLEX QUERIES AND REASONING (10 Hours)

Logic of Query Languages – Relational Calculi – Recursive rules – Syntax and semantics of Data log – Fix semantics – Implementation Rules and Recursion – Rule rewriting methods – Compilation and Optimizat Recursive Queries in SQL – Open issues.
Introduction to Big data analytics and No-SQL
TEXT / REFERENCE BOOKS:

1. Ramakrishnan, Gehrke, “Database Management System”, Tata McGraw Hill Publications, Third Edition.
2. Carlo Zaniolo, Stefano Ceri “Advanced Database Systems”, Morgan Kauffmann Publishers.
3. VLDB Journal.
4. Elmaski&Navathe -Fundamentals of Database Systems, 4th Edition, Pearson Education
5. Database Systems, Thomas Connolly, Carolyn Begg
6. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2002.

WEB REFERENCES

1. http://video.google.com
2. http://www.blinkvid.com/video
3. http://www.learnerstv.com/course.php?cat=Computers
4. http://www.crazyengineers.com/forum

MANAGEMENT SUPPORT SYSTEM

Course Code	**MC 535**	**L-P-T-Cr.:**	**3**	**0**	**0**	**3**	**Semester:**	**III**

Category: Programme Elective Course.

Prerequisite: Basic Software Engineering.

Objective:

- The objective of the course is to develop the basic understanding of the decision support system of the artificialintelligence for business organization.Implication of emerging trends in technology.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Management Support system
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

Unit – I: **(10 Hours)**

Management Information system: Introduction, objective, definition, benefits, characteristics of MIS, , information system level, types of information system, resistance to MIS, implementing MIS,features of MIS, components of MIS.

Unit – II: **(10 Hours)**

Managerial decision making: Decision making process, problem solving techniques, how decisions are being supported – decisions styles group, Simon Model of decision making, features of various CBIS. Decision support system overview - relevance, scope, characteristic and capabilities, components and classification of DSS Decision support System: Introduction, architecture, components, limitation, development.

Unit – III: **(08 Hours)**

Database management system: Objective, characteristics, components and use of DBMS, types of database, Role of DBA. Model base management system: types of models, certainty, uncertainty, risk

Unit – IV: **(12 Hours)**

Information Security challenges in E-enterprise : Introduction, Security Threats and Vulnerability, Controlling Security Threat and Vulnerability, Management Security Threat in E-business, Disaster Management, MIS and Security Challenges,Software security: threats, method of safety, cryptography, digital signature.Introduction to Emerging trends technology, Expert System, knowledge management, A.I., data mining,data warehousing,

Suggested Readings

TEXT BOOKS

1. Keen, peter G.W.: Decision Support System an Organisational Perspective Addison-Wesley Pub.
2. Theierauff, Robert J. Decision Support System for effective planning – Prentice Hall – 1982.

REFERENCE BOOKS

1 Kroger, Donald W., and Hugh J. Watson Computer Based Information System New York, 1984.
1. Davis, Michael W. A management Approach – Macmillan Publishing company, Prentice Hall, New Jersey,1988.
2. Andrew P. Decision support System Engineering, Sage, John Wiley & Sons, New York

OPEN SOURCE LAB

Course Code **MC 536** **L-P-T-Cr.:** **3 0 0 3** **Semester:** **III**

Category: Laboratory Course

Prerequisite: Basic concepts of Computer Science

Objective: To get clear understanding about LaTeX and shell scripting in LINUX.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Open source lab
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

Contents

A. Learning LaTeX

1. What is and why to learn LaTeX?
2. Writing your first piece of LaTeX
3. The preamble of a document
4. Adding a title, author and date and adding comments
5. Bold, italics and underlining
6. Adding images
7. Creating lists in LaTeX
8. Adding math to LaTeX
9. Basic Formatting
10. Creating tables and adding a Table of Contents
11. Preparing beamer slides

B. Shell Scripting in LINUX

Sno	List ofprograms
1	Write a Shell Script that accepts a file name, starting and ending line numbers as arguments and displays all lines between the given line numbers.
2	Write a shell script that deletes all lines containing the specified word in one or more files supplied as arguments to it.
3	Write a shell script that displays a list of all files in the current directory to which the user has read, write and execute permissions.
4	Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or directory and reports accordingly. whenever the argument is a file it reports no of lines present in it
5	Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.
6	Write a shell script to list all of the directory files in a directory
7	Write a shell script to find factorial of a given number.

WEB TECHNOLOGY LAB

Course Code	**MC 537**	**L-P-T-Cr.:**	**3**	**0**	**0**	**3**	**Semester:**	**III**

Category: Elective Course

Prerequisite: Basic programming concepts of HTML.

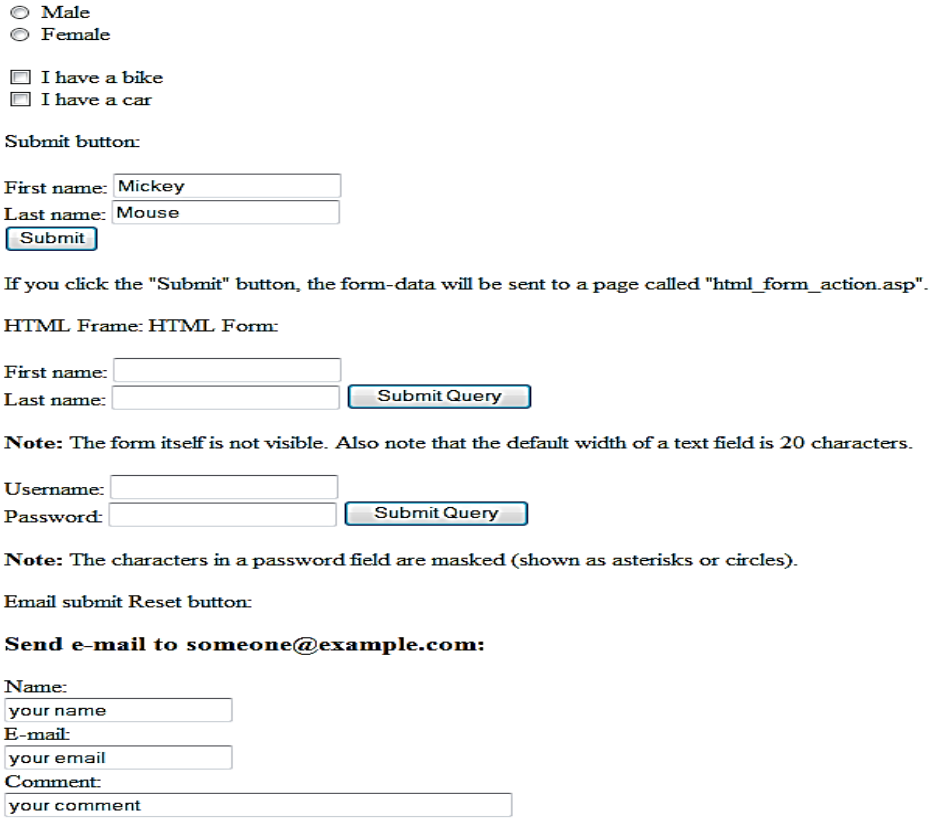
Objective:

- This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting. This will also expose students to the basic tools and applications used in Web publishing.

Course Outcome :

CO-1	Remember and understand the basic concepts/Principles of Web technology lab
CO-2	Analyze the Various Concepts to understand them through case studies
CO-3	Apply the knowledge in understanding practical problems
CO-4	Execute/Create the Project or field assignment as per the knowledge gained in the course

1. Design the following static web pages required for an online book store web site. **1) HOME PAGE:** The static home page must contain three **frames**. **2) LOGIN PAGE 3) CATOLOGUE PAGE:**The catalogue page should contain the details of all the books available in the web site in a table.
   4) CART PAGE: The cart page contains the details about the books which are added to the cart. **5) REGISTRATION PAGE**
2. Write JavaScript to validate the fields of the above page. Write JavaScript to validate the fields of the Login page.
3. Design a web page using CSS which includes the following:
   1) Use different font, styles:
   2) Set a background image for both the page and single elements on the page.
   3) Control the repetition of the image with the background-repeat property.
   4) Define styles for links
   5) Working with layers
   6) Add a customized cursor
4. Write an XML file which will display the Book information. Write a Document Type Definition (DTD) to validate the above XML file. Display the XML file in a table. Use XML schemas XSL and CSS for the above purpose.
5. Create a simple visual bean with a area filled with a color. The shape of the area depends on the property shape. If it is set to true then the shape of the area is Square and it is Circle, if it is false. The color of the area should be changed dynamically for every mouse click. The color should also be changed if we change the color in the "property window ".
6. Design the following Web page.



1. 1) Install TOMCAT web server and APACHE. 2) Access the above developed static web pages for books web site, using these servers by putting the web pages developed in week-1 and week-2 in the document root.
2. Assume four users user1, user2, user3 and user4 having the passwords pwd1, pwd2, pwd3 and pwd4 respectively. Write a servlet for doing the following. 1. Create a Cookie and add these four user id's and passwords to this Cookie. 2. Read the user id and passwords entered in the Login form and authenticate with the values available in the cookies.
3. Install a database (Mysql). Create a table which should contain at least the following fields: name, password, email-id, phone number Write a PHP program to connect to that database and extract data from the tables and display them. Insert the details of the users who register with the web site, whenever a new user clicks the submit button in the registration page.
4. Write a PHP which insert the details of the 3 or 4 users who register with the web site by using registration form. Authenticate the user when he submits the login form using the user name and password from the database.