FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT501T	Database Management System	3	-		3	30	70	100

Course Objectives	Course Outcomes
This course is intended	**Students will be able to·**
● To train the fundamental concepts of database management system, database modeling and design, SQL system implementation techniques. ● To enable students to model ER diagram for any customized applications. ● To provide knowledge on distributed databases, concurrency techniques, federated systems and active databases.	● An ability to apply the knowledge of mathematics, science and computing appropriate to the discipline. ● Understand the concept of data storage. ● Solve issues of information systems using the learned database principles. ● Construct database application using current tools and techniques. ● To gain overview advance SQL for database application.

Unit I : Introduction	**[8Hrs]**
History and motivation for database systems; components of database systems; DBMS functions; Database Architecture, Data Abstraction, Data Independence, Formal relational query languages: Relational Algebra, Tuple Relational calculus, Domain Relational Calculus. Database query languages: Overview of database languages; Introduction to SQL: SQL Data Definition, Basic Structure of SQL Queries, Set Operations, Null values, Aggregate functions.	
Unit II: Storage and file structure	**[7Hrs]**
Data dictionary storage, Basic concepts of indexing, Ordered indices, B+ Tree index files, B+ Tree indexing, B+ Tree Extensions, Multiple Key Access, Hashed files; signature files; Database efficiency and tuning, Bitmap Indices, Index Definition in SQL.	
Unit III: Data Models	**[7Hrs]**
Entity Relationship Model, Development of ER Diagrams, Extended Entity Relationship Model, Relational database design: Database design; Codd's Relational Database Rules, functional dependency; normal forms; multi-valued dependency; join dependency; SQL: Nested Sub-queries Join Expressions, Views, Integrity Constraints	
Unit IV: Transactions	**[7Hrs]**
Failure and recovery; concurrency control in SQL, Overview of Query Processing, Measures of Query cost, Evaluation of relational algebra expressions, Query equivalence, Query optimization.	
Unit V: Advanced SQL	**[7Hrs]**
Dynamic SQL and Embedded SQL, Functions and Procedures, Triggers. Overview of OODBMS & Distributed DBMS, Introduction to NoSQL Database	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Database System Concepts	Abraham Silberschatz, Henry F. Korth and S. Sudarshan	6th	McGraw Hill (SIE), 2013.
2	Database Systems - Models, Languages, Design and Application Programming	Ramez Elmasri and Shamkant Navathe	6th	Pearson Education
3	Database Systems Concepts	Shio Kumar Singh	2nd	Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1	An introduction to database systems	C. J. Date	8th	Addison Wesley

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT501P	Database Management System Lab		-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended	**Students will be able to**·
● To train the fundamental concepts of database management system, database modeling and design, SQL system implementation techniques. ● To enable students to model ER diagram for any customized applications. ● To provide knowledge on distributed databases, concurrency techniques, federated systems and active databases.	● An ability to apply the knowledge of mathematics, science and computing appropriate to the discipline. ● Solve issues of information systems using the learned database principles. ● Construct database application using current tools and techniques. ● To gain overview advance SQL for database application.

Expt. No.	Title of the experiment
1	SQL Database Installation
2	SQL Query for Database Creation & Deletion
3	SQL Query for Relation Creation & Deletion
4	SQL Query for Constraints
5	SQL Query for DML commands
6	SQL Query for DCL Commands
7	SQL Query for TCL Commands
8	SQL Query for Join & Set Operations
9	SQL Functions, Trigger in SQL
10	PL/SQL Program

Text Books

S.N	Title	Authors	Edition	Publisher
1	Database System Concepts	Abraham Silberschatz, Henry F. Korth and S. Sudarshan	6th	McGraw Hill (SIE), 2013.
2	Database Systems - Models, Languages, Design and Application Programming	Ramez Elmasri and Shamkant Navathe	6th	Pearson Education
3	Database Systems Concepts	Shio Kumar Singh	2nd	Pearson Education

Reference Books

S.N	Title	Authors	Edition	Publisher
1	An introduction to database systems	C. J. Date	8th	Addison Wesley
2	Database system implementation	H. Garcia et al.	-	Prentice Hall,2000

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
22IT502T	Design and Analysis of Algorithms	4	-		4	CA	ESE	Total
						30	70	100

Course Objectives	Course Outcomes
This course is intended • Analyze the asymptotic performance of algorithm • Apply important algorithmic design paradigms and methods of analysis • Solve simple to moderately difficult algorithmic problems arising in applications • Able to demonstrate the hardness of simple NP-complete problems	**Students will be able to·** • Illustrate different approaches for analysis and design of efficient algorithms and Analyze performance of various algorithms using asymptotic notations. • Determine and apply various divide & conquer strategies and greedy approaches for solving a given computational problem • Demonstrate and solve various real time problems using the concepts of dynamic programming • Make use of backtracking and graph traversal techniques for solving real-world problems • Recall and Classify the NP-hard and NP-complete problems

Unit I: Introduction to Algorithm **[9Hrs]**

Definition of algorithms and brief explanation about the basic properties of algorithms Recurrence relations, solutions of recurrence relations using technique of characteristic equation, master theorem, Asymptotic notations of analysis of algorithms, worst case, average case and best case, amortized analysis, application of amortized analysis.

Unit II: Greedy and Divide & Conquer Approach **[9Hrs]**

Divide and conquer strategies: Binary search, Stressen's matrix multiplication algorithm, min-max algorithm.
Greedy Approach: Application to job sequencing with deadlines problem, knapsack problem, optimal merge pattern, Huffman code, minimum cost spanning tree using Prim's and Kruskal's algorithm.

Unit III: Dynamic Programming **[10Hrs]**

Dynamic Programming: Basic Strategy, Multistage graph (forward and backward approach), Longest Common Subsequence, Optimal Binary Search Tree, 0/1 Knapsack problems, Travelling Salesman problem, single source shortest path using Bellman-Ford algorithm, all pair shortest path using Floyd- Warshall algorithm

Unit IV: Backtracking Algorithm **[10Hrs]**

Basic Traversal and Search Techniques: Breadth first search and depth first search, connected components.
Backtracking: Basic strategy, N-Queen Problem and their Analysis (4 & 8-Queen), graph coloring, Hamiltonian cycles.

Unit V: Computational Complexity **[10Hrs]**

NP-hard and NP-complete problems, basic concepts, non-deterministic algorithms, NP-hard and NP-complete, Cook's theorem, decision and optimization problems, graph based problems on NP Principle.

Text Books

S.N	Title	Authors	Edition	Publisher
1	I Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	3rd	Prentice Hall of India
2	The Design and Analysis of Computer Algorithms",	Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman	-	Pearson education
3	Fundamentals of Computer Algorithms	Horowitz, Sahani, Rajsekharam	2nd	University Press

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of Algorithms",	Brassard, Bratley	-	Prentice Hall
2	Design and Analysis of Algorithms	Parag Dave, Himanshu Dave	2nd	Pearson Education
3	Computer Algorithms: Introduction to Design and analysis, 3rd Edition,	Sara Baase and A.V. Gelder	Third Edition	Pearson Education

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT502P	Design and Analysis of Algorithms Lab		-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended ● Analyze the asymptotic performance of algorithm ● Apply important algorithmic design paradigms and methods of analysis ● Solve simple to moderately difficult algorithmic problems arising in applications ● Able to demonstrate the hardness of simple NP-complete problems	**Students will be able to**· ● Illustrate different approaches for analysis and design of efficient algorithms and Analyze performance of various algorithms using asymptotic notations. ● Determine and Apply various divide & conquer strategies and greedy approaches for solving a given computational problem ● Demonstrate and Solve various real time problems using the concepts of dynamic programming ● Make use of backtracking and graph traversal techniques for solving real-world problems ● Recall and Classify the NP-hard and NP-complete problems

Expt. No.	Title of the experiment
1	Practical based on Binary search algorithms.
2	Practical based on matrix multiplication algorithm
3	Practical based on min-max algorithm
4	Practical based on Huffman code
5	Practical based on Knapsack and Prim's problems
6	Practical based on Traveling Salesman problem
7	Practical based on Bellman- Ford algorithm
8	Practical based on Floyd- Warshall algorithm
9	Practical based on NP-hard and NP-complete
10	Practical based on Cook's theorem,

Text Books

S.N	Title	Authors	Edition	Publisher
1	I Introduction to Algorithms	Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein	3rd	Prentice Hall of India
2	The Design and Analysis of Computer Algorithms",	Alfred V. Aho, John E. Hopcraft, Jeffrey D. Ullman	-	Pearson education
3	Fundamentals of Computer Algorithms	Horowitz, Sahani, Rajsekharam	2nd	University Press

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of Algorithms",	Brassard, Bratley	-	Prentice Hall
2	Design and Analysis of Algorithms	Parag Dave, Himanshu Dave	2nd	Pearson Education
3	Computer Algorithms: Introduction to Design and analysis, 3rd Edition,	Sara Baase and A.V. Gelder	Third Edition	Pearson Education

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT503T	Operating Systems	3	1	-	4	30	70	100

Course Objectives	Course Outcomes
This course is intended ● To learn the fundamentals of Operating Systems. ● To learn the mechanisms of OS to handle processes and threads and their communication ● To learn the mechanisms involved in memory management in contemporary OS ● To gain knowledge on distributed operating system concepts that includes architecture, Mutual exclusion algorithms, deadlock detection algorithms and agreement protocols	**Students will be able to** ● Analyze the structure of OS and basic architectural components involved in OS design ● Analyze and design the applications to run in parallel either using process or thread models of different OS ● Analyze the various device and resource management techniques for timesharing and distributed systems ● Interpret the Mutual exclusion, Deadlock detection and agreement protocols of Distributed operating system ● Interpret the mechanisms adopted for file sharing in distributed Applications Conceptualize the components involved in designing a contemporary OS

Unit I: Introduction	**[8Hrs]**
What is Operating System (OS), structure of OS, history of OS, Types of OS: Time sharing, real-time, multiprocess (Asynchronous & Synchronous), multiprogramming (loosely coupled, tightly coupled), Distributed, web-based, client server, peer-to-peer, services of OS, user view & machine view of OS, System calls, Spooling and buffering.	
Unit II: File Management	**[7Hrs]**
File Concept, file attributes, file operations, file system structure, file system implementation, file access methods, Disk Scheduling Algorithms, File protection	
Unit III: Process Management	**[7Hrs]**
Process concept, process scheduling, operations on process, interprocess communication, communication between client-server, multithreaded model, process scheduling criteria, scheduling algorithm.	
Unit IV: Memory Management	**[7Hrs]**
Preliminaries, Bare machine, resident monitor, swapping, multiple partitions, paging, segmentations, combined systems. Virtual Memory: Overlays, demand-paging, page replacement, page replacement algorithms. Allocation algorithm, thrashing.	
Unit V: Process Synchronization & Deadlock and Protection	**[7Hrs]**
Critical Section problem, semaphores, classic problems: Dining Philosopher problem, producer-consumer, reader-writers problem. System model, deadlock characterization, methods for handling deadlocks, prevention, detection, recovery, avoidance, Banker's Algorithm.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Modern Operating Systems	A. S. Tanenbaum		Pearson
2	Operating System	A.S. Godbole	3rd	Tata McGraw Hill
3	Operating System Concepts	Silberschatz and Galvin		Addison Wesley

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Operating systems concepts and Design	Milan Milenkovic	3rd	Tata McGraw- Hill
2	Introduction to Operating Systems Concepts	P.C.P. Bhatt	3rd	PHI,2010.
3	Operating systems	Harvey M Deital	3rd	Pearson Education

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT503T	Operating Systems	3	1	-	4	30	70	100

Tutorial List

Tut. No.	Tutorial Based on
1	Disk Scheduling Algorithms
2	Page replacement algorithms
3	Allocation algorithm
4	Critical Section problem
5	Dining Philosopher problem
6	Producer-consumer
7	Reader-writers problem
8	Banker's Algorithm

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
22IT561O (ii)	OE-I Computer Animation	3	-	-	3	CA	ESE	Total
						30	70	100

Course Objectives	Course Outcomes
This Course is intended ● To use basic 3D modeling techniques ● To use basic shading, rendering, texturing and lighting techniques ● To apply animation concepts learned in fundamentals of animation to a 3D environment. ● To create a short 3D animation	**Students will be able to** ● Understand, identify and design art relating to that particular artwork in the given time frame ● Apply the concepts of animation using maya ● Understand and apply 3D animation concepts. ● summarize various formats and effects of motion capture. ● Relate and apply the features of animation and VFX for animated application.

Unit I **[8Hrs]**

What is mean by Animation – Why we need Animation – History of Animation – Uses of Animation – Types of Animation – Principles of Animation – Some Techniques of Animation – Animation on the WEB – 3D Animation – Special Effects - Creating Animation.

Unit II **[7Hrs]**

Introduction to the interface of Maya, Menu bar, Tool bar, Hot box, Using the shelf, hot keys. Using the spacebar, manipulating a view. Creating objects: Simple primitives, Lights, cameras. Selecting objects, types of selection, Single selection, adding and subtracting selection. Edit menu selection options, Marquee selection, Lasso selection, selection mask Using hyper shade, Relationship editor, hyper graph and outliner.

Unit III **[7Hrs]**

3D Animation & its Concepts – Types of 3D Animation – Skeleton & Kinetic 3D Animation – Texturing & Lighting of 3D Animation – 3D Camera Tracking – Applications & Software of 3D Animation

Unit IV **[7Hrs]**

Motion Caption – Formats – Methods – Usages – Expression – Motion Capture Software's – Script Animation Usage – Different Language of Script Animation Among the Software, Visual special effects techniques.

Unit V **[7Hrs]**

Animation &VFX around the world, concept development-story developing, Audio &Video-color Model-Device Independent Color model-Gamma and Gamma correction-Production Budgets-3D animated Movies

Text Books

S.N	Title	Authors	Edition	Publisher
1	PRINCIPLES OF MULTIMEDIA	Ranjan Parekh	-	TMH
2	Multimedia Technologies	Ashok Banerji, Ananda Mohan Ghosh	-	McGraw Hill Publication

Reference Books

S.N	Title	Authors	Edition	Publisher
1	The complete animation	Chris Patmore Pub.-Baron's	-	Educational Series.(New York)
2	Animation Unleashed	Ellen Bessen, Michael Weise	-	Productions,2008(U.S.A)

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT561O(i)	OE-I Web Development	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
This Course is intended ● Understand HTML web development markup ● Building Strong expertise to develop front end application using CSS3 ● Design and develop interactive, client-side, executable web applications ● Able to build the database and make user interface for web application	**Students will be able to** ● Create web pages using HTML ● Develop front end application using CSS ● Design and implement dynamic web pages using event-based Programming ● Construct **PHP** scripts to create dynamic web content. ● Connect the database using SQL

Unit I: HTML	**[8Hrs]**
Introduction, www, Internet, URL, Common tags: Text formatting tags Line and Paragraph tags Lists: ordered list Unordered List, definition List, anchor tag , Absolute and relative path, Tables and its attributes, Image tag- alt attribute, image mapping frames, forms	
Unit II: Cascading Style sheet	**[7Hrs]**
Introduction CSS, Applying CSS to HTM, Selectors, Properties and Values, CSS Colors and Backgrounds, CSS Box Model, CSS Margins, Padding, and Borders, CSS Text and Font Properties	
Unit III: Java Script	**[7Hrs]**
Introduction to JavaScript, Applying JavaScript (internal and external), Understanding JS Syntax, Introduction to Document and Window Object, Variables and Operators, Data Types and Num Type Conversion, Math and String Manipulation, Objects and Arrays, Date and Time, Conditional Statements, Switch Case, looping in JS, Functions	
Unit IV: PHP	**[7Hrs]**
Introduction to PHP. Evaluation of Php, Basic Syntax, Defining variable and constant, Php Data type, Operator and Expression, Decisions and loop, Function, Array, Handling Html Form with Php	
Unit V: Database Connectivity with MySql	**[7Hrs]**
Introduction to RDBMS, Connection with MySql Database, performing basic database operation (DML) (Insert, Delete, Update, Select), Setting query parameter.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	HTML: The Complete Reference	Thomas A. Powell	-	McGraw Hill.
2	Learning PHP, MySQL, JavaScript, CSS & HTML5: A Step-by-Step Guide to Creating Dynamic Websites	Robin Nixon	3rd	OREILLY

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Java Script: The Complete Reference 2/E	Thomas Powell	-	McGraw Hill.

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT504T (i)	PE-I Advance Computer Network	3	1	-	4	30	70	100

Course Objectives	Course Outcomes
The course is intended ● To provide basic understanding of Protocols at Network layers with special emphasis on IP, TCP & UDP and Routing algorithms. ● To Implementation Routing and Addressing. ● To Provide the mathematical background of routing protocols. ● To develop some familiarity with current research problems and research methods in advanced computer networks.	**Students will be able to** ● Learn the functionality and services provided by the network layer, analyze and apply routing algorithms. ● Analyze how to assign the IP addresses for the given network. ● Select the transport protocol appropriate for a given application ● Select appropriate quality of service mechanisms for a give computer network ● Analyze emerging trends and security issues

Unit I: Network layer-Network Layer design issues **[8Hrs]**

store-and forward packet switching, services provided transport layers, implementation connection less services, implementation connection oriented services, comparison of virtual – circuit and datagram subnets. Routing Algorithm –shortest path routing, flooding, distance vector routing, link state routing, Hierarchical routing, Broadcast routing, Multicasting routing, routing for mobiles Hosts, routing in Adhoc networks, Congestion control algorithms-Load shedding, Congestion control in Data gram Subnet.

Unit II: IP Address and Network Layer **[7Hrs]**

IPV4 Address address space, notations, classful addressing, classless addressing network addressing translation(NAT) , IPV6 Address structure address space, Internetworking need for network layer internet as a data gram, internet as connection less network. IPV4 datagram, Fragmentation, checksum, options. IPV6 Advantages, packet format, extension Headers, Transition form IPV4 to IPV6

Unit III: TCP/UDP **[7Hrs]**

client/server paradigm, multiplexing and demultiplexing, connectionless versus connection oriented services, reliable versus reliable. UDP: well known ports for UDP, user data gram, check sum, UDP operation, and uses of UDP TCP: TCP services, TCP features, segment, A TCP connection, Flow control, error control, congestion control. SCTP: SCTP services SCTP features, packet format, An SCTP association, flow control, error control. Congestion control: open loop congestion control, closed loop congestion control, Congestion control in TCP, frame relay, Quality Of Service: flow characteristics, flow classes Techniques To Improve QOS: scheduling, traffic shaping, resource reservation, admission control.

Unit IV: Multimedia System **[7Hrs]**

Multimedia- introduction digital a audio , Audio compression, streaming audio, internet radio, voice over IP, introduction to video, video compression, video on demand, the MBone-the multicast back bone

Unit V: Emerging trends Computer Networks **[7Hrs]**

Mobile Ad hoc networks: applications of Ad hoc networks, challenges and issues in MANETS,MAC layers issues, routing protocols in MANET, transport layer issues, Ad Hoc networks security. Wireless sensors networks: WSN functioning, operation system support in sensor devices, WSN Characteristics, sensor network operation, sensor Architecture: cluster management; Wireless mesh networks WMN design, Issues in WMNs;

Text Books

S.N	Title	Authors	Edition	Publisher
1	Data communications and networking	Behrouz A Fourzan,	4th	TMH
2	Computer networks	Andrew S Tanenbaum,	4th	Pearson
3	Computer networks,	Mayank Dave,	-	CENGAGE

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Computer Networks, A system Approach,	Larry L Peterson and Bruce S Davie,	5th	Elsevier

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT504T (i)	PE-I Advance Computer Network		1		1	30	70	100

Tutorial List

Tut. No.	Tutorial Based on
1	Performing an Initial Switch Configuration or Performing an Initial Router Configuration
2	Demonstration Using the Cisco IOS Show Commands.
3	Problems on Implementing an IP Addressing Scheme
4	Problems based on Error detection and correction techniques in Computer Network.
5	Problems on Different Data Compression techniques.
6	Configuring a Cisco Router as a DHCP Server.
7	Quiz based on complete syllabus of Advance computer Network.

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT504T (ii)	PE-I Computer Graphics and Animation	3	1	-	4	30	70	100

Course Objectives	Course Outcomes
This course is intended 1. Learn to create 2D and 3D objects. 2. Able to apply various transformations on the 2D and 3D objects. 3. To apply hidden surface removal techniques along with various shading algorithms 4. Create 3D graphics with realistic effects	**Students will be able to-** ● Classify various graphics hardware and software devices ● Use primitive operations to create 2D and 3D objects and perform various operations thereon. ● Perform complex 2D and 3D transformations on objects. ● Implement various hidden surface removal techniques. ● Relate and apply the features of animation for animated application.

Unit I: Geometry and line generation	**[8Hrs]**
Introduction: Overview of Computer Graphics, graphics systems, Pixels and frame buffers, Types of display devices, Random scan methods, Raster scan methods, DDA and Bresenham's algorithms for line generation, Circle generation algorithm, Antialiasing	
Unit II: Graphics primitives & 2D transformations	**[8Hrs]**
Graphics primitives: Display files, algorithms for polygon generation, polygon filling algorithms.**2D transformations:** translation, scaling, rotation, , rotation about arbitrary point, reflections, shearing 3D Transformation, Projections	
Unit III: Windowing and clipping	**[6Hrs]**
3D transformations: 3D Transformation, parallel and perspective projections **Windowing and clipping:** window, viewport, viewing transformations, point, line and Polygon clipping, window to viewport transformation, NDC (Normalised Device Coordinates)	
Unit IV: Color models	**[8Hrs]**
Visible Surface Detection: Depth Buffer Method, Z-Buffer Method, Painter's Algorithm, Bezier and B-Spline curves, Shading Models **Color models:** Properties of light, CIE Chromaticity diagram, RGB,CMY,HSV colour Models	
Unit V: Animation & its concepts	**[7Hrs]**
Animation: Introduction to Animation, History of animation, Types of Animation, Principles of animation, Key-Frame Animation, Animation Tools, Morphing **3D animation & its concepts-** 2D and 3D animation ,3D pipeline, Motion Capture software, Special Effects, Visual Effects	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Computer Graphics	D. Hearn, M.P .Baker	2nd	Pearson Education
2	Principles of Interactive Computer Graphics	W .M. Newman & R.F. Sproul	2/e,	McGraw Hill
3	Principles of Multimedia	Rajan Parekh		Tata McGraw-Hill

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Computer Graphics Using Open GL	F.S. Hill	2nd	Pearson Education
2	Fundamentals of Multimedia	Ze-Nian, Li, Mark S. Drew		Pearson Education
3	Computer Graphics	Harington		McGraw Hill

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT504T(ii)	PE-I Computer Graphics and Animation		1		1	30	70	100

Tutorial List

Tut. No.	Tutorial Based on
1	Quiz based on Unit-1
2	Problem solving on unit-1
3	Quiz based on Unit-2
4	Problem solving on unit-2
5	Quiz based on Unit-3
6	Problem solving on unit-3
7	Any free courses

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT504T (iii)	PE-I IoT DevOps	3	1	-	4	30	70	100

Course Objectives	Course Outcomes
The course is intended ● DevOps methodology and its key concepts ● Linux for DevOps ● Cloud computing and DevOps ● Source code management with Git ● Continuous integration concept ● Configuration management in DevOps ● Popular DevOps tools like Docker, Puppet, Chef and SaltStack ● System monitoring using Splunk ● The concept of version control with Nagios	**Students will be able to** ● Explain DevOps methodology and its key concepts ● Manage source code using Git ● Deploy DevOps concepts to respond faster to client needs ● Understand Docker in DevOps ● Understand ZnagiOS for DevOps

Unit I	**[8Hrs]**
Introduction, IoT applications for industry: Future Factory Concepts, Brownfield IoT, Smart Objects, SmartApplications, Four Aspects in your Business to Master IoT, Value Creation from Big Data and Serialization, IoT for Retailing Industry, IoT For Oil and Gas Industry, Opinions on IoT Application and Value for Industry, Home Management, eHealth	
Unit II	**[7Hrs]**
Introduction to Software Development LifeCycle, Agile Methodology and DevOps Process, Introduction to Operating System, Linux commands for DevOps	
Unit III	**[7Hrs]**
Cloud Computing, Cloud Services for DevOps, Managing Source Codes through various version control systems, Building & managing source code, Local repository & Remote Repository	
Unit IV	**[7Hrs]**
Building Source code, Understanding CICD pipeline, Integration tool JENKINS, Continuous Integration and its Tools, Managing Configuration in DevOps, Continuous deployment in DevOps.	
Unit V	**[7Hrs]**
Docker in DevOps , Puppet and Chef for DevOps ,SaltStack for DevOps, System Monitoring in DevOps using Splunk, Nagios for DevOps	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Learning DevOps: Continuously Deliver Better Software	Joakim Verona, Michael Duffy, Paul Swartout	-	Packt
2	Practical DevOps	Joakim Verona	-	Packt

Reference Books

S.N	Title	Authors	Edition	Publisher
1	The DevOps Adoption Playbook: A Guide to Adopting DevOps in a Multi-Speed IT ..	Sanjeev Sharma	-	Wiley
2	Learning DevOps: The complete guide to accelerate collaboration with Jenkins .	Mikael Krief	-	Packt

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT504T (iii)	PE-I IoT DevOps		1		1	30	70	100

Tutorial List

Tut. No.	Tutorial Based on
1	Demonstrate Applications for Industry: Future Factory Concepts
2	Illustrate four key aspects essential for successful IoT integration in any business
3	Explore the sequential phases that encompass the software development process, from project initiation to deployment
4	Study the essential command-line tools that are indispensable for tasks such as file manipulation, directory navigation, text processing, and process management.
5	Explore the process of building and managing source code
6	Demonstrate the concepts of CI and CD and how they enhance software development and delivery

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22AS501T	Economics and Management	3	-	-	3	30	70	100

Course Objectives	Course Outcomes
• The course examines how the economics, business and industrial management practices are related and how business decision is taken.	• Apply managerial economics concept in business analysis and business decision making. • Explain relationships between production and costs and understand different forms of market structures. • Assess impact of macroeconomics and government policies on business and economy. • Recognize the functions of management and marketing management for business decisions. • Explore role of financial management in business and decision making.

Unit I	**[8Hrs]**
Economics, Classification of economics, Industrial economics, Consumer demand, Law of Demand, Determinants of demand, Demand forecasting, Law of supply, Utility, Law of diminishing marginal Utility, Types of Elasticity of demand	
Unit II	**[7Hrs]**
Concept of Production, Factors of Production, Laws of return, Cost concepts and types of cost, cost curves, Market Structures- Perfect competition, Monopoly, Oligopoly, and Monopolistic competition.	
Unit III	**[7Hrs]**
The functions of central bank, Inflation, Deflation, Recession. Measures to control Inflation, National income, GDP, GNP, Liberalization, Privatization and Globalization	
Unit IV	**[7Hrs]**
Definition of management, functions of management – planning, organizing, directing, Controlling, human resources Management, Marketing Management, Concepts of Marketing, Marketing mix, Methods of pricing, channels of distribution, advertising and sales promotion.	
Unit V	**[7Hrs]**
Financial Management, nature and scope of financial management, Sources of finance, Types of capital, Brief outline of profit and loss account, balance sheet, Budgets and types of budgets, Ratio analysis	

Text Books

S. N	Title	Authors	Edition	Publisher
1.	Managerial Economics	D.N. Dwivedi	8th	Vikas Publishing
2.	Modern Economic Theory	K.K. Dewett	2005	S. Chand Publisher
3.	Industrial Management	Dr.I.K. Chopde, Dr.A.M. Sheikh	Revised edition	S. Chand Publisher

Reference Books

S. N	Title	Authors	Edition	Publisher
1.	Industrial Organization and Industrial economics	T.R. Banga, S.C. Sharma	2006	Khanna Publishers

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
22IT505P	Technical Skill Development-II	-	-	2	1	50		50

Course Objectives	Course Outcomes
This course is intended to • Utilizing AngularJS formats adequately • Help develop single-page applications • Build complex user interfaces. • Highly fault-tolerant data management and ability to continue operating even after multiple hardware and system	**Students will be able to**· • Understand Angular UI for user Interface • Perform testing in AngularJS • Allow developers to create fast user interfaces for websites and applications alike. • Acquire skills such as designing and building applications using MongoDB

Expt. No.	Title of the experiment
1	Practical based on React Basic, React Js Styling
2	Practical based on dynamic Component, React fragment
3	Practical based on HTTP methods, react router
4	Practical based on react redux advance, React Authentication.
5	Practical based on setting up the development Environment, AngularJS Data Binding,
6	Practical based on directives and templates, controllers and scopes
7	Practical based on Services and dependency injections, routing and navigations.
8	Practical based on Testing angular JS application, Integration with backends
9	Practical based on basics of MongoDB and CURD Operations.
10	Practical based on data modeling and schema design, querying mongo DB.
11	Practical based on MongoDB Atlas and Cloud Services, Advanced Querying and aggregation
12	Practical based on sharding and scalability, Security and authentication

Text Books

S.N	Title	Authors	Edition	Publisher
1	Learning React	Alex Banks and Eve Porcello	First	O'REILLY
2	Angular:Up and Running: Learning Angular Step by step	Shyam Seshadri	1th edition	O'Reilly
3	Mastering MongoDB 4.x	Alex Giamas	2nd Edition	Packt

Reference Books

S.N	Title	Authors	Edition	Publisher
1	The Road to learn React	Robin Wieruch	1st edition	Independently Published
2	Learn AngularJS by one day,complete angular JS guide with example	Krishna Rungta	1st edition	Independently Published
3	MongoDB Fundamentals	Amit Phaltankar, Juned Ahsan , Michael Harrison, Liviu Nedov	1st edition	Packet

FIFTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
22IT506T	Career Development-III	2	-	-	0	CA	ESE	Total
						Audit		

Course Objectives	Course Outcomes
The course is intended To suit the need of the outgoing students and to acquaint them with frequently asked patterns in quantitative aptitude and logical reasoning during various examinations and campus interviews	**Students will be able to** • Enhance personality to deal with the various problems of a professional world • Express and demonstrate the right soft skills • Solve basic and complex mathematical problems in short time. • Perform well in various competitive exams and placement drives • Compete in various competitive exams like CAT, CMAT, GATE, GRE, GATE, UPSC,GPSC etc.

Unit I	**[6Hrs]**
Chain Rule Problem, Speed Time Distance(Part1-Basic Problem, Relative Speed),Speed Time Distance(Part2-Problem on Trains, Races)	
Unit II	**[6Hrs]**
Permutation & Combination, Probability ,Logical Thinking & Data Sufficiency	
Unit III	**[6Hrs]**
Operator Based Questions, Number & Letter Series & Logical Sequence of Words, Grammar Subject Verb agreement, Prepositions.	
Unit IV	**[4Hrs]**
Conjunction, Tense, Identifying Common errors, Decision Making Skills & Negotiating Skills	
Unit V	**[4Hrs]**
Personal Interview Skills,MS PowerPoint	

Reference Books

S.N	Title	Authors	Edition	Publisher
1.	Personality Development and Soft Skills	Barun K. Mitra	2nd	OUP India
2.	The 55 Soft Skills That Guide Employee and Organizational Success	Bob Graham and Tobin Edward Porterfield Kiser Randall		Mason-WEST
3.	Verbal Reasoning, LSAT Material	GL Barrons	14th	Barrons Educational Series
4.	A modern approach to logical Reasoning	R S Agarwal	4th	S.Chand
5.	Quantitative Aptitude	R S Agarwal	4th	S.Chand