ST. VINCENT PALLOTTI COLLEGE OF ENGINEERING & TECHNOLOGY, NAGPUR

(An autonomous institution affiliated to Rashtrasant Tukadoji Maharaj Nagpur University)

B. Tech. Scheme of Examination & Syllabus 2024-25

COMPUTER ENGINEERING

SEMESTER IV

Sr. No.	Course Category	Course Code	Course Title	Hours per Week			Credits	Maximum Marks				No. of Hrs. for ESE
				L	T	P		Mid-Sem Examination	Continual Assessment	End Sem Examination	Total	
1.	PCC	**24CE401T**	Data Communication	**2**	**-**	**-**	**2**	**10**	**10**	**30**	**50**	**1.5**
2.	PCC	**24CE402T**	Database Management System	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
3.	PCC	**24CE402P**	Database Management System Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**-**
4.	PCC	**24CE403T**	Object Oriented Programming	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
5.	PCC	**24CE403P**	Object Oriented Programming Lab	**-**	**-**	**2**	**1**	**-**	**25**	**25**	**50**	**-**
6.	VSC	**24CE404P**	Technical Skill Development - I	**-**	**-**	**4**	**2**	**-**	**50**	**-**	**50**	**-**
7.	AEC	**24CE405T**	Economics and Management	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
8.	SEC	**24CE441P**	Career Development - IV	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	**-**
9.	ELC	**24CE406P**	Micro Project II*	**-**	**-**	**2**	**1**	**-**	**50**	**-**	**50**	**-**
10.	MDM	**24CE431M**	Multidisciplinary Minor - II	**3**	**-**	**-**	**3**	**20**	**20**	**60**	**100**	**3**
			Total	**14**	**0**	**12**	**20**	**90**	**290**	**320**	**700**	

*** Field Project or Community engagement project in the major discipline**

MDM-II	**Essentials of Computing System**

		JULY 2025	NEP 2.1	**Applicable for 2025-26**
Chairman - BoS	**Dean – Academics**	**Date of Release**	**Version**	

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24CE401T	Data Communication	2	-	-	2	10	10	30	50

Course Objectives	Course Outcomes
This course is intended 1. To obtain a theoretical understanding of data communication fundamentals, network components, topologies, error control, Ethernet, and switching concepts. 2. To understand transmission media, network performance, layered models, IPv4 addressing, and routing and configuration protocols. 3. To understand transport layer protocols, socket programming basics, and key application protocols like DNS and HTTP/HTTPS.	Students will be able to 1. Apply data communication concepts, analyze network structures and error control, and evaluate Ethernet and switching techniques. 2. Apply line coding and addressing, analyze network performance and routing mechanisms, and evaluate IP configuration and message handling processes. 3. Apply transport and socket concepts, analyze TCP/UDP mechanisms, and evaluate application-layer protocol operations.

Unit I	**[10 Hrs]**
Introduction to Data Communication: Definition, Characteristics, Data Representation, Types of Data flow, advantages and disadvantages, Network Hardware Components, Hubs, switches, VLANs (concepts), basic wireless LAN overview (802.11 basics).Network Topology, Framing methods, error detection(CRC) and correction methods, ARQ (stop-and-wait, sliding window concept).Ethernet (CSMA/CD), IEEE 802.3,Switching.	
Unit II	**[10 Hrs]**
Layered Model: Transmission Media, Digital-to-Digital Communication, Line coding Techniques, Performance of Network: Bandwidth, Throughput, Latency, and Jitter, Difference between Bit rate and Baud rate. Reference Model: OSI, TCP/IP, Message Distribution Mechanisms, IPv4 Classful Addressing, subnetting, CIDR,ARP, RARP, DHCP, Static routing, dynamic routing(RIP,OSPF),ICMP messages (echo, unreachable), fragmentation & reassembly.	
Unit III	**[10 Hrs]**
Transport & Application layers: Transport: UDP (features, use cases), TCP (connection, three-way handshake, RTT, flow control, congestion control.) Sockets: Client-server paradigm, ports, simple socket programming concepts (TCP/UDP). Common application protocols: DNS, HTTP/HTTPS.	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Data Communications and Networking	Behrouz A Forouzan	Fourth Edition	McGraw Hill
2	Computer Networks	Andrew S.Tanenbaum	Vol.4	PHI

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Data and Computer Communication	William Stallings		Pearson
2	Computer Networking: A Top-Down Approach	James F. Kurose, Keith W. Ross		Pearson
3	Computer Networks Principles, technologies and Protocols for Network Design	Natalia Olifer		Wiley India

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COMPUTER ENGINEERING

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24CE402T	Database Management Systems	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended 1. To provide understanding of issues involved in design, implementation & manipulation of a relational DBMS 2. To enable the student to design and build simple database systems and demonstrate the competence with the fundamental tasks involved with modeling, designing and implementing a DBMS. 3. To develop comprehension of essential concepts of normalization, concurrency, integrity and security along with the advancements in DBMS	**Students will be able to** 1. Create Entity-Relationship (ER) diagrams to model real-world scenarios accurately, identifying entities, attributes, and relationships. 2. Construct SQL queries using basic syntax, set operations, aggregate functions, and nested sub queries to extract specific information from a database. 3. Apply normalization techniques up to 3NF and BCNF to relational schemas, ensuring non-loss decomposition and dependency preservation in database design. 4. Analyze the processes of query processing, query optimization, and database storage structures used in modern DBMS. 5. Demonstrate the use of concurrency control, transaction management, scheduling, and recovery mechanisms to ensure reliable and consistent database operations.

Unit I	**[6 Hrs]**
Introduction: Database System Applications, Data Abstraction, DBMS architecture, Database types **ER diagrams:** ER Model - Entities, Attributes and Entity sets, Relationships and Relationship sets, Extended ER Model	
Unit II	**[9 Hrs]**
Introduction to the Relational Model: Structure, Database Schema and instances, Keys **Relational Algebra:** selection, projection set operations, renaming, joins, division **Overview of the SQL Query Language:** Basic Structure of SQL Queries, Set Operations, Aggregate Functions, GROUPBY – HAVING, Nested Sub queries, Views, Triggers, stored procedures	
Unit III	**[9 Hrs]**
Relational Database Design: Dependency theory - functional dependencies, Armstrong's axioms for FD's, closure of a set of FD's, minimal covers, Normalization - 1NF, 2NF, 3NF and BCNF, Non-loss Decomposition & Dependency preservation, Multi-valued dependencies and 4NF, Join dependencies and definition of 5NF	
Unit IV	**[9 Hrs]**
Query Processing & Optimization: Query Processing, Evaluation of relational algebra expressions, Algorithms for SELECT and JOIN operations, Materialized Views **Storage Structure & strategies:** RAID, Indexing and Hashing, Ordered Indices, B tree and B+ tree Index Files, Static Hashing, Dynamic Hashing, cloud database storage strategies	
Unit V	**[12 Hrs]**
Transaction Processing: Transaction Concepts, ACID Properties, Schedules, Serializability, Concurrency Control, Need for Concurrency, Locking Protocols, Two Phase Locking, Deadlock handling, Timestamp based protocols. **Introduction to NoSQL**: Need for NoSQL, BASE Properties, CAP Theorem, Types of NoSQL Databases (Key–Value, Document, Column-Family, Graph), SQL vs NoSQL Comparison, Use Cases of NoSQL, Basic of cloud databases AWS, Google Cloud Firestore, Azure Cosmos DB	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Database System Concept	Henry F. Korth, Abraham Silberschatz, S.Sudarshan		Mcgraw Hill Education
2	Database Systems: Models, Languages, Design and Application Programming	Ramez Elmasri, Shamkant B. Navathe		Pearson

Reference Books

S.N	Title	Authors	Edition	Publisher
1	An Introduction to Database Systems	C.J.Date, A.Kannan, S.Swamynathan	8th Edition	Pearson Education
2	Next-Generation Databases	Guy Harrison.		Apress

		July 2024	NEP 2.1	Applicable for 2025-26
Chairman - BoS	Dean – Academics	Date of Release	Version	

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24CE402P	Database Management Systems Lab	-	-	2	1	25	25	50

Sr. No.	Name of Practical
1.	Implementation of basic DDL & DML commands: - Create, Alter, Drop Table - Insert, Update, Delete
2.	Implementation of SQL Functions: - Number, Aggregate, Character, Conversion, Date
3.	Implementation of Joins: - Inner, Outer, Natural Join
4.	Implementation of Subqueries and Views
5.	Implementation of Group By, Having, Order By
6.	Implementation of Constraints: - Primary Key, Foreign Key, Unique, Check, Not Null
7.	Implementation of Stored Procedure & Trigger
8.	NoSQL CRUD Operations (MongoDB / Firestore): - Insert, Find, Update, Delete
9.	Mini Project

Text Books

S.N	Title	Authors	Edition	Publisher
1	Database System Concept	Henry F. Korth, Abraham Silberschatz, S.Sudarshan		Mcgraw Hill Education
2	Learning SQL	Alan Beaulieu		O'Reilly Publications
3	The Art of SQL	Stephane Faroult, Peter Robson		O'Reilly Media

Reference Books

S.N	Title	Authors	Edition	Publisher
1	An Introduction to Database Systems	C.J.Date, A.Kannan, S.Swamynathan	8th Edition	Pearson Education
2	Next-Generation Databases	Guy Harrison.		Apress

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COMPUTER ENGINEERING

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24CE403T	Object Oriented Programming	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended 1. To enable students to think in terms of object oriented paradigm and apply concepts to develop programs 2. To develop skills in applying OOP principles for modular and reusable software. 3. To enhance the ability to handle exceptions, manage files, use collections, and apply basic design patterns.	**Students will be able to** 1. Analyze and think in terms of object oriented paradigm during development of application using concepts of classes, objects, and access modifiers. 2. Develop applications using constructors, methods, arrays, wrapper classes, strings, and packages. 3. Apply inheritance, interfaces, abstraction, and runtime polymorphism to build flexible class hierarchies. 4. Implement robust applications using exception handling, stream-based file I/O, and serialization. 5. Utilize generics, collections, UML diagrams and basic design patterns to create modular and reusable software.

Unit I **[9Hrs]**

Object-Oriented Programming paradigm, Procedure-Oriented Programming vs Object-Oriented Programming, Features of OOP: Encapsulation, Abstraction, Inheritance, Polymorphism, Benefits of OOP, Introduction to Java, JVM, JDK, JRE, Bytecode, Structure of a Java program, Concept of Class and Object, Object lifetime & Garbage Collection. Access Modifiers: public, private, protected, default.

Unit II **[8Hrs]**

Constructors in Java: Default and Parameterized, Methods in Java, Method Overloading, Static Members: Static variables and static methods, Arrays and Array of objects, Wrapper classes (Integer, Double etc.), String Class, Packages: Creating Packages, Importing Packages.

Unit III **[9Hrs]**

Inheritance: Types of Inheritance, Member Access Rules, this & Super Keywords, Polymorphism - Basic concept, Method Overloading vs Method Overriding, Abstract Class, Run time polymorphism - Dynamic Method Dispatch, Use of Final Keyword, Defining & Implementing Interfaces, Extending Interfaces.

Unit IV **[9Hrs]**

Exception Handling: Exception, Types of exception, use of try-catch, handling multiple exceptions, using finally, throw and throws clause, user-defined exceptions, Streams: Introduction to streams, byte streams, character streams, file handling, Serialization.

Unit V **[10Hrs]**

Generics: Introduction, generic classes, generic methods, Collections Framework: Need for Collections, Interfaces: List, Set, Map, Common classes: ArrayList, LinkedList, HashSet, HashMap, UML Class Diagrams: Classes, Objects, Relationships (Association, Aggregation, Composition, Inheritance), Introduction to Design Patterns, Categories: Creational, Structural, Behavioral, Overview of Common patterns: Singleton, Factory Method, Adapter, Observer.

Text Books

S.N	Title	Authors	Edition	Publisher
1	Programming with Java	E.Balaguruswamy	6th Edition	Tata McGraw Hill
2	The Complete Reference Java	Herbert Schildt	9th Edition	Tata McGraw Hill

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Core Java Volume I – Fundamentals	Cay S. Horstmann & Gary Cornell	12th Edition	Pearson Education
2	Design Patterns: Elements of Reusable Object-Oriented Software	Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides (Gang of Four)	1st Edition	Pearson Education
3	Object-oriented Modeling and Design	James Rumbaugh	1st Edition	PHI

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FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24CE403P	Object Oriented Programming Lab	-	-	2	1	25	25	50

Course Objectives	Course Outcomes
This course is intended 1. To realize the fundamental concepts of object oriented programming language 2. To develop program using features of object oriented programming language to solve real world problems.	**Students will be able to** 1. Apply object-oriented programming principles to design and implement programs using core OOP concepts. 2. Develop applications using exception handling, collections and file-handling techniques. 3. Demonstrate problem-solving skills through the implementation of modular and reusable programs.

Expt. No.	Title of the experiment
1	Program to implement concept of class and object
2	Program to implement constructor & destructor
3	Program to implement inheritance
4	Program to implement polymorphism
5	Program to implement abstract class and interface
6	Program to implement package
7	Program to implement exception handling
8	Program to implement file handling using stream
9	Program to implement Generics and Collections
10	Programming Assignment - Design and develop a module

Text Books

S.N	Title	Authors	Edition	Publisher
1	Programming with Java	E.Balaguruswamy	6th Edition	Tata McGraw Hill
2	The Complete Reference Java	Herbert Schildt	9th Edition	Tata McGraw Hill
3	Core Java Volume I – Fundamentals	Cay S. Horstmann & Gary Cornell	12th Edition	Pearson Education
4	Head First Java	Kathy Sierra & Bert Bates	12th Edition	O'Reilly

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24CE404P	Technical Skill Development – I	2	-	-	2	50	-	50

Course Objectives	Course Outcomes
1. This course is intended to understand how to create web pages and web applications along with its validation.	**Students will be able to** 1. Implement functional React components and demonstrate the difference between normal DOM and Virtual DOM 2. Analyze and manage component data flow using props, prop drilling, state, and use Effect to create interactive UI elements like counters and login panels 3. Evaluate the design of multi-page applications by implementing React Router, dynamic routing, and asynchronous API data fetching 4. Create complete React applications with forms, validation, dynamic components, and proper state management to solve real-world problem.

Expt. No.	Title of the experiment
1	Create a new React application using Create React App. Build a simple "Hello React" functional component and display it on the webpage.
2	Create two components: Header and Footer. Use JSX to display dynamic text (such as student name, today's date). Combine them in an App component to form a complete UI layout.
3	Design a component StudentCard that accepts props such as name, roll number, and branch. Pass these props from a parent component and display the data
4	Build a Counter App using use State. Include buttons for increment, decrement, and reset. Display the updated count dynamically.
5	Create a component that prints a message "Component Mounted" on initial load using use Effect. Also log "Value Updated" whenever the state variable changes.
6	Build a login panel that displays a Login Form if a user is not logged in, and Welcome User message if logged in. Use conditional rendering (ternary operator / &&).
7	Create a student registration form with fields (name, email, mobile, course). Validate the form and display entered data in a preview card upon submission.
8	Develop a small application with three pages: Home, About, Contact using React Router which enable dynamic routing for /users/:i
9	Fetch data from a public API (e.g., https://jsonplaceholder.typicode.com/posts) using fetch() or axios and display the results in a list. Show a loading state while data is being fetched
10	Mini-Project

Text Books

S.N	Title	Authors	Edition	Publisher
1.	Full Stack JavaScript Development With MEAN: MongoDB, Express, AngularJS, and Node.JS, SitePoint	Greg Sidelnikov	1st Edition	Kindle
2.	The Road to React	Robin Wieruch	3rd edition	Kindle

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COMPUTER ENGINEERING

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation			
						MSE	CA	ESE	Total
24CE405T	Economics and Management	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
1. The course examines how the economics, business and industrial management practices are related and how business decision is taken.	At the end of the course, students will be able to: 1. Apply managerial economics concept in business analysis and business decision making. 2. Explain relationships between production and costs and understand different forms of market structures. 3. Assess impact of macroeconomics and government policies on business and economy. 4. Recognize the functions of management and marketing management for business decisions. 5. Explore role of financial management in business and decision making.

Unit I **[9 Hrs]**

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 **[9 Hrs]**

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 **[9 Hrs]**

The functions of central bank, Inflation, Deflation, Recession. Measures to control Inflation, National income, GDP, GNP. Liberalization, Privatization and Globalization

Unit IV **[9 Hrs]**

Definition of management, functions of management – planning, organizing, directing, Controlling, Introduction to human resources Management, Marketing Management, Concepts of Marketing, Marketing mix, Methods of pricing, channels of distribution, advertising and sales promotion.

Unit V **[9 Hrs]**

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

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B. Tech. Scheme of Examination & Syllabus 2024-25

Computer Engineering

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24CE441P	Career Development - IV	-	-	2	01	50	-	50

Course Objectives	Course Outcomes
1. The sole objective of imparting aptitude training is to make students able to critically evaluate various real-life situations by resorting to an analysis of key issues and factors. 2. This Aptitude Training helps them to demonstrate various principles involved in solving mathematical problems and thereby reducing the time taken for performing job functions. 3. To categorize, apply and use thought process to distinguish between concepts of Quantitative methods.	1. Students shall understand the concepts of Quadratic Equation, AP, GP, and HP. 2. Students shall understand the concepts of Averages and Mixture and allegations 3. Students shall understand the concepts of Blood relation. Students shall understand the concept of Dice and Cubes 4. Students shall understand the concepts of clocks and Calendars.

Unit I	**[6Hrs]**
Aptitude : Quadratic Equation Arithmetic progression, Geometric progression, Harmonic progression Imax: Critical Thinking, Interview Simulation, Engineering Leadership, Spatial Reasoning	
Unit II	**[6Hrs]**
Aptitude : Average Mixture and Allegation Imax: Interactive Interview Training, Start-Up & Entrepreneurship,	
Unit III	**[6Hrs]**
Aptitude : Blood Relation :- Family Tree, Coding Blood Relation, Pointing to a Person Problem Imax: Engineering Ethics, Employability, Engineering Judgment	
Unit IV	**[6Hrs]**
Aptitude : Cubes and Dice Problems:- Number of cuts to be made, Number of colorful Faces of Cubes, Hidden Dice Number Imax: Disposition for Innovation, Disposition for Start up	
Unit V	**[6Hrs]**
Aptitude : Clocks :- Angle made by Hour hand, Minutes hand, Mirror and water Image of Clock, Behind and Ahead time concept Calendars :- Day on Specific date, Coded Calendars Problems, Calendars repetition Imax: Creating A Winning Resume, Patriotism Self - respect & Start - up	

Text Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude By R. S. Aggarwal	R.S. Aggarwal		
2	Quantitative Aptitude	Shripad Deo		Allied Publication
3	A Modern Approach to Verbal & Non-Verbal Reasoning	R.S. Aggarwal		

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Quantitative Aptitude for CAT by Arun Sharma	Arun Sharma		

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FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits	Evaluation		
						CA	ESE	Total
24CE406T	Micro Project – II	-	-	2	1	50	-	50

Course Objectives	Course Outcomes
This course is intended This study focuses on analyzing a real-life scenario through systematic data collection and analysis using simple, practical methods, providing hands-on exposure to real-world data and enhancing analytical and problem-solving skills.	**Students will be able to** 1. Apply theoretical concepts to analyze and solve a real-world problem. 2. Collect and analyze data using appropriate tools and methodologies. 3. Design and implement a simple functional solution or prototype. 4. Work independently or in a team to plan, execute, and document the project. 5. Evaluate project outcomes and reflect on learning and impact.

2 Hrs
Students are required to undertake micro-projects focused on emerging technologies with the objective of applying theoretical concepts to practical scenarios. Through hands-on exploration, experimentation, and analysis of real-world problems, students will gain practical exposure and deepen their understanding of the chosen domain. These micro-projects aim to enhance technical competence, foster creativity and critical thinking, and develop the ability to design, implement, and evaluate simple yet effective solutions that address real-time challenges.

FOURTH SEMESTER

Course Code	Course Name	Th	Tu	Pr	Credits		Evaluation		
						MSE	CA	ESE	Total
24CE431M	MDM-II Essentials of computing Systems	3	-	-	3	20	20	60	100

Course Objectives	Course Outcomes
This course is intended 1. To remember the basics of Computer, memory and Computer history. 2. To understand the utility of programming languages. 3. To learn basics of computer software and Operating Systems.	**Students will be able to** 1. Describe computer memory organization, storage structures, magnetic disks, and basic disk scheduling. 2. Explain the evolution of computer systems through generations along with the types of computer systems. 3. Recognize the need and use of programming language constructs like algorithms and flowcharts for problem solving. 4. Apply computer Software and its use in logic building. 5. Analyze of Basic Concepts of Operating Systems and Working of CPU Scheduling

Unit I **[9 Hrs]**

COMPUTER MEMORY: Computer Memory: Memory cell and organization, including structure, addressing, and word/byte organization; primary memory covering RAM (SRAM, DRAM), ROM, and basic cache concepts; storage structure with sequential and random access, magnetic hard disk structure, including platters, tracks, sectors, cylinders, and read/write heads; and disk access and scheduling techniques, including FCFS, SSTF, SCAN

Unit II **[9 Hrs]**

COMPUTER GENERATIONS: First generation computers, Second generation computers, Third generation computers, Fourth generation computers, Fifth generation computers, Moore's Law, Classification of computers, Parallel computer systems, Distributed computer systems.

Unit III **[9 Hrs]**

COMPUTER LANGUAGES: Algorithms, Flowcharts, Why programming languages? Characteristics of good programming languages, Machine level language, Assembly language, Middle level language – C, Factors affecting the choice of the languages, High level programming languages.

Unit IV **[9 Hrs]**

COMPUTER SOFTWARES: Introduction to computer software, Types of computer software, System management programs, System development programs, Unique application programs, Problem solving, Structuring the logic, Developing a program.

Unit V **[9 Hrs]**

OPERATING SYSTEMS DETAILS : Need and Definition of Operating System, Types of Operating Systems (UNIX, MAC OS, LINUX – Ubuntu & Fedora, WINDOWS), Process Concept (Process Definition, Process in Memory, Process States), CPU Scheduling Concept, Pre-emptive and Non-Preemptive Scheduling, Scheduling Algorithms (FCFS, SRTF, Priority, Round Robin)

Text Books

S.N	Title	Authors	Edition	Publisher
1	Fundamentals of Computers	V. Rajaraman	IVth	PHI
2	Operating System Concepts	A.Silberschatz,Peter B. Galvin,Grag Gagne	8th edition	Willey

Reference Books

S.N	Title	Authors	Edition	Publisher
1	Operating Systems	Achyut Godbole & Atul Kahate	3rd	McGraw Hill Education
2	Fundamentals of Computers	Balguruswamy	Ist	McGraw Hill Education