COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS301N	DCC	**Discrete Structures**	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall 2exceed more than 10 marks

Course Educational Objectives (CEOs):

The student will have ability to:

1. Provide the fundamentals of formal techniques for solve the problems in computational domain and algorithm development.
2. Apply appropriate mathematical and statistical concepts and operations to interpret data and to solve problems
3. Formulate and evaluate possible solutions to problems, and select and defend the chosen solutions
4. Construct graphs and charts, interpret them, and draw appropriate conclusions.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate the following knowledge, skills and attitudes.
The students will be able to:

1. Understand the notion of mathematical thinking, mathematical proofs, and algorithmic thinking, and be able to apply them in problem solving.
2. Define sets and perform operations and algebra on sets.
3. Demonstrate an understanding of relations and functions and be able to determine their properties.
4. Analyze logical propositions via truth tables.
5. Write an argument using logical notation and determine if the argument is or is not valid.
6. Understand some basic properties of graphs and related discrete structures and be able to relate these to practical examples.
7. Model problems in Computer Science using graphs and trees.
8. Be able to use effectively algebraic techniques to analyze basic discrete structures and algorithms.
9. Draw hasse diagram and identify lattice.
10. Understand generating functions and recurrence relation.

Chairperson	**Chairperson**	**Controller of Examination**	**Joint Registrar**
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS301N	DCC	**Discrete Structures**	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall 2exceed more than 10 marks

Syllabus:

UNIT I   **10HRS**
Set Theory
Definition of Sets, Venn Diagrams, complements, Cartesian products, power sets, counting principle, cardinality and countability (Countable and Uncountable sets), pigeonhole principle. Relation: Definition, types of relation, domain and range of a relation, pictorial representation of relation, properties of relation, partial ordering relation. Function: Definition and types of function, composition of functions, recursively defined functions.

UNIT II   **9 HRS**
Propositional logic
Proposition logic, basic logic, logical connectives, truth tables, tautologies, contradiction, normal forms (conjunctive and disjunctive), modus ponens and modus tollens, validity, predicate logic, universal and existential quantification. Notion of proof: proof by implication, converse, inverse, contrapositive, negation, and contradiction, proof by using truth table.

UNIT III   **9HRS**
Graph Theory
Terminology Graph Representation Graph isomorphism; Connectedness; Various graph properties; Euler & Hamiltonian graph; shortest paths algorithms. Trees: Terminology; Tree traversals; prefix codes; Spanning trees; Minimum spanning trees.

UNIT IV   **8 HRS**
Algebraic Structure
Binary composition and its properties definition of algebraic structure; Groupoid, Semi group, Monoid Groups, Abelian Group, properties of groups, Permutation Groups, Sub Group, Cyclic Group, Rings and Fields (definition and standard results).

Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth		
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS301N	DCC	**Discrete Structures**	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall 2exceed more than 10 marks

UNIT V   **9 HRS**
Posets, Hasse Diagram and Lattices
Introduction, ordered set,well ordered set, Hasse diagram of partially,Lattices, properties of Lattices, bounded and complemented lattices.Generating functions, Solution by method of generating functions.Recurrence Relation and Generating Function: Introduction to Recurrence Relation, Linear recurrence relations with constant coefficients, Homogeneous solutions, Particular solutions, Total solutions.

Text Books:
1. Kenneth H. Rosen, "Discrete Mathematics and its applications", McGraw Hill, 8th Edition, 2021.

References:
1. Trembley, J.P &Manohar; "Discrete Mathematical Structure with Application CS", McGraw Hill, 1st Edition, 2017
2. Biswal,"Discrete Mathematics & Graph Theory", PHI, 4thEdition, 2015.
3. Seymour Lipschutz, M.Lipson, "Discrete Mathemataics" Tata McGraw Hill, 4thEdition, 2021.
4. C.L.Liu,D. P.Mohapatra "Elements of Discrete Mathematics" Tata McGraw-Hill Edition, 4th Edition, 2017.

Chairperson	**Chairperson**	**Controller of Examination**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**		

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS306M	DCC	Fundamentals of Data Structures	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To understand efficient storage mechanisms of data for an easy access.
2. To design and implementation of various basic and advanced data structures.
3. To introduce various techniques for representation of the data in the real world.
4. To develop application using data structures.
5. To understand the concept of protection and management of data.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to

1. Get a good understanding of applications of Data Structures.
2. Develop application using data structures.
3. Handle operations like searching, insertion, deletion, traversing mechanism etc.on various data structures.
4. Decide the appropriate data type and data structure for a given problem.
5. Select the best algorithm to solve a problem by considering various problem characteristics, such as the data size, the type of operations, etc.

Syllabus:

UNIT I   **10HRS**
Introduction: Overview of Data structures, Types of data structures, Primitive and Non Primitive data structures and Operations, Introduction to Algorithms & complexity notations. Characteristic of Array, One Dimensional Array, Operation with Array, Two Dimensional Arrays, Three or Multi-Dimensional Arrays, Sparse matrix, Drawbacks of linear arrays. Strings, Array of Structures, Pointer and one-dimensional Arrays, Pointers and Two Dimensional Arrays, Pointers and Strings, Pointer and Structure.

Chairperson	Chairperson	Controller of Examination	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth		
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS306M	DCC	Fundamentals of Data Structures	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT II   **9HRS**
Linked List: Linked List as an ADT, Linked List Vs. Arrays, Dynamic Memory Allocation & De-allocation for a Linked List, Types of Linked List: Circular & Doubly Linked List. Linked

List operations: All possible insertions and deletion operations on all types of Linked list Reverse a Single Linked List; Divide a singly linked list into two equal halves, Application of Linked List.

UNIT III   8**HRS**
Stack: The Stack as an ADT, Stack operation, Array Representation of Stack, Link Representation of Stack, Application of stack – Recursion, Polish Notation . Types of Recursion, problem based on Recursion: Tower of Hanoi
The Queue :The Queue as an ADT, Queue operation, Array Representation of Queue, Linked Representation of Queue, Types of Queue :Circular Queue & Dequeue, Introduction of Priority Queue, Application of Queues.

UNIT IV   **7HRS**
Tree: Definitions and Concepts of Binary trees, Types of Binary Tree, Representation of Binary tree: Array & Linked List. General tree, forest, Expression Tree. Forest and general tree to binary tree conversion. Binary Search Tree Creation, Operations on Binary Search Trees: insertion, deletion & Search an element, Traversals on Binary SEARCH TREE and algorithms. Height balanced Tree: AVL, B-Tree, 2-3 Tree, B+Tree: Creation, Insertion & Deletion.
Graph: Definitions and Concepts Graph Representations: Adjacency MATRIX, Incidence matrix, Graph TRAVERSAL (DFS & BFS), Spanning Tree and Minimum Cost Spanning Tree: Prim's & Kruskal's Algorithm.

Chairperson	**Chairperson**	**Controller of Examination**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**		

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS306M	DCC	Fundamentals of Data Structures	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT V   8**HRS**

Sortings: Sorting Concept and types of Sorting, Stable & Unstable sorting. Concept of Insertion Sort, Selection sort, Bubble sort, Quick Sort, Merge Sort, Heap & Heap Sort, Shell Sort & Radix sort. Algorithms and performance of Insertion, selection, bubble, Quick sort & Merge sort.

Text Books:
1. Ashok N. Kamthane, "Introduction to Data structures", 2ⁿᵈ Edition, Pearson Education India,2011.
2. Tremblay & Sorenson, "Introduction to Data- Structure with applications", 8ᵗʰ Edition, Tata McGrawHill,2011.

References:
1. Rajesh K. Shukla ,Data Structures Using C & C++, Wiley-India 2016.
2. ISRD Group ,Data Structures Using C, TataMcGraw-Hill 2015.
3. E. Balagurusamy ,"Data Structure Using C" ,Tata McGraw-Hill 2017.
4. Prof. P.S. Deshpande, Prof. O.G. Kakde, C & Data Structures, Charles River Media 2015 .
5. Gav Pai, Data Structures, Tata McGraw-Hill, 2015.

Suggested list of Practicals:-
1. To develop a program to find an average of an array using AVG function.
2. To implement a program that can insert, delete and edit an element in array.
3. To implement an algorithm for insert and delete operations of circular queue and implement the same using array.
4. Write a menu driven program to implement the push, pop and display option of the stack with the help of static memory allocation.
5. Write a menu driven program to implement the push, pop and display option of the stack with the help of dynamic memory allocation.
6. Write a menu driven program to implementing the various operations on a linear queue with the help of static memory allocation.

Chairperson	**Chairperson**	**Controller of Examination**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**		
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	**Vishwavidyalaya, Indore**	**Vishwavidyalaya, Indore**

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS306M	DCC	Fundamentals of Data Structures	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

7. Write a menu driven program to implementing the various operations on a linear queue with the help of dynamic memory allocation.
8. Write a menu driven program to implement various operations on a linear linked list.
9. Write a menu driven program to implement various operations on a circular linked list
10. Write a program for implementation of Bubble sort
11. Write a program for Insertion sort
12. Write a program for Merge Sort
13. Write a program to implement Heap sort
14. Write a program to implement Quick sort
15. Write a program to Construct a Binary Search Tree and perform deletion, inorder traversal on it
16. Write a program to develop an algorithm for binary tree operations and implement the same.
17. Write a program to design an algorithm for sequential search, implement and test it.
18. Write a program to develop an algorithm for binary search and perform the same.

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS307M	DCC	Principles of Operating Systems	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The student will have ability to:
1. To learn the fundamentals of Operating Systems.
2. To study the mechanisms of Operating System to handle processes and threads and their communication.
3. To gain knowledge of process management concepts that includes architecture, Mutual exclusion algorithms, deadlock detection and recovery algorithms.
4. To learn the mechanisms involved in memory management in Operating System.
5. To know the components and management aspects of disc scheduling.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to:
1. To describe the detail structure of Operating System.
2. To design and Implement Process management Techniques in Operating System.
3. To calculate CPU Scheduling criteria.
4. To understand The Memory Management of Operating System.
5. To elaborate Disc Scheduling.

Syllabus:

UNIT I   **10HRS**
Introduction to Operating System: Introduction and Need of operating system, Layered Architecture /Logical Structure of Operating system, Type of OS(Multiprogramming , Time Sharing, Real Time ,Networked, Distributed, Clustered, Hand Held), Operating system as

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS307M	DCC	Principles of Operating Systems	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Resource Manager and Virtual Machine,System Calls/Monitor Calls, Firmware- BIOS, Boot Strap Loader. Threads- processes versus threads, threading, concepts, models, kernel & user level threads, thread usage, benefits.

UNIT II   9HRS
Process Management: Process Model, Creation, Termination, States & Transitions, Context Switching, Process Control Block, CPU and I/O bound, CPU scheduler- short, medium, long-term, dispatcher, scheduling:- preemptive and non-preemptive, Static and Dynamic Priority
Criteria/Goals/Performance Metrics, scheduling algorithms- FCFS, SJFS, shortest remaining time, Round robin, Priority scheduling, multilevel queue scheduling, multilevel feedback queue scheduling

UNIT III   8HRS
Interprocess Communication: Introduction to Message Passing, Race Condition, Critical Section Problem, Peterson's Solution, Semaphore, Classical Problems of Synchronization Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem. **Deadlock-** System model, Resource types, Deadlock Problem, Deadlock Characterization, Methods for Deadlock Handling, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock Detection, Recovery from Deadlock.

UNIT IV   7HRS
Memory Management: concepts, functions, logical and physical address space, address binding, degree of multiprogramming, swapping, static & dynamic loading- creating a load module, loading, static & dynamic linking, memory allocation schemes- first fit, next fit, best fit, worst fit and quick fit.
Virtual Memory- concept, virtual address space, paging scheme, pure segmentation and segmentation with paging scheme hardware support and implementation details, memory fragmentation, demand paging ,working set model, page fault frequency, thrashing, page replacement algorithms- optimal, FIFO,LRU; Bleady's anomaly; TLB (translation look aside buffer).

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS307M	DCC	Principles of Operating Systems	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT V   **8HRS**
File Management: Concepts, Naming, Attributes, Operations, Types, Structure, File Organization & Access (Sequential, Direct ,Index Sequential) Methods, Memory Mapped Files, Directory Structures One Level, Two Level, Hierarchical/Tree, Acyclic Graph, General Graph, File System Mounting, File Sharing, Path Name, Directory Operations, Overview Of File System in Linux & Windows.

Input/output Subsystems- Concepts, Functions/Goals, Input/Output devices- Block And Character, Spooling, Disk Structure & Operation, Disk Attachment, Disk Storage Capacity, Disk Scheduling Algorithm- FCFS, SSTF, Scan Scheduling, C-Scan Schedule.

Text books:
 1. Abraham Silberschatz,"Operating system concepts",10th Edition,John Willey & Sons. INC, 2018
 2. Andrew S.Tannanbaum, "Modern operating system", 4th Edition,Pearson Education, 2014

Reference Books:
   1. Achyut S Godbole,"Operating System",3rd TMH,2017.
   2. William Stalling, "operating system" 8th, Pearson Education, ,2014.
   3. Vijay Shukla, "Operating System", 3rd Kataria&Sons ,2013.
   4. Singhal&Shivratri,"Advanced Concept in Operating Systems", 1st Tata Mc-Graw Hill Education, edition 2017.

Suggested list of Practicals:-
  1. Implement and update the BIOS settings of your PC.
  2. If there are 5 printers are connected in a system each process to print will take different time to complete, and CPU will give a fixed time to each process after that deadline next process will enter in CPU. If a problem not completed in a given slot then that process will be re enter as per the FCFS, on rotation basis? Apply the scheduling on this?
  3. Implement Non Preemptive Priority CPU Scheduling.
  4. Implement Non Preemptive Shortest Job first CPU Scheduling.

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS307M	DCC	Principles of Operating Systems	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
 ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

5. If there are 5 different resources like 3 printer,2 scanner are connected to a system each taking different time to complete the task. Which scheduling is best and gives best performance of CPU?

6. Implement the scheduling for that where CPU give chance to complete those process first which comes first?

7. Implement Round-Robin CPU scheduling.

8. Write a program to implement Semaphore.

9. Find the solution for the situation where 5 faculties are sitting in a round table. There are 4 ball pens are placed on this table. At a time only one pen can be picked by one faculty to writing work. What will happen if all picked the pen for writing simultaneously?

10. Find the solution for dentist checkup clinic where only one chair and one dentist is available for treatment. And having n chairs to waiting for patient.

   ▪ If there is no patient, then the doctor sleeps in his own chair.

   ▪ When a patient arrives, he has to wake up the doctor.

   ▪ If there are many patients and the doctor is doing treatment of him, then the remaining patients either wait if there are empty chairs in the waiting room or they leave if no chairs are empty.

11. Write a program for Memory Management Algorithms e.g. First Fit, Best Fit, Worst Fit.

12. Demonstrate Virtual memory Techniques like, LRU, FIFO etc.

13. Implement Shortest Seek Time First Disk Scheduling Algorithm.

14. Implement Scan Scheduling Disk Scheduling Algorithm.

15. Implement Circular Scan Disk Scheduling Algorithm.

16. Implement Look Disk Scheduling Algorithm.

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS402N	DCC	**Software Engineering and Project Management**	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The student will have ability to:
1. Get the knowledge of basic software engineering methods and practices.
2. Define software requirements and requirement engineering.
3. Apply approaches for various design and their principle.
4. Explore testing in various domain.
5. Development of significant teamwork and project based experience.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to
1. Compare various software process models and identify where these models are applicable.
2. Define and analyze software project management, the framework and the dimensions of software project management.
3. Comprehend System modeling using UML.
4. Identify software testing strategies by using testing tools.
5. Analyze software risks and risk management strategies.

Syllabus:

UNIT I   **10HRS**
Introduction to Software Engineering: The evolving role of software, changing nature of software, software myths.
A Generic view of process: Software engineering- a layered technology, a process framework, the capability maturity model integration (CMMI), process patterns, process assessment, personal and team process models.

Chairperson	Chairperson	Joint Registrar
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS402N	DCC	Software Engineering and Project Management	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Process models: The waterfall model, incremental process models, evolutionary process models, the unified process. Agile development-Agile Process, Extreme Programming

UNIT II   9HRS

Software Requirements: Functional and non-functional requirements, user requirements, system requirements, interface specification, the software requirements document.
Requirements engineering process: Feasibility studies, requirements elicitation and analysis, requirements validation, requirements management.
System models: Context models, behavioral models, data models, object models, structured methods.

UNIT III   8HRS

Design Engineering: Design Process- Design concepts: Abstraction, Architecture, patterns, Separation of Concerns, Modularity, Information Hiding, Functional Independence, Refinement, Aspects, Refactoring, Object Oriented Design Concepts, Design Classes- Design Model: Data, Architectural, Interface, Component, Deployment Level Design Elements
Creating an architectural design: software architecture, data design, architectural styles and patterns, architectural design, conceptual model of UML, basic structural modeling, Use Case Diagrams, Class Diagrams, Interaction Diagrams, State chart Diagrams, Activity Diagrams, Package Diagrams, Component Diagrams, Deployment Diagrams

UNIT IV   7HRS

SOFTWARE IMPLEMENTATION:- Structured coding Techniques, Coding Styles, Standards and Guidelines, Documentation Guidelines-Modern Programming Language Features: Type checking-User defined data types-Data Abstraction-Exception Handling- Concurrency Mechanism.
Testing Strategies: A strategic approach to software testing, test strategies for conventional software, black-box and white-box testing, Object oriented software, Web
Apps-validation testing, system testing, the art of debugging.

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS402N	**DCC**	**Software Engineering and Project Management**	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT V   **8HRS**
Metrics for Process and Products: Software measurement, metrics for software quality. Quality Management: Quality concepts, software quality assurance, software reviews, formal technical reviews, statistical software quality assurance, software reliability, the ISO 9000 quality
standards.
Risk management: Reactive Vs proactive risk strategies, software risks, risk identification, risk projection, risk refinement, RMMM, RMMM plan.
MAINTENANCE: Software Maintenance-Software Supportability- Reengineering- Business Process Reengineering- Software Reengineering- Reverse Engineering- Restructuring- Forward Engineering- Economics of Reengineering

Text Books:
1. Software Engineering, A practitioner's Approach- Roger S. Pressman, 6th edition, Mc Graw Hill International Edition.

References:
1. Software Engineering, an Engineering approach- James F. Peters, Witold Pedrycz, John Wiley.
2. Software Engineering principles and practice- Waman S Jawadekar, The Mc Graw-Hill Companies.
3. Fundamentals of object-oriented design using UML Meiler page-Jones: Pearson Education.
4. Rajib Mall, "Fundamentals of Software Engineering" Second Edition, PHI Learning.
5. Software Engineering- Sommerville, 7th edition, Pearson Education.
6. The unified modeling language user guide Grady Booch, James Rambaugh, Ivar Jacobson, Pearson Education.
7. Pankaj Jalote ,"An Integrated Approach to Software Engineering", Narosa Pub, 2005.
8. Richard H.Thayer,"SoftwareEnginerring& Project Managements",Willey India

Chairperson

Board of Studies

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

Chairperson

Faculty of Studies

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

Joint Registrar

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCS402N	**DCC**	**Software Engineering and Project Management**	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested list of Practicals:-
1. Study and compare the SDLC models.
2. Prepare a SRS document in line with the IEEE recommended standards.
3. Study Requirement Engineering of project.
4. Study the UML drawing tools.
5. Draw the Entity relationship diagram of a project.
6. Draw the data flow diagrams at level 0 and level 1.
7. Draw use case diagram in argo UML.
8. Draw activity diagram in argo UML.
9. Draw class diagram in argo UML.
10. Draw the component diagram in argo UML.
11. Draw sequence diagram in argo UML.
12. Draw collaboration diagram in argo uml.
13. Use testing tool such as junit.
14. Using configuration management tool-libra.

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE321M	DSC	Fundamentals of Information Theory and Coding	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
*Teacher Assessment shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The student will have ability to:

1. To provide an insight into the concept of information in the context of communication theory and its significance in the design of communication receivers.

2. To explore in detail, the calculations of channel capacity to support error-free transmission and, commonly used source coding and channel coding algorithms.

3. To encourage and train to design coding schemes for data compression and error correction, and they will also get an overall perspective of how this impacts the design of an optimum communication receiver.

4. To give a detailed study about the cryptography and their algorithms.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1. Overview of Probability Theory, significance of "Information" with respect to Information Theory.

2. Derive equations for entropy, mutual information, and channel capacity for all kinds of channels.

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE321M	DSC	Fundamentals of Information Theory and Coding	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

3.   Implement the various types of source coding algorithms and analyse their performance.

4. Explain various methods of generating and detecting different types of error correcting codes.

5.   Design linear block codes and cyclic codes (encoding and decoding).

6.   Implement and decode a sequence at the receiver using Trellis decoder and Viterbi decoder.

7. Understand and implement the concept of cryptography and various Algorithms.

8.   Perform mathematical analysis of problems in Information Theory and Coding,

   Implementation and verification in Programming Language c/c++

Syllabus:

UNIT I   **9HRS**
Introduction of Information Theory, Introduction, Measure of information, Mark off statistical model for information source, Entropy, and information rate of mark off source. Mutual Information, Conditional and Joint Entropy.

UNIT II   **9HRS**
Source Coding: Encoding of the source output, Shannon's encoding algorithm, Communication Channels, Discrete communication channels, Continuous channels. Fundamental Limits on Performance: Source coding theorem, Huffman coding, Discrete memory less Channels, Channel Capacity.

UNIT III   **9HRS**
Channel: Channel coding theorem, Differential entropy and mutual information for continuous ensembles, Channel capacity Theorem Introduction. Introduction to Error Control Coding: Types of

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE321M	DSC	**Fundamentals of Information Theory and Coding**	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

errors, examples, Types of codes Linear Block Codes: Matrix description, Error detection and correction, Standard arrays and table look up for decoding.

UNIT IV   8HRS
Cyclic Codes Binary Cycle Codes, Algebraic structures of cyclic codes, Encoding using an (n-k) bit shift register, Syndrome calculation. BCH codes. RS codes, Golay codes, shortened cyclic codes, Burst error correcting codes. Burst and Random Error correcting codes. Convolution Codes: Convolution Codes, Time domain approach. Transform domain approach.

UNIT V   7HRS
Introduction to Cryptography: Symmetric Key and Asymmetric Key Cryptography, known Algorithms: DES, IDEA, PGP, RSA.

Text Books:
1. R. Bose, Information theory, coding and cryptography, McGraw-Hill, 3rd Edition, 2016.

References:
W. Stallings, Cryptography and Network Security: Principles and Practice, 4th Edition, Prentice Hall, 2006.
2.B. Schneier, Applied Cryptography: Protocols, Algorithms and Source Code in C, John Wiley & Sons, 2nd Edition, 1995.
3.Digital Communications Glover and Grant, Pearson Ed. 2nd Ed 2008.
 4.Information Theory and Coding, K. N. Hari Bhat, D. Ganesh Rao, Cengage, 2017.
5. Digital and analog communication systems, K. Sam Shanmugam, Wiley,1996.
6. Digital communication, Simon Haykin, Wiley, 2003.

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	**Vishwavidyalaya, Indore**

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE321M	DSC	Fundamentals of Information Theory and Coding	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested list of Practicals:-

Implement the following encoding algorithms using C/C++ programming Languages.
1. Source Coding Theorem -Lempel-Ziv etc.
2. Shannon's Encoding Algorithm.
3. Huffman Coding Algorithms.
4. channel coding theorem.
5. Error Control Coding.
6. Error Detection and Correction code.
7. Linear Code and Block Code.
8. Binary Cyclic code.
9. BCH, RH, Cyclic Codes.
10. Apply cryptography concept to implement program to convert plain text to another form.
11. Implement various Algorithms DES, RSA, IDEA etc.

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE322M	DSC	**Principle of Programming Language**	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The student will have ability to:
1. Understanding the fundamental concepts of E-Commerce.
2. Understand structured E-Payment Systems.
3. Understand e-Readiness & Ecommerce Security.
4. Knowledge of basic Security of E-Commerce.
5. Understand E-Governance& Models.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to:
5. Students will understand basics E-Commerce & E-Governance.
6. Students would be able to analyze the concept of electronic market and market place
7. Students will understand e-Readiness&Ecommerce Security.
8. Understand the e-business concepts, models and infrastructure.
9. Willcome up with online business ideas and will be motivated to apply what they learned
10. Students would be able to understand the legal and security issues.
11. Learn how e-business concepts are applied to different fields, such as: education, banking, tourism etc.

Syllabus:

UNIT I   **10HRS**
Introduction To E-Commerce: The Scope of E-Commerce, Commercial Use Of The Internet, Emergence of World Wide Web, Electronic Data Exchange-Business, E-Commerce In India, E-

Chairperson

Board of Studies

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

Chairperson

Faculty of Studies

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

Joint Registrar

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
B.Tech (CSE - Big Data and Cloud Engineering - Impetus Technologies)
Choice Based Credit System (CBCS)-2024-28
SEMESTER-III

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE322M	DSC	Principle of Programming Language	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Commerce Opportunities For Industries, B2C,B2B,C2C,C2B Models, Advantages and Disadvantages of E-Commerce.

UNIT II   9HRS
Electronic Payments Overview of Electronics payments, Overview, The SET protocol, Payment Gateway, Digital Token based Electronics payment System, magnetic strip card, E-Checks,Smart Cards, Credit Card, Debit Card based EPS, Emerging financial Instruments, Home Banking, Online Banking.

UNIT III8HRS
E-readiness, e-government readiness, e-Framework, step & issues, application of data warehousing and data mining in e-government, e-Advertising Techniques: Banners, Sponsorships, Portals, Online Coupons, Case studies: NICNET-role of nationwide networking in e-governance, E-seva

UNIT IV   7HRS
E-Commerce Security: Security on the internet, E-commerce security issues, Cryptography, Digital Signature & Authentication protocol, Digital Certificates. Online Security Challenges and approach to e-government security, security for server computers, communication channel security, security for client computers.Information security environment in India.

UNIT V   8HRS
E-Government, theoretical background of e-governance, issues in e-governance applications, evolution of e-governance, its scope and content, benefits and reasons for the introduction of e-governance, e-governance models- broadcasting, critical flow, comparative analysis, mobilization and lobbying, interactive services / G2C2G.

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya
Shri Vaishnav Institute Of Information Technology
B.Tech (CSE - Big Data and Cloud Engineering - Impetus Technologies)
Choice Based Credit System (CBCS)-2024-28
SEMESTER-III

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE322M	DSC	Principle of Programming Language	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Text Books:
1. V. Rajaraman, "Essentials of E-Commerce Technology", PHI Learning Private Limited

References:.
1. Gary P. Schneider, "E-commerce", Cengage Learning India. 9th Edition
2. Hanson and Kalyanam, "E-Commerce and Web Marketing", Cengage Learning.
3. P.T. Joseph, "E-Commerce An Indian Perspective", PHI Learning Private Limited.
4. J. Satyanarayan, "E-government: The science of the possible", PHI Learning Private Limited.
5. David Whiteley, "E-commerce study, technology and applications", TMH.
6. C.S.R. Prabhu, "E-governence: concept and case study", PHI Learning Private Limited.

Suggested list of Practicals:-
In order to understand the concepts of different programming languages, students must implement various programming components in C/C++/Java/Python, such as data structures, conditional statements, functions, and OOPs concepts.

Program No 1:Examine name and scope.
- static variables in 'C'
- call resolution in Java.

Program No 2: Examine garbage and memory leak in C
Develop a mechanism to avoid /detect memory leak.

Program No 3: Examine assignment operation
- assignment of arrays in Java
- assignment of lists in Python
- assignment of structures in C

Program No 4:   Examine goto statement
- scope of goto in 'c'
- jump into/out of the block
- non-local goto.

Program No 5: Examine callbacks
- callbacks in C

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore

COURSE CODE	CATEG ORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE322M	DSC	**Principle of Programming Language**	60	20	20	30	20	2	0	2	**3**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
*****Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

- interface and inner classes in Java.

Program No 6: Examine closure

- in python
- in C

Program No7: Examine functions.

- Variable# of args in C
- Variable #of args in Java
- Variable # of args in Python

Program No 8: Examine functions

- tail recursion
- keyword parameter in python
- stack smashing in 'C'

Program No 9: Examine Generics

Lists-linked lists ,Array lists

Sets-hash set

- Pre set
- Link hash set
- Map

Program No 11: Examine Inheritance

- overide in Java
- Final in Java
- Multiple inheritance in python
- Downcasting in Java

Program No 12: Examine Java thread model / pthread / Python.

- racing
- synchronization
- interthread communication
- Thread local storage.

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE323M	DSC	**Modern Computing Hardware**	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

1. To learn the concept of memory and its types along with HDD/SDD.
2. To learn the input/output components presents on themotherboard.
3. To learn different modes of power supply to the PC and it'stroubleshooting.
4. To learn the concept of BIOS.
5. To learn the device drivers and peripherals attached to the PCboard.

Course Outcomes (COs):

Upon completion of the course, students will be able:
1. To understand the hierarchy of the Memory used for PC and itsapplications.
2. To understand the use and working of I/Ocomponents.
3. To understand the principles behind the power supply and itsusage.
4. To understand the BIOS concept and its configuration.
5. To understand the use and requirement of peripherals and their devicedrivers.

Syllabus:

UNITI   **8 HRS**
Hardware Organization: Motherboards, Chipset and Controllers, Types of processors (Intel Core i3/ i5 /i7 /i9 & AMD) and their compatibility with motherboards, USB Ports, HDMI, DVI, Interconnection between units, Graphic cards.

UNIT II   **6HRS**
Memory& Storage Devices: Introduction to memory, classification of Memory and its use, Overview Memory chips and Modules, and its working principle and Trouble shooting of Memory.DVD & Blue-Ray Disk, Hard Disk Drives, Solid-State Drives, USB Flash Drives.

UNIT III   **4 HRS**

Chairperson	Chairperson	Joint Registrar
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE323M	DSC	**Modern Computing Hardware**	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Power Supply: Working of SMPS, On-Line/Off-Line/Line-Interactive/uninterrupted power supplies (UPS), CMOS, Lithium-ion battery, basic principle of working their importance and maintenance.

UNIT IV   **4 HRS**
Basic Input/output System: Concept of BIOS. Function of BIOS, software interrupts,testing and initialization, configuring the system.

UNIT V   **6 HRS**
Peripherals &Device Drivers: Input devices: Wireless Keyboard & Mouse, Light-Pen, Touch Screen, HD web camera, Barcode Reader, Output devices: Touch Screen Monitor, 3D Printer, Projector, Software drivers for various devices and their role.

TextBooks:
1. Craig Zacker& John Rourtre, PC Hardware- The complete reference, First Edition, TMH, 2017

References:
1. Stephen Bigelow, Bigelow's Troubleshooting, Maintaining & Repairing PCs, 5 edition, McGraw Hill Education, 2017
2. Vikas Gupta, Comdex Hardware and Networking Course Kit: Revised & Upgraded, Dreamtech Press,2014
3. Dan Gookin, Troubleshooting and Maintaining Your PC All–in–One For Dummies, 3rd edition, John Wiley & Sons,2017
4. Robert Bruce Thompson, Barbara Fritchman Thompson, Building the Perfect PC, 3 edition, O'Reilly,2010
5. B. Govindarajalu, IBM PC and CLONES: Hardware, Troubleshooting and Maintenance McGraw Hill Education, 2nd Edition2002.
6. 2. Mike Meyers, Introduction to PC Hardware and Troubleshooting, 1st edition, McGraw Hill Education,2017

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE323M	DSC	**Modern Computing Hardware**	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested list of Practicals:-
Note :-Students will prepare and give seminar (presentation) on assigned topic for evaluation .

1. Hardware Organization:
   - Assembling and disassembling a desktop computer.
   - Identifying major components on a motherboard (CPU socket, RAM slots, expansion slots, etc.).
   - Understanding different form factors (ATX, micro-ATX, mini-ITX) and their implications.

2. Memory and Storage Devices:
   - Installing RAM modules onto the motherboard.
   - Demonstrating the concept of virtual memory by adjusting page file settings in the operating system.
   - Installing and formatting various types of storage devices (HDD, SSD) and comparing their performance.

3. Power Supply:
   - Understanding power supply unit (PSU) ratings and connectors.
   - Testing the output voltage of a power supply unit using a multimeter.
   - Troubleshooting common power supply issues like voltage fluctuations or overheating.

4. Input Output System:
   - Exploring BIOS/UEFI settings and performing basic configurations (boot order, date/time settings, etc.).
   - Updating BIOS/UEFI firmware.
   - Understanding the role of BIOS/UEFI in system initialization and hardware detection.

5. Peripherals and Device Drivers:
   - Installing and configuring peripheral devices (printers, scanners, webcams, etc.).

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTDSE323M	DSC	**Modern Computing Hardware**	60	20	20	30	20	2	0	2	3

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

- Updating device drivers for improved compatibility and performance.
  - Troubleshooting common peripheral device issues (driver conflicts, connectivity issues, etc.).

6. Troubleshooting and Maintenance:
   - Identifying and replacing faulty hardware components (RAM, CPU, GPU, etc.).
   - Using diagnostic tools (e.g., memtest86) to diagnose memory issues.
   - Performing routine maintenance tasks such as cleaning dust from fans and heat sinks.

7. Exploring and Understanding of CPU
   - Types of processor.

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT301N	DCC	**Computer Networks**	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):
The student will have ability to:

1.Understand the general overview of the concepts and fundamentals of computer networks.
2.Understand the various components required to build different networks.
3.Familiarize the students with the standard models for the layered approach to communication between machines in a network and the protocols of the various layers.

Course Outcomes (COs):
After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.
The students will be able to
1. Understanding basic computer network technology.
2. Understand the functions of each layer in the OSI and TCP/IP reference model.
3. Obtain the skills of subnetting and routing mechanisms
4. Familiarity with the essential protocols of computer networks, and how they can be applied in network design and implementation.

Syllabus:
UNIT I   **9HRS**
Introduction: Importance of Computer Networks, Classifications & Types. Layered Architecture: Protocol hierarchy, Interfaces and Services, Connection Oriented &Connection less Services, ISO- OSI Reference Model, TCP/IP model overview, comparison of TCP/IP and ISO-OSI reference model.

UNIT II   **9HRS**
Data Link Layer &MAC Sublayer: Need, Services Provided, Design issues, Elementary data link protocols: simplex protocol, A simplex stop and wait protocol for an error-free channel, A simplex stop and wait protocol for noisy channel. Sliding Window protocols: A one-bit sliding window protocol, A protocol using Go-Back-N, A protocol using Selective Repeat, MAC Addressing, Binary Exponential

Chairperson	Chairperson	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTIT301N	**DCC**	**Computer Networks**	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Back-off (BEB) Algorithm, Distributed Random Access Schemes/Contention Schemes: for Data Services (ALOHA and Slotted- ALOHA), CSMA, CSMA/CA, CSMA/CD.

UNIT III   **9HRS**
Network Layer:Need, Services Provided, Design Issues, Routing Algorithms and types of Routing Algorithm, IPv4, IPv6, Classful and classless Addressing, Subnetting, Supernetting.

UNIT IV   **10HRS**
Transport Layer: Need, Design Issues, Multiplexing and Demultiplexing, transport layer services, UDP,UDP Header Format, Principles of reliable data transfer, TCP,Connection Management, TCP Flow Control, TCP Congestion Control, TCP Header Format, TCP Timer Management, SCTP.

UNIT V   **8HRS**
Session layer: Overview, Authentication, Session layer protocols, Presentation layer: Overview, Data conversion, Encryption and Decryption, Presentation layer protocols (LPP, Telnet, X.25 packet Assembler/Disassembler), Application Layer: Domain name system, SNMP, Electronic Mail; the World WEB, HTTP, FTP.

Text Books:

Andrew S Tanenbaum, Computer Networks, 6th Edition, Pearson Education, 2016.

References:
1.BehrouzA.Forouzan, TCP/IP-Protocol suite, 4th edition, McGraw-Hill, 2010.
2.William Stallings, Data and Computer Communication, 10th edition Pearson, 2014.
3. Comer, Internet working with TCP/IP Volume one, Addison-Wesley, 2015.
4. W. Richard Stevens, TCP/IP Illustrated, Volume 1, 2nd Edition Addison-Wesley Professional Computing Series.

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTIT301N	DCC	**Computer Networks**	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Suggested list of Practical:-

1. Demonstrate Different Types of Network Equipment's.
2. Color coding standard of CAT 5, 6, 7 and crimping of cable in RJ-45.
3. LAN installations and Configurations.
4. Experiment with basic Network configuration commands.
5. Write a program for error detection and correction technique.
6. Write a program for framing.
7. Write a program for routing algorithm.
8. Socket Programming.
9. Study about different network simulators.
10. Establish and simulate peer to peer network using packet tracer.
11. Simulate LAN using hub and switch and discuss pros and cons of hub.
12. Router configuration using packet tracer.

Chairperson

Board of Studies

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

Chairperson

Faculty of Studies

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

Joint Registrar

Shri Vaishnav Vidyapeeth

Vishwavidyalaya, Indore

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTIT307N	SEC	**Introduction to core JAVA**	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The student will have ability to:
1. Understand Java Environment for application development.
2. Understand Programing using Object Oriented Technology.
3. Develop computer program to solve specific problems with high performance.
4. Create debug and run java standalone applications.
5. Understand the concept of Exception handling and Multithreading.

Course Outcomes (COs):

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes.

The students will be able to

1. Design new applications using object oriented methodologies.
2. Explore various system libraries.
3. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages.
4. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes..
5. Design Data base connectivity program for simple problems.

Syllabus:

UNIT I   **12HRS**
Introduction to Java: Java's magic, The Byte code,Java Development Kit (JDK), Java Buzzwords, Object oriented programming, Simple Java programs, Data types, variables and arrays, Operators, Control Statements.

Chairperson	Chairperson	Joint Registrar
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTIT307N	SEC	**Introduction to core JAVA**	0	0	0	30	20	0	0	2	**1**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical;   **C** - Credit;
*__Teacher Assessment__ shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT II   **8HRS**
Classes, Inheritance, Packages and Interfaces: Classes: Classes fundamentals, Declaring objects, Constructors, this keyword, garbage collection. Inheritance: inheritance basics, using super, creating multi level hierarchy, method overriding. Packages, Access Protection, Importing Packages, Interfaces.

UNIT III   **7HRS**
 Exceptions handling and Multi threading: Exception , Exceptions and Errors ,Types of Exception, Control Flow in Exceptions, Use of Try, Catch, Finally, Throw, Throws in Exception Handling, In-Built and User Defined Exceptions, Checked and Un Checked Exceptions.

UNIT IV   **8HRS**
Understanding Threads, Needs of Multi-Threaded Programming ,Thread Life Cycle, Thread Priorities ,Synchronizing Threads,

UNIT V   **8HRS**
The Java Library: String Handling, Exploring Java. Lang, Java.Util – The Collection Framework, Exploring Java.IO.

Text Books:
   1. E. Balagurusamy, "Programming with java A Primer", Fourth Edition, Tata McGraw Hill, 2009
References:
   2. Java How to Program, Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
   3. Introduction to Java programming, By Y.DanielLiang,Pearson Publication.
   4. SouravSahay, Object Oriented Programming with C++ , Oxford University Press,2006
   5. Herbert Schildt, "The Complete Reference Java", Ninth Edition, McGraw Hill, 2014
   6. Bert Bates, Kathy Sierra, "Head First Java", 2nd Edition, O' Reilly, 2005

Suggested list of Practical:-
   1. Write a program to show concept of Class in Java.
   2. Write a program showing Type Casting

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	**Faculty of Studies**	**Shri Vaishnav Vidyapeeth**
Shri Vaishnav Vidyapeeth	**Shri Vaishnav Vidyapeeth**	**Vishwavidyalaya, Indore**
Vishwavidyalaya, Indore	**Vishwavidyalaya, Indore**	

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTIT307N	SEC	**Introduction to core JAVA**	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

3. Write a program showing Different type of inheritance
4. Write a program showing Different types of Polymorphism
5. Write a program showing Encapsulation
6. Write a program showing Abstraction
7. Write a program showing interface.
8. Write a program showing abstract class.
9. Write a program showing inner class.
10. Write a Multithreaded program .
11. Write a program showing Checked and Unchecked Exception.

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	

Chairperson	**Chairperson**	**Joint Registrar**
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore