Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Information Technology
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech Computer Science and Engineering-Mobile Applications-Apple Authorized Training Center
SEMESTER-II (2021-2025)

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMACS 201	BS	Mathematics - II	60	20	20	--	--	3	1	0	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
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Course Educational Objectives (CEOs):

The student will have ability to:

1. To introduce the students with the Fundamentals of the Calculus of Matrices, Differential Equations, Numerical Analysis and Statistics.

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. Understand and apply the basics of the calculus of matrices.
2. Solve the fundamental problems of the ordinary differential equations.
3. Apply the advanced techniques to find the solution of the ordinary differential equations.
4. Know the techniques of the numerical analysis.
5. Find the numerical solution of the ODE.
6. Understand and apply the basics of the statistical methods.

Syllabus:

UNIT I **10HRS**

Calculus of Matrices

Systems of linear equations and their solutions. Matrices, determinants, rank and inverse. Linear transformations. Range space and rank, null space and nullity. Eigen values and eigen vectors. Similarity transformations. Diagonalization of Hermitian matrices.

UNIT II **9 HRS**

Differential Equation

Ordinary Differential Equations: First order linear and nonlinear ordinary differential equations, exactness and integrating factors. Ordinary linear differential equations of n-th

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BTMACS 201	BS	Mathematics - II	60	20	20	--	--	3	1	0	4

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order, solutions of homogeneous and non-homogeneous equations. Operator method. Method of undetermined coefficients and variation of parameters.

UNIT III **8 HRS**

Numerical Analysis

Interpolation and Curve Fitting: Introduction to Interpolation; Calculus of Finite Differences; Finite Difference and Divided Difference Tables; Newton-Gregory Polynomial Form; Lagrange Polynomial Interpolation; Approximation by Least Square Method.

Numerical Differentiation and Integration: Discrete Approximation of Derivatives: Forward and Backward Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule.

UNIT IV **7 HRS**

Numerical Solution of ODE: Euler's Method for Numerical Solution of ODE; Modified Euler's Method; Runge-Kutta Method (RK2, RK4); Multistep Method: Predictor-Corrector method.

UNIT V **8 HRS**

Probability Theory and Random Process

Axiomatic construction of the theory of probability, independence, conditional probability, and basic formulae, random variables, binomial, Poisson and normal random variable, probability distributions, functions of random variables; mathematical expectations, Definition and classification of random processes, discrete-time Markov chains

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BTMACS 201	BS	Mathematics - II	60	20	20	--	--	3	1	0	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.

Text Books:

1. G. Strang, Linear Algebra And Its Applications, 4th Edition, Brooks/Cole, 2006
2. S. L. Ross, Differential Equations, 3rd Edition, Wiley, 1984.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall, 1995.
4. W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 7th Edition, Wiley, 2001.
5. E, K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).
6. S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill, 2005.
7. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi

References:

1. E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley,1999.
3. J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
4. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.
5. J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw Hill, 2001.
6. M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi,2004.
7. S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw Hill2008.

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HUCS101	SEC	Communication Skills	60	20	20	30	20	1	0	2	2

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Course Educational Objectives (CEOs):

1. Develop the second language learners 'ability to enhance and demonstrate LSRW Skills.
2. Enable students to acquire English Language Skills to further their studies at advanced levels.
3. Prepare students to become more confident and active participants in all aspects of their under graduate programs

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. Enhance confidence in their ability to read, comprehend, organize, and retain written in formation.
2. Write grammatically correct sentences for various forms of written communication to express oneself.

Syllabus:

UNIT I **10HRS**

Communication: Nature, Meaning, Definition, Verbal and Non Verbal Communication Barriers to Communication.

UNIT II **9HRS**

Basic Language Skills: Grammar and usage- Parts of Speech, Tenses, S-V Agreement, Preposition, Article.

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Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

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HUCS101	SEC	Communication Skills	60	20	20	30	20	1	0	2	2

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UNIT III **8HRS**

Basic Language Skills: Types of Sentence, Direct - Indirect, Active - Passive voice, Phrases& Clauses.

UNIT IV **7HRS**

Business Correspondence: Business Letter, Parts & Layouts of Business Resume and Job application, E-mail writing.

UNIT V **8HRS**

Report Writing: Importance of Report, Types of Report, Structure of a Report.

List of Practical's:

1. Self Introduction
2. Reading Skills and Listening Skills
3. Oral Presentation
4. Linguistics and Phonetics
5. JAM (Just a Minute)
6. Group Discussion

Suggested Readings:

1. Ashraf Rizvi.(2005). Effective Technical Communication. New Delhi:Tata McGrawHill
2. Adair, John (2003). Effective Communication. London: Pan Macmillan Ltd.
3. A.J.ThomsonandA.V.Martinet(1991).APracticalEnglishGrammar(4thed).Newyork:Ox-ford IBH Pub.
4. Kratz, Abby Robinson (1995). Effective Listening Skills. Toronto: ON: Irwin Professional Publishing.
5. Prasad, H. M.(2001) How to Prepare for Group Discussion and Interview. New Delhi: Tata McGraw-Hill.
6. Pease, Allan. (1998).Body Language. Delhi: Sudha Publications.

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BTCS201N	DCC	Data Structure & Algorithms	60	20	20	30	20	3	1	2	5

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Course Educational Objectives (CEOs):

The student will have ability to:

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.

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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.

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 **8HRS**

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.

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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.

UNIT V **8HRS**
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.
3. Bhagat Singh & Thomas Naps, "Introduction to Data structure", 2nd Edition, Tata Mc-GrawHill 2009.
4. Robert Kruse, "Data Structures and Program Design",2nd Edition,PHI,1997.
5. Lipschutz Seymour,"Data structures with C" ,1st Edition ,Mc- GrawHill,2017.

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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.

List of Practical:

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.
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

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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.

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BTCS202N	DCC	Object Oriented Programming	60	20	20	30	20	2	0	2	3

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Course Educational Objectives (CEOs):

The student will have ability to:

1. To explain abstract data types, classes and different types of objects.
2. To analyze the public, protected and private modes of inheriting the classes.
3. To demonstrate the overloading of functions and operators to grant them a different meaning.
4. To provide complete knowledge of Object Oriented Programming through C++ and to enhance the programming skills of the students by giving practical assignments to be done in labs.

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. Identify and describe the components of object-oriented technology and justify their relevance.
2. Implement inheritance for code reusability and polymorphism.
3. Implement object oriented approach for real world scenarios.
4. Use advance features like temples and exception to make programs supporting reusability and sophistication
5. Develop the applications using object oriented programming with C++.

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Syllabus

Unit-I **10HRS**

Concepts of OOP: Introduction OOP, Procedural vs. Object Oriented Programming, Principles of OOP, Benefits and applications of OOP. C++ Basic Overview, Program structure, namespace, identifiers, variables, constants, enum, operators, typecasting, control structures.

Unit-II **9HRS**

C++ Functions: The Main Function, Function prototyping, Simple functions, Call and Return by reference, Inline functions, Macro Vs. Inline functions, Overloading of functions, default arguments.

Unit-III **8HRS**

Objects and Classes: Basics of object and class in C++, Private and public members, static data and function members, constructors and their types, destructors, operator overloading, friend function.
Inheritance: Concept of Inheritance, types of inheritance, access modifiers, overriding, virtual base class.

Unit-IV **7HRS**

Polymorphism: Polymorphism and its types, Pointers in C++, Pointes and Objects, this pointer, virtual and pure virtual functions, Implementing polymorphism, Abstract Methods and Classes.
Exception Handling, Templates function and class in C++

Unit-V **8HRS**

I/O and File management: Concept of Streams, Cin and Cout Objects, C++ Stream Classes, Unformatted and Formatted I/O, Manipulators, File Stream, C++ File Stream Classes, File Management Functions, File Modes, Binary and Random Files.

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Text Books:

1. David Parsons; Object oriented programming with C++; Second edition; BPB publication; 1997.
2. Robert Lafore; Object oriented programming in C++ ; Fourth edition ; Pearson publication;2002 .
3. E Balagurusamy; Object oriented programming with C++; Seven edition; TMH; 2017.
4. Herbert Schildt ; Java Complete Reference;Seven edition; McGrawHill; 2006 .

References:

1. John R Hubbard; Programming in C++ (Schaum); Third edition; TMH; 2000.
2. Venugopal; Mastering C++ ; second edition ;TMH; 2006.
3. Steven Holzner; C++ Programming Black Book; First Edition; Coriolis Group,U.S;2001.
4. E Balagurusamy; Programming with java a primer; Fourth edition; TMH ; 2011.

List of Experiments:

1. Write a program to display the following output using a single cout statement. Maths=90, Physics=74, Chemistry=76
2. Write a program to read 2 numbers from the keyboard and display the larger value on the screen.
3. Write a function using reference variables as arguments to swap the values of a pair of integers.
4. Write a macro that obtains the largest of 3 numbers.

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BTCS202N	DCC	Object Oriented Programming	60	20	20	30	20	2	0	2	3

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5. Define a class to represent a bank account. Include the following members:
   Data members
   1. Name of the depositor
   2. Account number
   3. Type of account
   4. Balance amount in the account

   Member functions
   1. To assign initial values
   2. To deposit an amount
   3. To withdraw an amount after checking the balance
   4. To display name and balance

   Write a main program to test the program.
6. Create two classes DM and DB which store the value of distances. DM stores distances in meters and centimeters and DB in feet and inches. Write a program that can read values for the class objects and odd one object of DM with another object of DB.

   Use a friend function to carry out the addition operation. The object that stores the results may be a DM object or DB object, depending on the units in which the result are required. The display should be in the format of feet and inches or meters and centimeters depending on the object on display.
7. Design a constructor for bank account class.
8. A book shop maintains the inventory of books that are being sold at the shop. The list includes details such as author, title, price, publisher and stock position. Whenever a customer wants a book, the sales person inputs the title and author and the system searches the list and displays whether it is available or not. If it is not, an appropriate message is displayed. If it is, then the system displays the book details and requests for the number of copies required. If the requested copies book details and requests for the number of copies

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required. If the requested copies are available, the total cost of the requested copies is displayed; otherwise the message "Required copies not in stock" is displayed.

Design a system using a class called books with suitable member functions and Constructors. Use new operator in constructors to allocate memory space required.

9. Improve the system design in exercise 8 to incorporate the following features:
   (a) The price of the books should be updated as and when required. Use a private meneber function to implement this.
   (b) The stock value of each book should be automatically updated as soon as a transaction is completed.
   (c) The number of successful transactions should be recorded for the purpose of statistical analysis. Use static data members to keep count of transaction.
10. Design a C++ Class 'Complex' with data members for real and imaginary part. Provide default and parameterized constructors. Write a program to perform arithmetic operations of two complex numbers using operator overloading (using either member functions or friend functions).
11. Assume that a bank maintains two kinds of accounts for customers, one called as savings account and the other as current account. The savings account provides compound interest and withdrawal facilities but no cheque book facility. The current account provides cheque book facility but no interest. Current account holders should also maintain a minimum balance and if the balance falls below this level, a service charge is imposed. Create a class account that stores customer name, account number and type of account. From this derive the classes cur*acct and sav*acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:

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a. Accept deposit from a costumer and update the balance.
b. Display the balance
c. Compute and deposit interest.
d. Permit withdrawal and update the balance.
e. Check for the minimum balance, impose penalty, necessary and update balance.

12. Create a base class shape. Use this class to store two double type values that could be used to compute area of figures. Derive two specific classes called triangle and rectangle from the base shape. Add to the base a member function getdata() to initialize base class data member and another member function display_area() to compute and display the area of figures. Make display_area() as a virtual function and redefine it the derived class to suit their requirements.

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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):

Upon completion of the subject, 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.

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Syllabus:

UNIT I

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 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

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

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

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Deadlock Handling, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock Detection, Recovery from Deadlock.

UNIT IV

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).

UNIT V

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.

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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
3. Dhananjay M. Dhamdhere, "Operating Systems:A concept Based Approach", 3rd Edition TMH, 2017,
4. SibsankarHaldar, Alex AlagarsamyAravind,"Operating System", 8th Edition, Pearson Education India,, 2010

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 , TataMc-Graw Hill Education, edition 2017.

List of Practical:

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

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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.
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.

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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.

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BTIT204N	DCC	Principle of Programming Language	60	20	20	--	--	3	0	0	3

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Course Educational Objectives (CEOs):

The student will have ability to:

1. To improve the background for choosing appropriate programming languages for certain classes of programming problems.
2. To be able in principle to program in an imperative (or procedural), an object-oriented, a functional, and a logical programming language.
3. To understand the significance of an implementation of a programming language in a compiler or interpreter
4. To Increase the ability to learn new programming languages
5. To Increase the capacity to express programming concepts and choose among alternative ways to express things.

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. Students will gain insight and develop understanding to the underlying principles and concepts of programming languages. Also Gain an overview of programming language translation process.
2. Students will be able to competent with analyzing programming language design issues related to data types, expressions and control structures.
3. Students will be able to describe the concept of sub-programming with the help of Functions. Also develop understanding with the parameter passing techniques and concept of function overloading.
4. Students will be able to analyze various memory management techniques as well as apply various concepts of object oriented programming.

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5. Students will be able to develop understanding with the exception handling concept and gain knowledge of logical and functional programming.

Syllabus

UNIT I **Preliminary Concepts:** Reasons for Studying, Concepts of Programming Languages, Programming Domains, Language Evaluation Criteria, Influences on Language Design, Language Categories, Programming Paradigms – Imperative, Object Oriented, Functional Programming , Logic Programming. **8HRS**

UNIT II **Data Types:** Introduction, Primitive, Character, User Defined, Record, Union, Pointer and Reference Types, Design and Implementation Uses Related to these Types. Names, Variable, Concept of Binding **8HRS**

UNIT III **Expressions and Statements:** Arithmetic Relational and Boolean Expressions, Short Circuit Evaluation Mixed Mode Assignment, Assignment Statements, Control Structures **8HRS**

UNIT IV **Subprograms and Blocks:** Fundamentals of Sub-Programs, Scope and Lifetime of Variable, Static and Dynamic Scope, Design Issues of Subprograms and Operations, Local Referencing Environments, Parameter Passing Methods, Overloaded Sub-Programs, Generic Sub-Programs. **8HRS**

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UNIT V **Abstract Data Types:** Abstractions and Encapsulation, Introductions to Data Abstraction, Static and Stack Based Storage Management. Heap Based Storage Management. Garbage Collection. Object Oriented Programming in Smalltalk, C++, Java, C#, Php, Perl. **8HRS**

Text Books:

1. Robert .W. Sebesta “Concepts of Programming Languages”, 10th Edition, Pearson Education, 2008.
2. D. A. Watt, “Programming Language Design Concepts, Wiley dreamtech, rp-2007.
3. Louden and Lambart,“Programming Languages: Principles and Practices”, 3rd Edition, Cengage Learning, 2011

References:

1. Gabbrielli and Martini “Programming Languages: Principles and Paradigms., Springer, 2010.
2. Peter Sestoft, “Programming Language Concepts”, Springer, 2017.
3. A.B. Tucker, R.E. Noonan, “Programming Languages”, 2nd Edition, Tata McGraw Hill.
4. Terrance W Pratt, "Programming Languages: Design and Implementation" Pearson Education.

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Course Educational Objectives (CEOs):
The student will have ability to:
1. To introduce functions, Closures and Class in Swift Language.
2. Understand the Object oriented and Procedure oriented concepts of Swift.
3. Learn the Concepts of Inheritance, Enumerations and Initializes in Swift.
4. To provide knowledge of class and Structures for Mobile app development.

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. Understand the functions, Closures and Class used in Swift programming Language.
2. Proficient in using the the Object oriented and Procedure oriented concepts of Swift, to develop program.
3. Apply the Knowledge Class and Structures for iOS App development.
4. Understand the fundamentals of Swift and be able to apply it in iOS app development.

Syllabus:
UNIT I
Functions: Defining and Calling Functions, Function Parameters and Return Values: Functions Without Return Values, Functions with Multiple Return Values, Optional Tuple Return Types
Function Argument Labels and Parameter Names: Specifying Argument Labels, Omitting Argument Labels, Default Parameter Values, Variadic Parameters, Function Types, Function Types as Parameter Types.

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UNIT II
Closures and Enumeration: Closure Expressions, Inferring Type From Context, Implicit Returns from Single-Expression Closures, Shorthand Argument Names, Operator Methods, Trailing Closures, Capturing Values, Escaping Closures. **Enumeration :** Enumeration , Enumeration with Switch Statement, Iterating Enumeration Cases , Associated Values, Raw Values, Recursive Enumerations.

UNIT III
Structures and Classes: Definition Syntax, Structure and Class Instances, Accessing Properties, Member wise, Initializers for Structure Types, Value types or Reference Types. Properties: Stored Properties, Lazy Stored Properties, Computed Properties, Property Observers. Global and Local Variables, Type Properties, Type Property Syntax, Querying and Setting Type Properties.

UNIT IV
Method and Inheritance: Methods, Instance Methods, self Property, Mutating Method, Type Methods Inheritance: Base Class,types of Inheritance, Subclassing, Overriding: Accessing Superclass Methods, Properties, and Subscripts, Overriding Methods, Overriding Properties, Overriding Property Getters and Setters, Preventing Overrides.

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UNIT V

Initializers: Initializers, Default Property Values, Customizing Initialization, Initialization Parameters, Parameter Names and Argument Labels, Initializer Parameters Without Argument Labels, Optional Property Types, Default Initializers, Initializer Delegation for Value Types, Class Inheritance and Initialization, Initializer Inheritance and Overriding, Automatic Initializer Inheritance, Failable Initializers, Failable Initializers for Enumerations, Overriding a Failable Initializer.

Text Books:

1. Matthew Mathias, John Gallagher, Swift Programming: The Big Nerd Ranch Guide 2nd edition, 2015.
2. Matt Neuberg, iOS 12 Programming Fundamentals with Swift, OReilly; 5th edition.
3. App Development with Swift (as available on iBook Store).

Reference Books:

1. Paris Buttfield-Addison, Jonathon Manning , Tim Nugent Learning Swift: Building Apps for macOS, iOS, and Beyond, O'Reilly Media, Inc., 3rd ed, 2018.
2. Jon Hoffman, Mastering Swift 4, Packt Publishing Limited ,4th edition,2017.
3. Vandad Nahavandipoor. iOS 11 Swift Programming Cookbook, O'Reilly Media, 2017
4. S. Yamacli, Beginner's Guide to iOS 11 App Development Using Swift 4: Xcode, Swift and App Design Fundamentals,(1e), USA: CreateSpace Independent Publishing Platform, 2017.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Information Technology
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech Computer Science and Engineering-Mobile Applications-Apple Authorized Training Center
SEMESTER-II (2021-2025)

COURSE CODE	Category	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment *	END SEM University Exam	Teachers Assessment *				
BTCSMOB201N	DCC	Mobile Application Development-II	---	---	---	90	60	0	2	4	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.

List of Practicals:

1. Programs to demonstrate function with and without return type and parameters.
2. Program to demonstrate function returning multiple values.
3. Program to demonstrate function returning optional tuple.
4. Programs to demonstrate function with and without argument label.
5. Program to demonstrate Closures.
6. Program to demonstrate Single-Expression Closures.
7. Program to demonstrate Shorthand Argument Names.
8. Program to demonstrate Trailing Closures.
9. Program to demonstrate Enumeration
10. Program to demonstrate with Switch case.
11. Program to demonstrate Enumeration Associated values, Raw Values.
12. Program to demonstrate Structure .
13. Program to demonstrate Properties, Member wise and Initializers for Structure Types.
14. Programs to demonstrate Stored Properties, Lazy Stored Properties, Computed Properties, and Property Observers.
15. Programs to demonstrate different types of Inheritance in Swift.
16. Programs to demonstrate Methods, Instance Methods, self Property and Mutating Method
17. Programs to demonstrate Accessing Super class Methods, Properties, Overriding Methods and Overriding Properties.
18. Programs to demonstrate Initializers, Default Property Values and Custom Initializers.
19. Programs to demonstrate Initializer Inheritance, Overriding and Automatic Initializer Inheritance.
20. Programs to demonstrate Failable Initializers, Failable Initializers for Enumerations and Overriding a Failable Initializer.