B.Tech CSE Semester III

BCO 011A	COMPUTER NETWORKS	3-1-0 [4]

OBJECTIVES:

- To build an understanding of the fundamental concepts of computer networking.
- To familiarize the student with the basic taxonomy and terminology of the computer networking area.
- To introduce the student to advanced networking concepts, preparing the student for entry Advanced courses in computer networking.
- To allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

UNIT 1	Introduction -Hardware and software, Data communication, Networking, Protocols and standards. Data transmission concepts. Analog and digital transmission. Transmission impairments. Layered Architecture of Computer Networks, OSI and TCP/IP architectures Physical Layer- Guided transmission media and wireless transmission, Data encoding - Digital and analog data. Data communication interface - asynchronous and synchronous transmission, Data link layer - Flow control. Error detection and error control. HDLC and other data link protocols. Multiplexing – Frequency-division, synchronous time-division, and statistical time-division multiplexing
UNIT 2	Link Layer: Medium Access Control: CDMA, ALOHA, and Ethernet; Link Layer Addressing and Forwarding; Spanning Trees; The Channel Allocation Problem, Multiple Access Protocols, Ethernet, Wireless LANs, Broadband Wireless, Bluetooth, Data Link Layer Switching, Switched networks. Circuit-switched networks, switching concepts, Routing in circuit-switched networks. Control signaling. Packet switching principles. Routing and congestion control
UNIT 3	Network Layer: Network layer design issues. Routing algorithms , Flooding, Shortest path routing, Link Sate routing, Hierarchical routing, Broadcast and multicast routings, Routing in the Internet, Path Vector routing, OSPF routing. The network layer in the Internet: IP protocol: ARP and RARP, BOOTP, ICMP, DHCP, Network Address Translation(NAT) Internetworking
UNIT 4	Transport Layer:TCP introduction, Reliable/Un- Reliable Transport, TCP, UDP, Congestion Control, Intra-Domain Routing: Distance-Vector, Intra-Domain Routing: Link- State, Wireless Networks: 802.11 MAC, Efficiency considerations
UNIT 5	Application Layer: DNS-The Domain Name System, Electronic Mail, HTTP, FTP, Simple network management protocol (SNMP), The World Wide Web

***Course Outcome (CO) of* Computer Network**

At the end of this course students will have:

CO1: To provide an in-depth understanding of the terminology of network and concepts of OSI reference model and TCP/IP model.
CO2: To equip our students with technical concept of protocols, network interfaces, and design/performance issues in networks.
CO3: To be familiar with contemporary issues in networking technologies.

CO4: To be familiar with network tools and to enhance analytical skills to develop innovative solutions.
CO5: To be familiar with message structure used in various type of network applications using the various protocols like SMTP,HTTP,FTP.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H			L									H		
CO2	M		H									L		L	
CO3		M							M				M		L
CO4 CO5	H	H		M	H					M	M	L	M	L	L

H = Highly Related; M = Medium L = Low

Text Books:

1. Computer Networks, by Andrew S Tanenbaum, PHI. (2010)

Reference Books:

- Data Communications, Computer networking on OSI , by Fred Halsall, Addison Wesley Publishing Co.1998
- Computer Networking -A Top-Down Approach Featuring the Internet ,James F. Kurose and Keith W. Ross ,Addison Wesley Publishing Co. 2004
- Computer Networks: Protocols standards and interfaces , by Uyless Black, Prentice Hall.2002
- Data communication & Networks , by Behrou A. Forouzan, Tata McGraw Hill. 2002
- Data and Computer Communications, by Walliam Stallings, PHI. (2002)

BCO 002B	**DATA STRUCTURES AND ALGORITHMS**	**3-1-0 [4]**

OBJECTIVE:

- To study various data structure concepts like Stacks, Queues, Linked List, Trees and Files
- To overview the applications of data structures.
- To be familiar with utilization of data structure techniques in problem solving.
- To have a comprehensive knowledge of data structures and algorithm.
- To carry out asymptotic analysis of algorithm.

UNIT 1	Introduction: Notions of data type, abstract data type and data structures. Importance of algorithms and data structures in programming. Notion of Complexity covering time complexity, space complexity, Worst case complexity & Average case complexity. BigOh Notation, Omega notation, Theta notation. Examples of simple algorithms and illustration of their complexity. Sorting- Bubble sort, selection sort, insertion sort, Quick sort; Heap sort; Merge sort; Analysis of the sorting methods. Selecting the top k elements. Lower bound on sorting.
UNIT 2	Stack ADT, Infix Notation, Prefix Notation and Postfix Notation. Evaluation of Postfix Expression, conversion of Infix to Prefix and Postfix Iteration and Recursion- Problem solving using iteration and recursion with examples such as binary search, Fibonacci numbers, and Hanoi towers. Tradeoffs between iteration and recursion.
UNIT 3	List ADT. Implementation of lists using arrays and pointers. Stack ADT. Queue ADT. Implementation of stacks and queues. Dictionaries, Hash tables: open tables and closed tables. Searching technique- Binary search and linear search, link list- single link list, double link list, Insertion and deletion in link list.
UNIT 4	Binary Trees- Definition and traversals: preorder, post order, in order. Common types and properties of binary trees. Binary search trees: insertion and deletion in binary search tree worst case analysis and average case analysis. AVL trees. Priority Queues -Binary heaps: insert and delete min operations and analysis.
UNIT 5	Graph: Basic definitions, Directed Graphs- Data structures for graph representation. Shortest path algorithms: Dijkstra (greedy algorithm) and Operations on graph, Worshall's algorithm , Depth first search and Breadth-first search. Directed acyclic graphs. Undirected Graphs, Minimal spanning trees and algorithms (Prims and Kruskal) and implementation. Application to the travelling salesman problem.

Course OUTCOME (CO):

CO1: Show the understanding of various data structure concepts like Stacks, Queues, Linked List, Trees and Files
CO2: Understand the applications of data structures.
CO3: Understand with utilization of data structure techniques in problem solving.
CO4: Use comprehensive knowledge of data structures and algorithm.
CO5: Use asymptotic analysis of algorithm.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	**Program Outcome**												**Program Specific Outcome**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H												M		
CO2			H		M								M		
CO3		H							M			L		H	
CO4	H	M											L		L
CO5		M		H											L

H = Highly Related; M = Medium; L = Low

Text Books:

1. Data Structures and Algorithms by Alfred V. Aho, Jeffrey D. Ullman and John E. Hopcroft , Addison-Wesley Series (1983)

Reference Books:

1. T.H. Cormen, C.E. Leiserson, and R.L. Rivest. Introduction to Algorithms.The MIT Press and
2. McGraw-Hill Book Company, Cambridge, Massacusetts, 1990 (Available in Indian Edition).
3. Steven S. Skiena. The Algorithm Design Manual.Springer, Second Edition, 2008.
4. Data Structures and Algorithm Analysis in Java (3rd Edition) by Mark Allen Weiss, Addison Wesley(2011).

BAS 007B	DISCRETE MATHEMATICS	3-0-0 [3]

Objective:

- To introduce a number of Discrete Mathematical Structures (DMS) found to be serving as tools even today in the development of theoretical computer science.
- To solve problems occurred in the development of programming languages.
- To familiarize students with concepts and techniques of graph theory, and sets apart from languages of logic and proof methods.

UNIT 1	**Sets:** Definition and types, Set operations, Partition of set, Cardinality (Inclusion-Exclusion & Addition Principles), Recursive definition of set. Functions: Concept, Some Special Functions (Polynomial, Exponential & Logarithmic, Absolute Value, Floor & Ceiling, Mod &Div Functions), Properties of Functions, Cardinality of Infinite Set, Countable & Uncountable Sets,
UNIT 2	**Graph Theory**: Graphs – Directed, Undirected, Simple,. Adjacency & Incidence, Degree of Vertex, Subgraph, Complete graph, Cycle & Wheel Graph, Bipartite & Complete Bipartite Graph, Weighed Graph, Union of Simple Graphs. Complete Graphs. Isomorphic Graphs, Path, Cycles & Circuits Euclerian& Hamiltonian Graphs. Planar Graph: Kuratowski's Two Graphs, Euler's Formula, Kuratowski's Theorem. Trees: Spanning trees- Kruskal'sAlgo, Finding Spanning Tree using Depth First Search, Breadth First Search, Complexity of Graph, Minimal Spanning Tree.
UNIT 3	**Semigroups, Groups and Coding**: Binary Operations, Semigroups, Products and Quotients of Semigroups, Groups, Product and Quotients of Groups, Coding of Binary Information and Error Correction, Decoding and Error Correction. **Language of Logic**: Proposition, Compound Proposition, Conjunction, Disjunction, Implication, Converse, Inverse &Contrapositive, Biconditional Statements, tautology, Contradiction & Contingency, Logical Equivalences, Quantifiers, Arguments.
UNIT 4	**Proof Methods**: Vacuous, Trivial, Direct, Indirect by Contrapositive and Contradiction, Constructive & Non-constructive proof, Counterexample. The Division Algorithm, Divisibility Properties (Prime Numbers & Composite Numbers), Principle of Mathematical Induction, The Second Principle of Mathematical Induction, Fundamental Theorem of Arithmetic. Algorithm Correctness: Partial Correctness, Loop Invariant. Testing the partial correctness of linear & binary search, bubble & selection sorting.
UNIT 5	Relations: Boolean Matrices, Binary Relation, Adjacency Matrix of Relation, Properties of Relations, Operations on Relations, The Connectivity Relations, Transitive Closure-Warshall's Algorithm, Equivalence relations- Congruence Relations, Equivalence Class, Number of Partitions of a Finite Set, Partial & Total Orderings.

Course Outcome (CO):

At the end of this course, students will demonstrate ability to:

CO1: Demonstrate complete knowledge on various discrete structures available in literature.
CO2: Realization of some satisfaction of having learnt that discrete structures are indeed useful in computer science and engineering.
CO3: Gaining of some confidence on how to deal with problems which may arrive in computer science and engineering in near *future.*
CO4: Construct mathematical arguments using logical connectives and quantifiers and verify the correctness of an argument using propositional and predicate logic and truth tables.
CO5: Able to model and solve real world problems using graphs and trees.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	L		H		M						L				
CO2		H		H								M	M		
CO3								H	M	L				H	
CO4								H	M	L				H	
CO5								H	M	L				H	

- H = Highly Related; M = Medium L = Low

Text Books

1. B.Kolman et.al- Discrete mathematical Structures, 5th Edn, Pearson Education, New Delhi - 2004.

Reference Books

1. K.H. Rosen – Discrete Mathematics and Its Applications – 4th Edn, Tata McGraw Hill, New Delhi – 2001
2. J.P. Tremblay et.al – Discrete Mathematical Structures with Applications to Computer Science, TMH, New Delhi – 2004.

3. Mott. J.L., Kandel A. and Baker, T.P. "Discrete mathematics", for computer scientists and Mathematicians", Second Edition, Prentice Hall 1986.

4. Tremblay J.P. and Manohar, R. "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1975.

BCO 232A	SOFTWARE ENGINEERING AND PROJECT MANAGEMENT	3-0-0 [3]

Objective

- *To learn about generic models of software development process.*
- *To understand fundamental concepts of requirements engineering and Analysis Modeling.*
- *To understand the different design techniques and their implementation.*
- *To learn various testing and maintenance measures*

UNIT 1	*Introduction- Introduction to Software Engineering, Software Components, Software Characteristics, Software Crisis, Engineering aspects of Software production – necessity of automation .Job responsibilities of Programmers and Software Engineers as Software developers. Software Development Life Cycle (SDLC)*
UNIT 2	*Process Models and Program Design Techniques- Software Development Process Models – Code & Fix model, Waterfall model, Incremental model, Rapid Prototyping model, Spiral (Evolutionary) model. Software Requirement Specifications (SRS), Management of User Needs, Data Flow Diagrams, Entity Relationship Diagrams, Decision Tables, SRS Document, Design Techniques – Structured Programming, Coupling and Cohesion, Abstraction and Information Hiding, Software Modeling Tools –Data flow Diagrams, UML and XML.*
UNIT 3	*Software Testing: Testing Objectives, Unit Testing, Integration Testing, Acceptance Testing, Regression Testing, Verification and Validation: Testing of Software Products – Black-Box Testing and White-Box Testing, Static Analysis, Symbolic Execution and Control Flow Graphs –Cyclomatic Complexity. Maintenance and its need and types of maintenance. CASE tools & graphical reporting tools.*
UNIT 4	*Project Management: project, project specification parameters, principle &life cycle, project management Plan, why the project is delayed? and scheduling activities, critical Path, PERT& CPM. Monitoring & Control: Change Control, Software Configuration Management (SCM).*
UNIT 5	*Quality Management and People Management- Introduction, Understanding Behavior, Organizational Behavior, Selecting The Right Person For The Job, Motivation, The Old man – Hackman Job Characteristics Model , Working in Groups, Organization and team structures, Decision Making, Leadership, Organizational Structures, Stress, Health And Safety.*

Course Outcome (CO):

At the end of this course students will have:

CO1. *Learn about software and models of software development process and their implementation prospects*

CO2. *To understand fundamental concepts of requirements engineering and Analysis Modelling.*

CO3. *To understand the importance of software testing and implementation of various testing approaches.*

CO4. *To learn about importance of project management and monitoring of software projects*

CO5. *To learn about software quality management and people management*

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	***Program Outcome***												***Program Specific Outcome***		
	PO1	*PO2*	*PO3*	*PO4*	*PO5*	*PO6*	*PO7*	*PO8*	*PO9*	*PO10*	*PO11*	*PO12*	*PSO1*	*PSO2*	*PSO3*
CO1	*L*		*H*		*M*						*L*				
CO2		*H*		*H*								*M*	*M*		
CO3								*H*	*M*	*L*				*H*	
CO4	*L*		*L*			*L*	*M*								*L*
CO5	*H*				*H*	*M*		*M*			*H*		*M*		

H = Highly Related; M = Medium L = Low

Text Books:

- *Fundamentals of Software Engineering – Carlo Ghezziet. Et.al.*
- *Software Engineering – Design, Reliability Management – Pressman.*
- *Bob Hughes, Mike Cotterell, "Software Project Management", Tata McGraw Hill. (2009)*

Reference Books:

- *Software Engineering – Ian Sommerville.*
- *Software Engineering - Shoeman.*
- *Software Engineering with Abstraction – Berzins and Luqi*
- *Pankaj Jalote, Software Engineering, Wiley.*
- *Royce, "Software Project Management", Pearson Education. (2005).*
- *Robert K. Wysocki, "Effective Software Project Management", Wiley.(2006)*

Advance ist of Experiments

1.Write a program to implement following searching algorithms using array data structure
- 1.1 Matrix Addition and Subtraction
- 1.2 Matrix Multiplication and Transpose

2.Write a program to implement following searching algorithms using array data structure
- 2.1. Linear Search
- 2.2. Binary Search

3. Write a program to implement following searching algorithms using array data structure
- 3.1. Insertion Sort
- 3.2 Bubble Sort

4. Write a program to implement following searching algorithms using array data structure
- 4.1. Selection Sort
- 4.2 Quick Sort

5. Write a program to implement following operations on stack using array data structure.
- 5.1 Traversing
- 5.2 Push
- 5.3 POP

6. Write a program to implement following examples of recursion
- 6.1 Fibonacci Series
- 6.2 Factorial Function
- 6.3 Tower of Hanoi

7. Write a program to implement Merge Sort.

8. Write a program to implement following operations on Queue using array data structure.
- 8.1 Insertion8.2 Deletion8.3 Traversing

9. Write a program to implement Postfix evaluation.

10. Write a program to implement Infix to Postfix Notation.

11. Write a program to implement following operations on Link List data structure.
- 11.1 Insertion at beginning
- 11.2 Insertion at last

11.3 Insertion at any location

12. Write a program to implement following operations on Link List data structure.
    12.1 Deletion at beginning
    12.2 Deletion at last
    12.3 Deletion at any location

13. Write a program to implement Doubly Link List
    13.1 Insertion13.2 Traversing
14. Write a program to implement Breadth First Search Algorithm.

15. Write a program to implement Depth First Search Algorithm.

Course Outcomes:

CO1: Show the understanding of various data structure concepts like Stacks, Queues, Linked List, Trees and Files
CO2: Understand the applications of data structures.
CO3: Understand with utilization of data structure techniques in problem solving.
CO4: Use comprehensive knowledge of data structures and algorithm.
CO5: Use asymptotic analysis of algorithm.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H												M		
CO2			H		M								M		
CO3		H							M			L		H	
CO4	H	M											L		L
CO5		M		H											L

H = Highly Related; M = Medium; L = Low

B.Tech CSE Semester IV

BCO 009B	COMPUTER ORGANIZATION AND DESIGN	3-1-0 [4]

OJECTIVE:

- To understand the number system conversions and logic gates.
- To study the design of logic unit and bus memory transfer.
- To study the addressing modes and instruction set architecture, register transfer RISC/CISC
- To study the hierarchical memory system including cache memories and its address mapping.
- To study the different ways of communicating with I/O devices and standard I/O interfaces.

UNIT 1	Introduction to number system, methods of base conversions; Binary, octal and hexadecimal arithmetic; Basic organization of computers; logic gates, Information representation, Fixed-Point Arithmetic: Floating point representation (Single & double precision), Complements.
UNIT 2	Using Karnaugh map methods, SOP, POS simplification, Logic design: Half adder, full adder, Adder–Subtractor. Multiplexer/ de-multiplexer, decoders. Fetch, decode and execute cycle. RTL, Bus & Memory Transfer, Tri state Buffer.
UNIT 3	Instruction set architectures, addressing modes, instruction cycles, Differentiate RISC versus CISC architectures. Arithmetic Micro-operation: Addition, Subtraction, Multiplication (Booth's Algorithm),Array Multiplier
UNIT 4	Memory Technology, static and dynamic memory, Random Access and Serial Access Memories, Cache memory and Memory Hierarchy, Address Mapping, Cache updation schemes,
UNIT 5	I/O subsystems: Interfacing with IO devices, keyboard and display interfaces; Basic concepts Bus Control, Read Write operations, Programmed IO, Concept of handshaking, Polled and Interrupt-driven I/O, DMA data transfer.

Course Outcome (CO):

At the ends of this course studentswill have:

CO1: Awareness of computer organization.
CO2: Design and architecture of machine.
CO3:Implement different system calls for various units.
CO4: Logical representation of storage, representation and management.
CO5: Analysis of I/O subsystem.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	**Program Outcome**												**Program Specific Outcome**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H											M	H		
CO2			H		M									M	
CO3				M					M				L		
CO4				H						M			M		L
CO5				H						M					L

H = Highly Related; M = Medium L = Low

Text Book:

1. Digital Design, M.Morris Mano, Pearson
2. Computer System Architecture by Mano, Pearson

Reference books:

1. Modern Digital Electronics, R.P. Jain, TMH
2. Computer Organization by V. Carl Hamacher, Safwat G. Zaky and Zvonko G. Vranesic , McGraw-Hill series(2002)
3. Digital Fundamental, Floyd & Jain, Pearson.
4. Computer Architecture and Organization, by Hayes, J.P.1998, McGraw-Hill
5. Digital Logic And Computer Design, Mano, Pearson

BCO 008B	OPERATING SYSTEMS	3-0-0 [3]

OJECTIVE:

- To understand the structure and functions of OS
- To learn about Processes, Threads and Scheduling algorithms
- To understand the principles of concurrency and Deadlocks
- To learn various memory management schemes
- To study I/O management and File systems

UNIT 1	Introduction : Operating system and functions, Classification of Operating systems- Batch, Interactive, Time sharing, Real Time System, Multiprocessor Systems, Multiuser Systems, Multiprocess Systems, Multithreaded Systems, Operating System Structure- Layered structure, System Components, Operating System services, Monolithic and Microkernel Systems.
UNIT 2	Process Management-Process & Threads – Process States - Process Control Block – Process Scheduling – Operations on Processes, Threads, CPU Scheduler – Preemptive and Non- Preemptive; Dispatcher, Scheduling Criteria, Scheduling Algorithms – Process Management in UNIX
UNIT 3	Process Synchronization & Inter process Communication-Concurrent Processes, Co-operating Processes, Precedence Graph, Hierarchy of Processes, Critical Section Problem – Two process solution, Synchronization Hardware, Semaphores – Deadlock- detection, handling, prevention, avoidance, recovery, Starvation, Critical Regions, Monitors, Inter process communication
UNIT 4	Memory Management-Objectives and functions, Simple Resident Monitor Program (No design), Overlays – Swapping; Schemes – Paging – Simple, Multi-level Paging; Internal and External Fragmentation; Virtual Memory Concept, Demand Paging – Page Interrupt Fault, Page Replacement Algorithms; Segmentation – Simple, Multi-level, Segmentation with Paging, Memory Management in UNIX.
UNIT 5	I/O Management and Disk Scheduling: I/O devices, and I/O subsystems, I/O buffering, Disk storage and disk scheduling. File System: File concept, File organization and access mechanism, File directories, and File sharing, File system implementation issues, File system protection and security.

Course Outcome (CO):

At the ends of this course students will have:

CO1: Classify Unix Kernel mode with user mode & contrast between Kernel structures.
CO2: Identify and estimate process management & thread management strategies along with their different operations
CO3: Implement different system calls for various file handling operations.
CO4: Determine paging and Caching techniques related to Virtual Memory.
CO5: Ability to understand and analyze various disk scheduling and file system techniques

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	Program Outcome												Program Specific Outcome		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H			M				L			L		H		L
CO2		M	L						M					M	
CO3			M		M									M	M
CO4	M		L									L			
CO5	M	M		H					L				M	M	

H = Highly Related; M = Medium L = Low

Text Books:

1. Operating Systems Concepts – Silberschatz, Galvin, Wiley Publications (2008)
2. Modern Operating Systems - Andrew S. Tanenbaum, Pearson Education Asia / PHI(2005)

Reference Books:

1. Operating Systems – William Stallings, Pearson Education Asia (2002)
2. UNIX System Programming Using C++, by Terrence Chan: Prentice Hall India, 1999.
3. Advanced Programming in UNIX Environment, by W. Richard Stevens: 2nd Ed, Pearson Education, 2005

BCO 014B	OPERATING SYSTEMS LAB	0-0-2 [2]

List of Experiments

Experiment No	*Aim*
1	Write a C program to implement the various process scheduling mechanisms such as FCFS scheduling.
2	Write a C program to implement the various process scheduling mechanisms such as SJF Scheduling.
3	Write a C program to implement the various process scheduling mechanisms such as Round Robin Scheduling.
4	Write a C program to implement the various process scheduling mechanisms such as Priority Scheduling.
5	To implement deadlock avoidance & Prevention by using Banker's Algorithm.
6	To implement page replacement algorithms FIFO (First In First Out).
7	To implement page replacement algorithm LRU (Least Recently Used).
8	To implement page replacement algorithms Optimal (The page which is not used for longest time)
9	To implement the memory management policy- Paging.
10	To implement the memory management policy-segmentation.
11	Write a C Program to implement Sequential File Allocation method.
12	Write a C Program to implement Indexed File Allocation method.
13	Write a C Program to implement Linked File Allocation method.
14	Write a program to implement multi program variable task (MVT).
15	Write a program to implement multi program fixed task (MFT).

Course Outcome (CO):

At the ends of this course students will have:

CO1: Classify Unix Kernel mode with user mode & contrast between Kernel structures.
CO2: Identify and estimate process management & thread management strategies along with their different operations
CO3: Implement different system calls for various file handling operations.
CO4: Determine paging and Caching techniques related to Virtual Memory.
CO5: construct shell scripts.

MAPPING COURSE OUTCOMES LEADING TO THE ACHIEVEMENT OF PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES:

Course Outcome	**Program Outcome**												**Program Specific Outcome**		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	H			M				L			L		H		L
CO2		M	L						M					M	
CO3			M		M									M	M
CO4	M		L									L			
CO5	M	M	L	M								L	H		

H = Highly Related; M = Medium L = Low