# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

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

**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 Objectives:**

**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:**

**After the successful completion of this course 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**

**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. Eigenvalues and eigenvectors.Similarity transformations.Diagonalization of Hermitian matrices.

**UNIT II**

**Differential Equation**

Ordinary Differential Equations: First order linear and nonlinear ordinary differential equations, exactness and integrating factors. Ordinary linear differential equations of n-th order, solutions of homogeneous and non-homogeneous equations.Operator method.Method of undetermined coefficients and variation of parameters.

**UNIT III**

**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.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

**UNIT IV**

**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**

**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.

**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.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | TEACHING & EVALUATION SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | THEORY | | PRACTICAL | | |
| | | | | | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* |
| **BTEC 104** | **UG** | **Digital Logic & Circuit Design** | **3** | **1** | **2** | **5** | **60** | **20** | **20** | **30** | **20** |

**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 Objectives:**

The objective of this course is to:

1. Use of Boolean algebra and Karnaugh Map to simplify logic function.
2. Describe the operation of different Combinational and Sequential Logic Circuits.

**Course Outcomes:**

After completion of this course the students will be able to:

1. Design an optimal digital logic circuit to meet the given specifications.
2. Evaluate the performance of the given digital logic circuit based on specific criteria for reliable system implementation.…

**Syllabus:**

**UNIT I**

**Number System & Codes:** Introduction to number systems, Binary numbers, Octal & Hexadecimal Numbers, Number base Conversion, Signed binary numbers : 1‟s Complement & 2‟s Complement representation and their arithmetic operation, Floating point representation, binary codes, BCD,ASCII, EBCDIC, Gray codes, Error detecting and Correcting codes, Hamming codes.

**UNIT II**

**Boolean algebra and Logic gates:** Introduction, Logic operations, Axioms and laws of Boolean algebra, Demorgan‟s theorem, Boolean functions, Canonical and standard forms. Logic gates and their applications, universal gates, NAND-NOR implementation of logic functions. Minimization techniques for logic functions-K-map, Tabular / QuineMcCluskey method.

**UNIT III**

**Combinational logic:** Arithmetic circuits- Half adder, Full adder, Halfsubtractor, Full subtractor, Parallel and Serial adder, BCD adder, Multiplexer, De-multiplexer, Encoder & Decoder.

**UNIT IV**

**Sequential logic:** Introduction, Latch and Flip Flop- S-R, D, JK and T, State diagram, characteristic equation, state table and excitation table, Flip flop conversion, applications of Flip flop, Counters, Registers.

**UNIT V**

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

**Semiconductor Memories and A/D and D/A converters:** Semiconductor Memory – RAM, ROM- Organization, operation and their Types, PLD- PAL, PLA, PROM, FPGA, Analog to Digital (A/D)and Digital to Analog (D/A) converters and their types.

**Text Books:**

1. M. Morris Mano,"Digital Logic and Computer Design", Pearson Education, 2016.
2. S Salivahanan and S Arivazhagan: Digital Circuits and Design,4th Edition, VikasPublishing House, 2012.

**Reference Books:**

1. A. Anand Kumar, "Fundamentals of Digital Circuits", 4th Edition, PHI,2016.
2. Floyd and Jain,"Digital Fundamentals", 10th Edition, Pearson Education India,2011.
3. Roland J.Tocci,Widmer,Moss, "Digital Systems Principles and Applications", 10th Edition, Pearson 2009.
4. Stephen Brown, ZvankoVranesic, "Fundamentals of Digital Logic Design", 3rd Edition, McGraw Hill, 2017.

**List of Practical's:**

1. To study and test of operation of all logic gates for various IC"s(IC7400,IC7403,IC408,IC74332,IC7486).
2. Verification of DeMorgan"s theorem.
3. To construct of half adder and fulladder.
4. To construct of half subtractor and full subtractor circuits.
5. Verification of versatility of NAND gate.
6. Verification of versatility of NOR gate.
7. Design a BCD to excess 3codeconverter.
8. Design a Multiplexer/Demultiplexer
9. Analysis of various flip flops with Preset and Clear capability.
10. Design of Johnson and Ring counter.
11. Design of synchronous and asynchronous up/down counters.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | TEACHING & EVALUATION SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | THEORY | | PRACTICAL | | |
| | | | | | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* |
| **BTCS403** | UG | **Data Structure and Algorithms** | **3** | **1** | **2** | **5** | **60** | **20** | **20** | **30** | **20** |

**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 Objectives:**

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:**

**Upon the completion of the course, 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**

**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**

**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**

**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**

**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**

**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.

**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.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

**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. Program for implementation of Bubble sort
11. Program for Insertion sort
12. Program for Merge Sort
13. Program to implement Heap sort
14. Program to implement Quick sort
15. Program to Construct a Binary Search Tree and perform deletion, inorder traversal on it
16. To develop an algorithm for binary tree operations and implement the same.
17. To design an algorithm for sequential search, implement and test it.
18. To develop an algorithm for binary search and perform the same.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | TEACHING & EVALUATION SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | THEORY | | PRACTICAL | | |
| | | | | | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* |
| **BTCS404** | **UG** | **Computer System Organization** | **3** | **1** | **-** | **4** | **60** | **20** | **20** | **-** | **-** |

**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 Objectives:**

1. Understand the architecture of a modern computer with its various processing units.
2. To impart knowledge on processor speed and processing of programs.
3. The performance measurement of the computer system.
4. To introduce hardware utilization methodology.
5. To impart knowledge in inter process communication.

**Course Outcomes:**

Upon the completion of the course, students will be able to:

1. Understand the architecture of modern computer.
2. Analyze the Performance of a computer using performance equation.
3. Understanding of different instruction types.
4. Understand how computer stores positive and negative numbers.

**Syllabus:**

**UNIT I**

**Introduction for basic model of computer**: Brief History of computers, Von Newman architecture, Computer components, CPU, Memory, I/O, System Bus, registers, Program Counter, Accumulator, Register Transfer Language, Instruction Cycle, Instruction formats and addressing modes of basic computer. Basic arithmetic operations: addition, subtraction, multiplication, division, floating point arithmetic.

**UNIT II**

**Control Unit Organization:** Control unit operations - Address Sequencing & Micro operations, Hardwired control unit, Micro and Nano programmed control unit, Control Memory, Micro Instruction formats, Micro program sequencer, Microprogramming.

**UNIT III**

**Input Output Organization:** I/O Systems, Modes of data transfer – program controlled, interrupt driven and direct memory access, Interrupt structures, I/O Interface, I/O processor, Introduction to 8085, 8085 I/O structure, 8085 instruction set and basic programming.

**UNIT IV**

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

**Memory organization:** Characteristics of Memory systems, Internal and External memories, Memory Hierarchy, High speed Memories: Cache Memory - Organization and mappings, Associative memory, Virtual memory: Segmentation, Paging, Address Translation Virtual to Physical.

Secondary Storage: Magnetic Disk, Tape, DAT, RAID, Optical memory, CDROM, DVD.

**UNIT V**

**Multiprocessors:** Multiprocessor organization, Instruction level pipelining and Superscalar Processors , Vector processing, Instruction and arithmetic pipelines, Vector and array processors, Interconnection structure and inter-processor communication, GPU.

**Text Books:**

1. Morris Mano, Computer System Architecture, Fourth edition, PHI, 2015.
2. Tanenbaum, Structured Computer Organization, First Edition, Pearson Education, 2016.
3. J P Hayes, Computer Architecture and Organizations, Third edition, Mc- Graw Hills, New Delhi, 2017

**References :**

1. Gaonkar, Microprocessor Architecture, Programming, Applications with 8085, fifth Edition, Prentice Hall, 2015.
2. William Stallings, Computer Organization and Architecture, Seventh Edition, PHI, 2009.
3. ISRD group, Computer Organization, Second edition, TMH, 2006.
4. Carter, Computer Architecture (Schaum), Third Edition, TMH, 2012.
5. Carl Hamacher, Computer Organization, Fifth Edition, TMH, 2002.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | TEACHING & EVALUATION SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | THEORY | | PRACTICAL | | |
| | | | | | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* |
| BTCS 305 | UG | Object Oriented Programming | 3 | - | - | 3 | 60 | 20 | 20 | - | - |

**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 OBJECTIVES**

1. To explain abstract data types, classes and different types ofobjects.
2. To distinguish among types of relationships between classes and express the associations diagrammatically.
3. To analyze the public, protected and private modes of inheriting theclasses.
4. To demonstrate the overloading of functions and operators to grant them a differentmeaning.

**COURSE OUTCOMES**

Upon completion of the course, students will be able to:

1. Identify and describe the components of object-oriented technology and justify theirrelevance.
2. Classify and model the relationships/associations that exist between classesandobjects.
3. Implement inheritance for code reusability and polymorphism.
4. Implement object oriented approachfor real world scenarios.

**UNIT–I**

**Introduction to OOP:** Abstract data types, Objects and classes, Attributes and Methods, Objects as software units, Encapsulation and Information hiding, Objects instantiations and interactions, Object lifetime, Static and dynamic objects, global and local objects, Metaclass, Modeling the real world objects.

**UNIT–II**

**Object and Classes:** Relationshipsbetween classes, Association of objects, Types of Association, Recursive Association, Multiplicities, Navigability, Namedassociation, Aggregation of objects. Types of Aggregation, Delegation, Modeling Association and Aggregation.

**UNIT–III**

**OOP Concepts :**Inheritance and Polymorphism, Types of Polymorphism, Static and Dynamic

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Polymorphism, Operator And Method Overloading, Inherited Methods, Redefined Methods, The Protected Interface, Abstract Methods and Classes, Public and Protected Properties, Private Operations, Multiple Inheritance**.**

**UNIT–IV**

**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.

**UNIT–V**

**C++/Java:** Exception Handling , TypeCasting ,Templates function and class in C++, Comparison Between C++ and Java, Features of Java ,Introduction to java, Inheritance, Interface and Abstract class in Java.

**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.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | TEACHING & EVALUATION SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | THEORY | | PRACTICAL | | |
| | | | | | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* |
| **BTCS 208** | **UG** | **Programming Skills with 'C++'** | **-** | **-** | **2** | **1** | **-** | **-** | **-** | **30** | **20** |

**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 Objectives:**

1. To explain abstract data types, classes and different types of objects.
2. To distinguish among types of relationships between classes and express the associations diagrammatically.
3. To analyze the public, protected and private modes of inheriting the classes.
4. To demonstrate the overloading of functions and operators to grant them a different meaning.
5. To formulate programs using the concepts of object oriented programming languages.

**Course Outcomes:**

Upon the completion of the course, students will be able to:

1. Identify and describe the components of object-oriented technology and justify their relevance.
2. Classify and model the relationships/associations that exist between classes and objects.
3. Perform experiments on inheritance by implementing code reusability and polymorphism by overloading the functions as well as operators.
4. Develop programs for real world scenarios using the object oriented approach.

**Syllabus**

**UNIT I**

**Object Oriented Programming:**

Concept of Object Oriented Programming - Data hiding, Data encapsulation, Class and Object, Abstract class and Concrete class, Polymorphism (Implementation of polymorphism using Function overloadings an example in C++); Inheritance, Advantages of Object Oriented Programming over earlier programming methodologies.

**UNIT II**

**Tokens, Expression and controls Structures:** Tokens , Keywords, Identifiers and Constants, C++ data types,Variables: Declaration, Dynamic initialization of variables, Reference variables. Operators in C++ : Scope resolution operator, Member Deferencing Operators, Memory Management Operators, Manipulators, Type cast operators, Expressions and Control Structures. Functions: The main() function, Function Prototyping, Call by reference, Return by reference, Inline function, Function Overloading.

**UNIT III**

**Class and Object:**Introduction, Specifying a Class, Defining Member Functions, C++ Program with Class, Nesting of Member functions, Private Member Functions, Memory Allocation for

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Objects, Static Data members, Static Member Functions, Arrays within a Class, Arrays of Objects, Objects as Function Arguments, Friendly Functions, Returning Objects.

**Constructor and Destructor**: Constructor: Special Characteristics, Declaration and Definition of a constructor, Default Constructor, Overloaded Constructors, Copy Constructor, and Constructor with default arguments;

**Destructor:** Special Characteristics, Declaration and definition of destructor;Operator overloading: Defining Operator Overloading, Overloading Unary Operators, and Overloading Binary Operators.

**UNIT IV**

**Inheritance and Polymorphisms:** Introduction, Defining Derived Classes, Single inheritance, Multiple inheritance, Hierarchical inheritance, Multilevel inheritance, Hybrid inheritance, Virtual Base Classes, Polymorphism, static and dynamic binding, Constructor in Derived Classes, Pointers to Derived Classes, Virtual Functions, Pure Virtual Functions.

**UNIT V**

**I/O Operations and Files:** C++ Stream Classes, Unformatted I/O Operations, Formatted I/O operations, Classes for File Streams, Opening and Closing a File: open() and close() functions, Manipulators of File Pointers : seekg(), seekp(),tellg(), tellp() functions, Sequential Input and output Operations : put (), get(), write(), read() functions,Error handling File Operations : eof(), fail(), bad(), good().

**Text Books:**

1. E Balagurusamy, Object Oriented Programming with C++, 7Th Edition, Mc Graw Hill India, 2017.
2. Robert Lafore, Object Oriented Programming In C++, 4Th Edition, 2001.
3. David Parsons, Object Oriented Programming with C++; BPB publication, 2008.
4. Hubbard, Programming in C++ (Schaum), 3rd Edition, McGraw Hill Education, 2009.

**References:**

1. Herbert Schildt, The Complete Reference, 4th Edition, Tata McGraw-Hill Education Pvt. Ltd.,2000.
2. K R Venugopal, Mastering C++, 2nd Edition, McGraw Hill Education, 2017.
3. Rajaram, R., Object Oriented Programming and C++, Second Edition, 2007
4. Saurav Sahay, Object Oriented Programming with C++, Oxford, 2006.
5.

**List of Practical:**

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.
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 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:
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.

# Shri Vaishnav Vidyapeeth Vishwavidyalaya

## B. Tech. (CSE with specialization in Information and Cyber Security)

### Choice Based Credit System (CBCS) 2018-19

### SEMESTER II

| COURSE CODE | CATEGORY | COURSE NAME | L | T | P | CREDITS | TEACHING & EVALUATION SCHEME | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | THEORY | | PRACTICAL | | |
| | | | | | | | END SEM University Exam | Two Term Exam | Teachers Assessment* | END SEM University Exam | Teachers Assessment* |
| HUCS101 | UG | Communication Skills | 1 | - | 2 | 2 | 60 | 20 | 20 | - | 20 |

**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 Objectives:**

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:**

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**

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

**UNIT II**

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

**UNIT III**

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

**UNIT IV**

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

**UNIT V**

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

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

Joint Registrar
Shri Vaishnav Vidyapeeth Vishwavidyalaya
Indore

**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:**


- Ashraf Rizvi.(200**5).**EffectiveTechnical Communication. NewDelhi:TataMcGrawHill
- Adair, John (2003). Effective Communication. London: Pan Macmillan Ltd.
- A.J.ThomsonandA.V.Martinet(1991).APracticalEnglishGrammar(4th ed).Newyork:Ox-fordIBH Pub.
- Kratz, Abby Robinson (1995). Effective Listening Skills. Toronto: ON: Irwin Professional Publishing.
- Prasad, H. M.(2001) How to Prepare for Group Discussion and Interview. New Delhi: Tata McGraw-Hill.
- Pease, Allan. (1998).Body Language. Delhi: SudhaPublications.