SAMRAT ASHOK TECHNOLOGICAL INSTITUTE VIDISHA (M.P.)
(A Govt. Aided UGC Autonomous & NAAC Accredited Institute Affiliated to RGPV Bhopal)

Scheme of Examination (Semester-III)

for Batch Admitted in session - 2022-23

Bachelor of Technology (B. Tech.) – CSE(Blockchain) (Dept. of CS & IT)

Subject Code	Subject Category	Subject Name	Maximum Marks Allotted								Contact Hrs. per week			Total Credits
			Theory				Practical			Total Marks				
			ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
MAB 201	BSC	Discrete mathematics	60	20	10	10	--	--	--	100	3	1	0	4
BCC 202	DC	Analysis and Design of Algorithms	60	20	10	10	30	10	10	150	3	0	2	4
BCC 203	DC	Object Oriented Programming	60	20	10	10	30	10	10	150	3	0	2	4
BCC 204	DC	Operating system	60	20	10	10	30	10	10	150	3	0	2	4
BCO 205	OC	Open elective-1	60	20	10	10	--	--	--	100	3	0	0	3
BCL 206	DLC	Internet Programming	--	--	--	--	30	10	10	50	0	0	4	2
ILT 208	ILC	Internship-I (60 Hrs) Institute Level (Evaluation)	--	--	--	--	50	-	-	50	-	-	2	2
Total			**300**	**100**	**50**	**50**	**170**	**40**	**40**	**750**	**15**	**1**	**12**	**23**
ILC 200	ILC	Extracurricular Activities	It is a one credit per year activity to be endorsed in eight semester marks sheet.											
MAC 207	MAC*	Energy, Ecology, Environment & Society												Grade
HUM 209	HEC	Holistic Education Course												Grade

MST: Minimum two mid semester tests to be conducted during Semester* MAC and HEC courses classes will be conducted in off hours (Weekends)

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Bachelor of Technology B.Tech in CSE (Blockchain)

Semester/Year		**III/II**		**Program**			**B.Tech – CSE(Blockchain)**				
Subject Category	**DC**	**Subject Code:**		**BCC-202**		**Subject Name**	**Analysis and Design of Algorithms**				
Maximum Marks Allotted								**Contact Hours**			**Total Credits**
Theory				**Practical**			**Total Marks**				
ES	**MS**	**Assignment**	**Quiz**	**ES**	**LW**	**Quiz**		**L**	**T**	**P**	
60	**20**	**10**	**10**	**30**	**10**	**10**	**150**	**3**	**0**	**2**	**4**

Prerequisites:

Fundamentals of Data structures.

Course Objective:

A) Determine different time complexities of a given algorithm
B) Demonstrate algorithms using various design techniques.
C) Develop algorithms using various design techniques for a given problem.

UNITs	**Descriptions**	**Hrs.**
I	Algorithms: Definition and characteristics. Analysis: Space and Time Complexity, Asymptotic Notations, Time Complexity Analysis of algorithms (Linear Search, Insertion Sort etc.)Recursive algorithms and recurrence relations. Solutions of recurrence relations. Divide and conquer technique, analysis, design and comparison of various algorithms based on this technique, example binary search, quick sort, merge sort, Heap Sort, Strassen's matrix multiplication with their complexity analysis. s.	8
II	Greedy Algorithms: Knapsack problem, Job sequencing with deadlines, optimal merge patterns, Huffman coding, Dynamic Programming: Multistage Graph, all pairs shortest paths, 0-1 Knapsack, Chained matrix multiplication, Longest common subsequence, Travelling salesperson problem.	8
III	Graph and Tree Algorithms: Traversal algorithms: Depth First Search (DFS) and Breadth First Search (BFS); Shortest path algorithms- Dijkstra's Algorithms and Complexity Analysis, Transitive closure, Minimum Spanning Tree- Prim's and Kruskal's Algorithm and their complexity analysis, Union Find Data Structure, Topological sorting, Network Flow Algorithm.	8
IV	Branch & Bound technique: Definition and application to solve 0/1 Knapsack Problem, 8-puzzle problem, travelling salesman problem. Back tracking concept and its examples like 8 Queens's problem, Hamiltonian cycle, Graph Coloring problem.	8
V	Tractable and Intractable Problems: Computability of Algorithms- P, NP, NP-complete and NP hard. Introduction to Approximation Algorithms, NP-complete problems and Reduction techniques. Lower bound theory and its use in solving algebraic problem.	8
Total Hours		40

Course Outcomes:

CO1: Explain the inherent mechanism involved in functioning of an operating system. Differentiate and justify the need of various operating systems.
CO2: Analyse various scheduling techniques with their comparisons.
CO3: Analyse various synchronisation techniques with their comparisons derive the solution for deadlock situation.
CO4: Describe memory management system of an operating system. Analyse and compare various management schemes.
CO5: Describe and Analyze File and Disk management Techniques.

Text Book:-

- Thomas Cormen, Charles Leiserson, Ronald Rivest and Cliford Stein, "Introduction to Algorithms", PHI, 3rd

edition, ISBN-13: 978-8120340077

- Ellis Horowitz, Sartaj Sahni and SanguthevarRajasekaran, "Fundamentals of Computer Algorithms", Universities Press, 2nd edition (2008), ISBN-13: 978-8173716126

Reference Books:-

- Gilles Brassard and Paul Bratley, "Fundamentals of Algorithmics", PHI, ISBN-13: 978- 8120311312

List/Links of e-learning resource

https://archive.nptel.ac.in/courses/106/106/106106131/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	3	2	3	1							2	3	
CO-2		3	3	2	3									
CO-3	2	3	3	3	2									
CO-4		2	3	3										
CO-5		3	2	3										

Suggestive list of experiments:

Q.1 Understand the working of Ubuntu operating system and basic commands for implementing Algorithm in c programming in Ubuntu operating system using gcc compiler.
Q.2 Write a simple c program to add two integer numbers.
Q.3 Implement factorial of given number using iteration method and recursive Method.
Q.4 Implement logic to swap two integer number using three different approach.
Q.5 Implement Algorithm to determine given number is divisible by 5 or not without using % Operator.
Q.6 Implement Algorithm to convert binary number to decimal number without using array and Power function.
Q.7 Implement Algorithm to print reverse of string using recursion and without using characterArray.
Q.8 Implement Linear Search Algorithm.
Q.9 Implement Binary Search Algorithm (By using Iterative Approach)
Q.10 Implement Binary Search Algorithm (By using Recursive Approach)
Q.11Implement Insertion Sort Algorithm
Q.12 Implement Quick Sort Algorithm (By using Recursive Approach)
Q.13 Implement Quick Sort Algorithm (By using Non Recursive Approach).
Q.14 Implement Merge Sort Algorithm.
Q.15 Implement Heap Sort Algorithm.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

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Bachelor of Technology B.Tech in CSE (Blockchain)

Semester/Year		**III/II**		**Program**			**B.Tech – CSE(Blockchain)**				
Subject Category	**DC**	**Subject Code:**		**BCC-203**		**Subject Name**	**Object Oriented Programming**				
Maximum Marks Allotted								**Contact Hours**			**Total Credits**
Theory				**Practical**			**Total Marks**				
ES	**MS**	**Assignment**	**Quiz**	**ES**	**LW**	**Quiz**		**L**	**T**	**P**	
60	**20**	**10**	**10**	**30**	**10**	**10**	**150**	**3**	**0**	**2**	**4**

Prerequisites:

Fundamentals of programming skills.

Course Objective:

A) Enable students to understand concepts and principles of object oriented programming methodologies using JAVA as a vehicle.

B) Also learn software development and problem solving using this JAVA technology.

UNITs	**Descriptions**	**Hrs.**
I	Introduction: Procedural Paradigms of programming, Object Oriented Paradigm for programming, Procedural vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP. OOP Concepts: Data Abstraction, Encapsulation, Inheritance and Polymorphism. Introduction of Java, Features of Java, Byte Code and Java Virtual Machine, Java Development Kit (JDK).	8
II	Command Line Argument, Classes and Objects, Encapsulation, Tightly Encapsulated classes, Nested class, Inner class, Anonymous inner class. inbuilt classes: Object, String, StringBuffer, Array, Vector. Wrapper classes. Data members, member Function, Data Hiding: Visibility modifiers in java.	8
III	Is-A relationship, Has-A relationship, Inheritance in Java, types of inheritance, Super and sub class, Method Signature. Overloading, Constructor Overloading, Method Overloading, this and static keyword, finalize() method, Casting objects, Instance of operator, Overriding, covariant return type. Super, final keyword, overloading vs. overriding. Static control flow, instance control flow.	8
IV	Abstraction: Abstract class, Interface in Java, differences between classes and interfaces. defining an interface, implementing interface, applying interfaces, variables in interface, extending interfaces. Defining, Creating and Accessing a Package, Understanding CLASSPATH, importing packages. Coupling, Cohesion.	8
V	Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception subclasses. Multithreading: Concepts of Multithreading, differences between process and thread, thread life cycle, creating multiple threads using Thread class, Runnable interface. Synchronization, thread priorities, inter thread communication, daemon threads, deadlocks, thread groups.	8
Total Hours		40

Course Outcomes:

CO1: Define classes, objects, members of a class and relationships among them .
CO2: Design java application using OOPs principles.
CO3: Design java application using constructors, overloading and overriding concepts.
CO4: Demonstrate package creation and exception handling.

CO5: Understand and develop multithreaded application programs.

Text Book:-

- Naughton & Schildt, "The Complete Reference Java 2", TataMcGraw Hill
- E Balaguruswamy, "Programming in Java", TMH Publications

Reference Books:-

- Deitel "Java-How to Program:" Pearson Education, Asia
- Horstmann & Cornell, "Core Java 2" (Vol I & II), Sun Microsystems
- Ivan Bayross, "java 2.0", BPB publications

List/Links of e-learning resource

https://archive.nptel.ac.in/courses/106/105/106105153/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	3	1	1									3	3	3
CO-2	3	1		1	2							2	1	3
CO-3	3	2	1									2	2	1
CO-4	3	3	2	3	2	1			1	2		3		3
CO-5	3	3	3	2	1				2		2	2	3	

Suggestive list of experiments:

1. Write a program to display any message.
2. Write a Java program to display the default value of all primitive data types of Java.
3. Write a program to give an example of control statements.
4. Write a program and give an example for command line arguments.
5. Write a program to create a room class, the attributes of this class is room no, room type, room area and A machine. In this class the member functions are set data and display data..
6. Write a program to create a class ‘simple object‘. Using the constructor display the message.
7. Write a program to give the example for ‘this’ operator. And also use the ‘this’ keyword as return statement.
8. Create a class named as ‘a’ and create a subclass ‘b’. Which is extends from class ‘a’. And use these classes in ‘inherit’ class.
9. Write a program to give an example of method overloading and overriding concepts.
10. Write a program to give a simple example for abstract class.
11. Write a program to give example for multiple inheritances in Java.
12. Write a program to illustrate usage of try/catch with finally clause.
13. Write a program to create two threads. In this class we have one constructor used to start the thread and run it. Check whether these two threads are run are not.

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

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Bachelor of Technology B.Tech in CSE (Blockchain)

Semester/Year		**III/II**		**Program**			**B.Tech – CSE(Blockchain)**				
Subject Category	**DC**	**Subject Code:**		**BCC--204**		**Subject Name**	**Operating system**				
Maximum Marks Allotted								**Contact Hours**			**Total Credits**
Theory				**Practical**			**Total Marks**				
ES	**MS**	**Assignment**	**Quiz**	**ES**	**LW**	**Quiz**		**L**	**T**	**P**	
60	**20**	**10**	**10**	**30**	**10**	**10**	**150**	**3**	**0**	**2**	**4**

Prerequisites:

knowledge of computer fundamentals

Course Objective:

To understand operating system architecture and functioning along with in-depth knowledge of internals and working of OS modules like process management, Storage management, file system, security and protection.

UNITs	**Descriptions**	**Hrs.**
I	Overview-Introduction to Operating Systems, Evolution of Operating System mainframe, desktop, multiprocessor, Distributed, Network Operating System, and Clustered and Handheld System), Operating System Structure- Operating System Services and System Calls, System Programs. Types of Operating Systems: Batch Processing, Real Time, Multitasking and Multiprogramming, time-sharing system and Distributed Operating systems, Objectives and functions of OS.	8
II	Process Management-Concept, Process Control Blocks (PCB), Process Scheduling. Scheduling Criteria, Scheduling Algorithms and their evaluation. Threads Overview and Multithreading	8
III	Inter Processes Communication and Critical Section Problem and Solution-Semaphores and Monitors, Deadlock Characterization, Methods for deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection and recovery from deadlock.	8
IV	Storage Management-Memory Hierarchy, Concepts of memory management, MFT and MVT, logical and physical address space, swapping, contiguous and non- contiguous allocation, Paging and Segmentation Structure and Implementation of Page table, Virtual memory, Cache Memory Organization, Demand paging, Page replacement Algorithms. Thrashing, Demand segmentation	8
V	File and Disk Management-File concepts, Access methods, Directory Structure, File Sharing and Protection, Free space management,Disk Scheduling, Efficiency and Performance- Case study on Unix, Linux and Windows.	8
Total Hours		40

Course Outcomes:

CO1: Explain the inherent mechanism involved in functioning of an operating system. Differentiate and justify the need of various operating systems.
CO2: Analyze various scheduling techniques with their comparisons.
CO3: Analyze various synchronization techniques with their comparisons derive the solution for deadlock situation.
CO4: Describe memory management system of an operating system. Analyze and compare various management schemes.
CO5: Describe and Analyze File and Disk management Techniques.

Text Book:-

- Peterson, J.L. &Silberschatz, A.: Operating System Concepts, Addison, Wesley-Reading.
- Brinch, Hansen: Operating System Principles, Prentice Hall of India.

Reference Books:-

- Haberman, A.N.: Introduction to Operating System Design Galgotia Publication, New Delhi.
- Tanenbaum, A.S.: Operating Systems.
- Hansen, P.B.: Architecture of Concurrent Programs, PHI.
- Shaw, A.C.: Logic Design of Operating Systems, PHI

List/Links of e-learning resource

- https://archive.nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs10/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester theory and practical examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1		2			2							2	1	2
CO-2	2	3		2	1						1	2	3	3
CO-3	2	3	3	2								2	2	2
CO-4	2	2		2								2	3	3
CO-5	2	2	2									2	3	3

Suggestive list of experiments:

1. Implementation of Basic Linux Commands.
2. Implementation of Process Related System Calls (Fork).
3. Write a program to simulate the following non-pre-emptive CPU scheduling algorithms to find turnaround time and waiting time. a) FCFS b) SJF
4. Write a program to simulate the following CPU scheduling algorithms to find turnaround time and waiting time. a) Round Robin b) Priority
5. Write a C program to simulate page replacement algorithms a) FIFO b) LRU c) OPTIMAL
6. Write a program to simulate Bankers algorithm for the purpose of deadlock avoidance.
7. Write a program to simulate disk scheduling algorithms a) FCFS b) SCAN c) C-SCAN

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

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Semester/Year		**III/II**		**Program**		**B.Tech – CSE(Blockchain)**
Subject Category	**DLC**	**Subject Code:**	BCL-206	**Subject Name**		Internet Programming

Maximum Marks Allotted								**Contact Hours**			**Total Credits**
Theory				**Practical**			**Total Marks**				
ES	**MS**	**Assignment**	**Quiz**	**ES**	**LW**	**Quiz**		**L**	**T**	**P**	
--	--	--	--	**30**	**10**	**10**	**50**	**0**	**0**	**4**	**2**

Prerequisites:

Fundamental knowledge of programming.

Course Objective:

Understand static and dynamic web pages.

UNITs	**Descriptions**	**Hrs.**
I	WEBSITE BASICS, Web Essentials: Clients, Servers and Communication, The Internet, Basic Internet protocols, World wide web.	8
II	HTTP Request Message, HTTP Response Message, Web Clients, Web Servers, HTML5, Tables, Lists, Image, HTML5 control elements, Semantic elements, Drag and Drop, Audio , Video control	8
III	CSS3, Inline, embedded and external style sheets, Rule cascading, Inheritance, Backgrounds, Border Images, Colors Shadows, Text, Transformations, Transitions, Animations.	8
IV	Java Script: An introduction to JavaScript, JavaScript DOM Model-Date and Objects, Regular Expressions.	8
V	Exception Handling-Validation-Built-in objects-Event Handling-DHTML with JavaScript. XML- Elements, attributes, parser, DOM, query.	8
	Total Hours	40

Course Outcomes:

CO1: To understand and interpret the basic concepts of the Internet, tools.
CO2: To understand, analyze CSS components and apply them to web page design tools like HTML,CSS.
CO3: To know and analyze client side scripting language concepts.
CO4: Design and Develop Internet applications with the help of Java script.
CO5: Understand the concept of exceptional handling

Text Book:-

- Achyut Godbole,Atul Kahate"Web Technologies:TCP/IP,Web/Java Programming, and Cloud Computing",Third Edition,McGraw Hill Education.

Reference Books:-

- Deitel, Deitel, Goldberg, "Internet & World Wide Web How to Program", Third Edition, Pearson Education, 2006.
- Raj Kamal, "Internet and Web Technologies", Tata McGraw-Hill.

List/Links of e-learning resource

- https://archive.nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs10/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

COs	**PO_1**	**PO_2**	**PO_3**	**PO_4**	**PO_5**	**PO_6**	**PO_7**	**PO_8**	**PO_9**	**PO_1**	**PO_{11}**	**PO_{12}**	**PSO1**	**PSO2**
CO-1	**2**	**1**	**2**										**1**	**1**
CO-2	**2**	**1**	**2**										**1**	**1**
CO-3	**2**	**1**	**2**										**1**	**2**
CO-4	**2**	**2**	**2**										**1**	**2**
CO-5	**2**	**2**	**2**										**1**	**2**

Suggestive list of experiments:

1. Design a web page to display your CV.

2. Design a web page using HTML tags to take the input in a form and display it in another page/frame.
3. Design a web page to isolate a part of the text that might be formatted in a different direction from other text outside it
4. Create a Zebra Striping a Table and make an image rounded with CSS3.
5. Create speech bubble shape and Image cross effect with CSS3 transition.
6. Using HTML, CSS create a styled checkbox with animation on state change.
7. Using HTML, CSS create display an image overlay effect on hover.
8. Using HTML, CSS create a list with floating headings for each section.
9. Using HTML, CSS, JavaScript create a typewriter effect animation.
10. Using HTML, CSS create an animated underline effect when the user hovers over the text.
11. Write a JavaScript program to set paragraph background color.
12. Write a JavaScript function to add rows to a table.
13. Write a JavaScript function that accepts a row, column (to identify a particular cell) and a string to update the cell's contents.
14. Write a JavaScript program to highlight the bold words of the following paragraph, on mouse over a certain link.
15. Write a JavaScript program to get the window width and height (any time the window is resized).

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

Open Courses launched by Program are not applicable for students of parental program.

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Open Course Offered by CSE(BC) Session: 2023-24 Semester III			
Open Course-I (BCO-205)	**A**	**B**	**C**
	Computer System Organisation	Data Structure	Operating system
Prerequisite	Digital Electronics	C/C++ Programming	Computer fundamentals
Remark	Open to All	Not Applicable for - CSE and Allied branches, EC	Not Applicable for - CSE&AIADS

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Semester/Year		**III**	**Program**		**B.Tech – CSE(Blockchain)**
Subject Category	**OC**	**Subject Code:**	BCO-205(A)	**Subject Name**	Computer system organization

Maximum Marks Allotted								**Contact Hours**			**Total Credits**
Theory				**Practical**			**Total Marks**				
ES	**MS**	**Assignment**	**Quiz**	**ES**	**LW**	**Quiz**		**L**	**T**	**P**	
60	20	10	10	--	--	--	100	3	0	0	3

Prerequisites:

Fundamental knowledge of digital electronics.

Course Objective:

- Understand the organization and architecture of computer systems and electronic computers.
- Design a simple computer using hardwired and micro programmed control methods.
- Study the basic components of computer systems besides computer arithmetic.
- Understand input-output organization, memory organization and management, and pipelining.

UNITs	**Descriptions**	**Hrs.**
I	Introduction: Function and structure of a computer, Functional components of a computer, Interconnection of components, Performance of a computer, Register Transfer language : Register Transfer, Bus and Memory Transfers, Three-Stare Bus Buffers, Memory Transfer, Arithmetic Microoperations Binary Adder, Binary Adder-Subtractor, Binary incremenrer, Arithmetic Circuit, Logic Microoperations, Shift Microoperations, Arithmetic Logic Shift Unit, List of Logic Microoperations, , Shift Micro operations, Arithmetic Logic Shift Unit	6
II	Control unit: Control memory, address sequencing, micro program example, Microinstruction Format, Symbolic Microinstructions, The Fetch Routine, Symbolic Micro program and design of the control unit, Microprogram Sequencer.	6
III	CPU design: Instruction cycle, data representation, memory reference instructions, input-output, and interrupt, addressing modes, data transfer and manipulation, program control. Computer arithmetic: Addition and subtraction, floating point arithmetic operations, decimal arithmetic unit.	8
IV	Memory organization: Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory; Input or output organization: Input or output Interface, asynchronous data transfer, modes of transfer, priority interrupt, direct memory access	8
V	Pipeline: Parallel processing, pipelining-arithmetic pipeline, instruction pipeline; Multiprocessors: Characteristics of multiprocessors, interconnection structures, inter-processor arbitration, inter-processor communication and synchronization.	7
Total Hours		35

Course Outcomes:

CO1:Understand the organization and levels of design in computer architecture.
CO2: Describe Register transfer languages, arithmetic micro-operations, logic micro-operations, shift micro-operations address sequencing, micro program example, and design of control unit
CO3: Understand the Instruction cycle, data representation, memory reference instructions, input-output, and interrupt, addressing modes, data transfer, and manipulation, program control. Addition and subtraction, floating point arithmetic operations, decimal arithmetic unit.
CO4: Knowledge about Memory hierarchy, main memory, auxiliary memory, associative memory, cache memory, virtual memory Input or output Interface, asynchronous data transfer, modes of transfer, Priority interrupt, and direct memory access.
CO5: Explore the Parallel processing, pipelining-arithmetic pipeline, instruction pipeline Characteristics of multiprocessors, interconnection structures, inter-processor arbitration, inter-processor Communication, and synchronization.

Text Book:-

- M. Morris Mano, "Computer Systems Architecture", Pearson, 3rdEdition,2007.

Reference Books:-

- John D. Carpinelli, "Computer Systems Organization and Architecture", Pearson, 1stEdition,2001.
- Patterson,Hennessy,"ComputerOrganizationandDesign:TheHardware/Software Interface",Morgan Kaufmann, 5 thEdition,2013

List/Links of e-learning resource

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Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester practical examination.

CO-PO Mapping:

	COs	**PO_1**	**PO_2**	**PO_3**	**PO_4**	**PO_5**	**PO_6**	**PO_7**	**PO_8**	**PO_9**	**PO_1**	**PO_{11}**	**PO_{12}**	**PSO1**	**PSO2**

	CO-1	**1**	**1**	**2**										**1**	**2**
	CO-2	**2**	**2**	**2**										**1**	**2**
	CO-3	**2**	**1**	**2**										**1**	**2**
	CO-4	**2**	**1**	**2**											**2**
	CO-5	**2**	**2**	**1**										**1**	**2**

Suggestive list of experiments:	
Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

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DEPARTMENT OF CS & IT

Semester/Year	III/II	Program	B.Tech – CSE(Blockchain)
Subject Category: OC	Subject Code: BCO-205(B)	Subject Name	Data structure

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10				100	3	0	0	3

Prerequisites:

Logical thinking and Computer Fundamentals

Course Objective:

- Introduce the fundamentals of data structures
- Utilization of the concepts are useful in problem solving

UNITs	Descriptions	Hrs.
I	Problem-solving concepts: top-down, bottom-up design, Concept of data type, variable, constant, and pointers. Dynamic memory allocation. Algorithm: Definition and complexity Analysis. Introduction to data structure: Linear, Nonlinear, Primitive, and Nonprimitive. Arrays-Concepts of Arrays, Single dimensional array, two-dimensional array- Representation and Address Calculation, Operations on arrays with algorithms (traversing, searching, inserting, deleting).	6
II	List-Singly linked lists: Representation in memory, Operations on singly linked list with algorithms(traversing, searching, insertion, deletion)Doubly linked list- Operations with algorithms and analysis.Circular linked lists-Operations with algorithms and analysis. Representation & manipulations of polynomials/sets using linked lists.	6
III	Stack- Introduction to Stack and its operations, Implementation of stack using array and linked list with comparison. Application of stacks (Polish Notations, converting infix to postfix notation, evaluating postfix notation, Parenthesis balancing, Recursion). Queue- Introduction to Queue and its operations. Implementation of queue using array and linked list. De-queue, circular queue, priority queue. Applications of the queue.	8
IV	Tree- Definition and terminology, the concept of binary tree and representation, Traversing binary tree(pre-order, post-order, in order) Operation with an algorithm -insertion and deletion. Binary Search Trees and Concept of Balance tree (AVL). Graph- Definition and terminology, Types of graphs, Representation of graph. Traversing of the graph- Breadth First Traversing and Depth First Traversing.	8
V	Searching- Search methods- Linear search, Binary search, and Hashing (collision, chaining, and probing) with their algorithms and analysis. Sorting- Sorting methods-Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort.	7
Total Hours		35

Course Outcomes:

CO1: Understand Problem-solving using data structure and various searching and sorting methods.
CO2: Apply different concepts of data structures to solve different computing problems.
CO3: Analyse the access pattern of various data structures and understand their applicability.
CO4: Evaluate and Compare the performance of different data structures on real-world problems.
CO5: Graph and Tree structure with their operations and applicability

Text Book:-

- Data Structure- Horwitz and Sartaj Sahni

Reference Books:-

- Data Structure- Schaum's Series- McGraw Hill Publication
- Data Structure through C, Yashwant Kanekar, BPB Publication.

List/Links of e-learning resource

- https://archive.nptel.ac.in/noc/courses/noc22/SEM1/noc22-cs26/

Modes of Evaluation and Rubric

The evaluation modes consist of performance in two mid semester Tests, Quiz/Assignments, term work, end semester

theory examination.

CO-PO Mapping:

COs	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_1	PO_{11}	PO_{12}	PSO1	PSO2
CO-1	**1**	**1**	**2**										**1**	**2**
CO-2	**2**	**2**	**2**										**1**	**2**
CO-3	**2**	**1**	**2**										**1**	**2**
CO-4	**2**	**1**	**2**											**2**
CO-5	**2**	**2**	**1**										**1**	**2**

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	Department of CS & IT

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
DEPARTMENT OF CS & IT

Semester/Year	III/II	Program	B.Tech – CSE(Blockchain)
Subject Category: OC	Subject Code: BCO-205(C)	Subject Name	Operating System

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
ES	MS	Assignment	Quiz	ES	LW	Quiz		L	T	P	
60	20	10	10				100	3	0	0	3

Prerequisites:

knowledge of computer fundamentals

Course Objective:

To understand operating system architecture and functioning along with in-depth knowledge of internals and working of OS modules like process management, Storage management, file system, security and protection

UNITs	Descriptions	Hrs.
I	Overview-Introduction to Operating Systems, Evolution of Operating System mainframe, desktop, multiprocessor, Distributed, Network Operating System, and Clustered and Handheld System), Operating System Structure- Operating System Services and System Calls, System Programs. Types of Operating Systems: Batch Processing, Real-Time, Multitasking, and Multiprogramming, time-sharing system and Distributed Operating Systems, Objectives and functions of OS.	**7**
II	Process Management-Concept, Process Control Blocks (PCB), Process Scheduling.Scheduling Criteria, Scheduling Algorithms, and their Evaluation. Threads Overview and Multithreading .	7
III	Inter Processes Communication and Critical Section Problem and Solution-Semaphores and Monitors, Deadlock Characterization, Methods for Deadlock handling, deadlock prevention, deadlock avoidance, deadlock detection and Recovery from Deadlock	7
IV	Storage Management-Memory Hierarchy, Concepts of memory management, MFT and MVT, logical and physical address space, swapping, contiguous and non-contiguous allocation, Paging and Segmentation Structure and Implementation of Page table, Virtual memory, Cache Memory Organization, Demand paging, Page replacement Algorithms. Thrashing, Demand segmentation	7
V	File and Disk Management-File concepts, Access methods, Directory Structure, File Sharing and Protection, Free space management, Disk Scheduling, Efficiency, and Performance- A case study on Unix, Linux, and Windows.	7
Total Hours		35

Course Outcomes:

CO1: Explain the inherent mechanism involved in the functioning of an operating system. Differentiate and justify the need for various operating systems.

CO2: Analyze various scheduling techniques with their comparisons.

CO3: Analyze various synchronization techniques with their comparisons to derive the solution for the deadlock situation.

CO4: Describe the memory management system of an operating system. Analyse and compare various management schemes.

CO5: Describe and Analyze File and Disk Management Techniques.

Text Book:-

- Peterson, J.L. & Silberschatz, A.: Operating System Concepts, Addison, Wesley-Reading.
- Brinch, Hansen: Operating System Principles, Prentice Hall of India.

Reference Books:-

- Haberman, A.N.: Introduction to Operating System Design Galgotia Publication, New Delhi.
- Tanenbaum, A.S.: Operating Systems.
- Hansen, P.B.: Architecture of Concurrent Programs, PHI.
- Shaw, A.C.: Logic Design of Operating Systems, PHI.

List/Links of e-learning resource

- https://archive.nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs10/

Modes of Evaluation and Rubric

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CO-PO Mapping:

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CO-1		2			2							2	1	2
CO-2	2	3		2	1						1	2	3	3
CO-3	2	3	3	2								2	2	2
CO-4	2	2		2								2	3	3
CO-5	2	2	2									2	3	3

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