

SIPNA COLLEGE OF ENGINEERING & TECHNOLOGY, AMRAVATI

**An Autonomous Institute Affiliated to
Sant Gadge Baba Amravati University, Amravati, Maharashtra (India)
(Approved by AICTE, New Delhi and Recognized by DTE, Maharashtra)
(Accredited With 'A+' Grade by NAAC)**



Bachelor of Technology (B. Tech.)

Syllabus - Semester III and Semester IV

Department of Computer Science and Engineering

B. Tech. Computer Science and Engineering

(Semester Pattern)

Effective from Academic Year 2026-27

Prepared by: Board of Studies - Computer Science and Engineering

Approved by: Academic Council - Sipna COET, Amravati

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Chairman Board of Studies	Dean Academics	Chairman Academic Council	Date of Release	Version



Program:	B. Tech. (Computer Science and Engineering)				Semester:		III	
Course:	Artificial Intelligence and Machine Learning				Code:		BTCSPC02CS3T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz								
Course Objectives: To introduce students to core AI concepts and practical machine learning approaches for decision-making.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Define core AI terminology, distinguish AI types, compare AI and ML, categorize agents, and analyze agent-environment interaction using rationality and the Turing Test.							L1
CO-2	Analyze and illustrate how search algorithms play vital role in problem solving, inference, perception, knowledge representation and learning.							L4
CO-3	To investigate knowledge representation techniques and reasoning methods including propositional and first-order logic in AI							L2
CO-4	To recognize the basics, types, applications, and challenges of machine learning and its role in intelligent systems.							L3
CO-5	To identify the different supervised learning methods of support vector machine and tree based models.							L3
CO-6	To Assess model selection, training, evaluation, and improvement techniques for various machine learning tasks.							L5

Unit I: Introduction to AI

(6 Hrs.)

Basic Definitions and terminology, Foundation and History of AI, Overview of AI problems, Evolution of AI,- Applications of AI, Classification/Types of AI. Artificial Intelligence vs Machine learning. Intelligent Agent: Types of AI Agent, Concept of Rationality, nature of environment, structure of agents. Turing Test in AI.

Unit II: Problem Solving

(6 Hrs.)

Search Algorithms in Artificial Intelligence: Terminologies, Properties of search Algorithms, Types of search algorithms: uninformed search and informed search, State Space search Heuristic Search Techniques: Generate-and-Test; Hill Climbing; Properties of A* algorithm, Best-first Search; Problem Reduction. Constraint Satisfaction problem.

Unit III: Knowledge and Reasoning

(6 Hrs.)

Knowledge-Based Agent in Artificial intelligence: Architecture, Approaches to designing a knowledge-based agent, knowledge representation: Techniques of knowledge representation, Propositional logic, Rules of Inference, First-Order Logic, Forward Chaining and backward chaining in AI, Reasoning in Artificial intelligence: Types of Reasoning and Probabilistic reasoning, Uncertainty.



Unit IV: Introduction to Machine Learning

(6 Hrs.)

Introduction : What is Machine Learning?, Types of Machine Learning: Supervised learning, Unsupervised learning, Reinforcement learning, Problems Not To Be Solved Using Machine Learning, Applications of Machine Learning, State-of-The-Art Languages/Tools In Machine Learning, Issues in Machine Learning

Unit V: Preparing to Model

(6 Hrs.)

Introduction: Machine Learning Activities, Basic Types of Data in Machine Learning, Exploring Structure of Data: Exploring numerical data, Plotting and exploring numerical data, Exploring categorical data Exploring relationship between variables. Data Quality and Remediation, Data Quality and Remediation, Data Pre-Processing: Dimensionality reduction, Feature subset selection

Unit VI: Modelling and Evaluation

(6 Hrs.)

Introduction, Selecting a Model, Training a Model (for Supervised Learning), Model Representation and Interpretability: Underfitting, Overfitting, Bias – variance trade-off, Evaluating Performance of a Model: Supervised learning – classification, Supervised learning – regression, Unsupervised learning – clustering, Improving Performance of a Model

Total: 36 Hrs

Textbooks:

1. Russell, S. and Norvig, P. 2015. Artificial Intelligence - A Modern Approach, 3rd edition, Prentice Hall
2. A Text book of Machine Learning by SaiKat Dutt Subramanian Chandramouli and Amit Kumar Das, Pearson

Reference Books:

1. Introduction to Artificial Intelligence & Expert Systems, Dan W Patterson, PHI., 2010 S Kaushik, Artificial Intelligence, Cengage Learning, 1st ed.2011.
2. Ric, E., Knight, K and Shankar, B. 2009. Artificial Intelligence, 3rd edition, Tata McGraw Hill.
3. Luger, G.F. 2008. Artificial Intelligence -Structures and Strategies for Complex Problem Solving, 6th edition, Pearson.
4. Alpaydin, E. 2010. Introduction to Machine Learning. 2nd edition, MIT.
5. Ethem Alpaydin: Introduction to Machine Learning, PHI 2nd Edition-2013.
6. Nilsson Nils J, "Artificial Intelligence: A new Synthesis, Morgan Kaufmann Publishers Inc. San Francisco, CA, ISBN: 978-1-55-860467-4.

MOOC Links:

1. NPTEL Course: An Introduction to Artificial Intelligence
https://onlinecourses.nptel.ac.in/noc22_cs56/preview
2. NPTEL Course: Fundamentals of Artificial Intelligence
<https://elearn.nptel.ac.in/shop/nptel/fundamentals-of-artificial-intelligence/>
3. NPTEL Course: Introduction to Machine Learning (IIT Madras)
https://onlinecourses.nptel.ac.in/noc25_cs46/preview



Program:	B. Tech. (Computer Science and Engineering)				Semester:		III	
Course:	Discrete Structure				Code:		BTCSPC03CS3T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives:								
● To develop mathematical reasoning and proof-writing skills. ● To introduce fundamental concepts in logic, sets, relations, and functions. ● To explore applications of discrete mathematics in computer science, such as algorithms and graph theory.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Analyze and express logic sentence in terms of predicates, quantifiers, and logical connectives.							L4
CO-2	Determine the solution for a given problem using set theory.							L5
CO-3	Classify algebraic structure for a given mathematical problem.							L2
CO-4	List Boolean algebra operations on Boolean variables using expansion methods.							L1
CO-5	Perform operation on trees data structures.							L3
CO-6	Develop the given problem as graph networks and solve with techniques of graph theory.							L6

Unit I: The Foundations: Logic and Proofs

(6 Hrs.)

Propositions, Truth Tables, Compound Propositions, Logical Operators, Logic and Bit Operations; Logical Equivalences, DeMorgan's Laws, Satisfiability: Applications and Solving Problems; Predicates, Quantifiers, Precedence, Logical Equivalences; Rules of Inference for Propositional Logic, Use to Build Arguments.

Unit II: Sets, Functions and Relation

(6 Hrs.)

Introduction, Venn Diagrams, Subsets, Size of a Set, Power Sets, Cartesian Products, Set Notation with Quantifiers, Truth Sets and Quantifiers, Set Operations, Functions, Inverse Functions, Compositions and Graphs of Functions; Countable Sets, An Uncountable Set; Functions as Relations, Relations on a Set, Properties of Relations, Combining Relations; Representing Relations Using Matrices; Representing Relations, Closures of Relations, Equivalence Relations.

Unit III: Algebraic Structures

(6 Hrs.)

Algebraic Systems: Examples and General Properties; Semigroups and Monoids: Homomorphism of Semigroups and Monoids, Groups: Definitions, Subgroups and Homomorphisms, Cosets and Lagrange's Theorem, Normal Subgroups, algebraic Systems with Two Binary Operations; Group Codes: The Communication Model and Basic Notions of Error Correction, Hamming Distance.

Unit IV: Boolean Algebra

(6 Hrs.)

Boolean Algebra: Boolean Functions, Representing Boolean Functions, sum of product expansions, Product of sum, Logic Gates, Combinations of Gate, Minimization of Circuits, Karnaugh Maps.



Unit V: Tree

(6 Hrs.)

Introduction, Rooted Tree, ordered rooted tree, tree as model, Properties of Trees, Applications of tree, Binary Search Trees, Decision Trees, Prefix Codes, Huffman Coding, Game Trees, Tree traversal, Preorder Traversing, Inorder Traversing, Post order Traversing, Spanning Tree, Minimum spanning tree.

Unit VI: Graph

(6 Hrs.)

Graph Models; Basic Terminology, Special Simple Graphs, Bipartite Graphs, Applications of Special Types of Graphs, New Graphs from Old; Graph Representation, Adjacency and Incidence Matrices, Isomorphism of Graphs, Determining Isomorphism; Paths, , Paths and Isomorphism; Euler Paths and Circuits, Hamilton Paths and Circuits, Planar Graphs: Euler's Formula, Kuratowski's Theorem; Graph Coloring: Introduction, Applications of Graph Colorings.

Total: 36 Hrs

Textbooks:

1. Kenneth H. Rosin: Discrete Mathematics and Its Applications, 7th Edition, McGraw-Hill.
2. T.Veerarajan : Discrete Mathematics ,McGraw-Hill.
3. G.Shanker Rao: Discrete Mathematical Structures, New age International Publishers ,2nd Edition

Reference Books:

1. Norman L. Biggs: Discrete Mathematics, 2nd Edition, Oxford University Press.
2. Seymour Lipschutz and Marc Lars Lipson: Schaum's Outline of Theory and Problems of Discrete Mathematics, 3rd Edition, Schaum's Outlines Series, McGraw-Hill.
3. C. L. Liu and D. P. Mohapatra: Elements of Discrete Mathematics: A Computer Oriented Approach, 3rd Edition, Tata McGraw-Hill, Mc-Graw Hill.

MOOC Links:

1. NPTEL Course: Discrete Mathematics
https://onlinecourses.swayam2.ac.in/cec24_ma18/preview.
2. NPTEL Course: Discrete Mathematics for CS
https://onlinecourses.nptel.ac.in/noc25_cs27/preview.



Program:	B. Tech. (Computer Science and Engineering)				Semester:		III	
Course:	Object Oriented Programming				Code:		BTCSPC04CS3T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: Students will be expected to demonstrate their understanding of Object-Oriented programming using java.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Explain the fundamentals of Java programming, including JRE, OOP principles, program structure, and flow control.							L2
CO-2	Apply the concepts of encapsulation, object creation, constructors, and class methods in Java programming.							L3
CO-3	Define inheritance, polymorphism, interfaces, and abstract classes to achieve code reusability and flexibility.							L1
CO-4	Examine the different exception handling and String handling mechanisms to develop robust Java applications							L4
CO-5	Interpret the use of data structures using Java Collections Framework for efficient data manipulation.							L6
CO-6	Relate multithreading and thread synchronization techniques to enhance concurrency and application performance.							L5

Unit I: Introduction to Java Programming

(6 Hrs.)

Introduction, Need of OOP, Principles of Object-Oriented Language, Features of Java, Program Structure, Variables, Data Types, Literals, Operators, Type Conversion & Casting, Precedence Rules & Associativity, Flow of Control: Conditional, Loops & Branching Statements.

Unit II: Objects and Classes

(6 Hrs.)

Classes, Objects, Creating Objects, Methods, Constructors, this keyword, Cleaning up Unused Objects, Class Variable and Methods, Arrays, Command line arguments, Enum Type.

Unit III: Inheritance & Polymorphism

(6 Hrs.)

Inheritance: Types of Inheritance, Method Overloading, Method Overriding, Interfaces, Abstract Class, super keyword, final keyword, Packages.

Unit IV: String Handling and Exception Handling

(6 Hrs.)

String Class, String Manipulation, StringBuffer class, StringBuilder class, Java Wrapper Class. Exception Handling: exception, try, catch, throw, throws, finally, check & unchecked exception

Unit V: Java Collections Framework

(6 Hrs.)

Collection Overview, The Collection Interface, The Collection Class, Implementation List: Array List, Linked List, Vector, Stack; Queue: Priority Queue, Dequeue; Set: HashSet and its Comparison.



Unit VI: Multithreading in java

(6 Hrs.)

Introduction, Multithreading in java, java. lang. thread, The Main thread, creating of new Threads, Thread. State in java, Thread Priority, Multithreading using is Alive and join, Synchronization Suspending and Resuming Threads, Communication between Threads.

Total: 36 Hrs.

Textbooks:

1. A Text Book of Java Complete Reference by Herbert Schildt, McGraw Hill.

Reference Books:

1. Programming in Java by Malhotra Sachin.
2. Java Generics & Collections by Maurice Naftalin Philip Wadler, O'REILLY.
3. The Definitive Guide to Java Swing by John Zukowski, John Zukowski.

MOOC Links:

1. **Course name:** Core Java Specialization
<https://www.coursera.org/specializations/core-java>
2. **Course name:** Object Oriented Programming in Java Specialization
<https://www.coursera.org/specializations/object-oriented-programming>
3. **Course name:** Java Programming - Master Java Basics
<https://www.udemy.com/course/java-programming-master-java-basics-learnit/>
4. **Course name:** Java Collection Framework
<https://online.codingblocks.com/courses/java-collections-framework?>



Program:		B. Tech. (Computer Science and Engineering)		Semester:		III
Course:		Object Oriented Programming Lab		Code:		BTCSPC05CS3P
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	0	2	1	30	20	50
Course Objectives: Students will be expected to create program from their understanding of Object Oriented programming using java.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level (L1 to L6)
CO1	State the basics of object-oriented Programming and debug a simple program by using different arithmetic operators and decision making statements in java.					L1
CO2	Make the use of array & array of objects.					L3
CO3	Illustrate the concept of encapsulation, abstraction, inheritance, and Polymorphism					L4
CO4	Identify the different exception handling mechanism by applying it in a java program					L2
CO5	Develop Java program to implement data structures using Collection Framework.					L5
CO6	Create a program for multithreading and thread synchronization techniques					L5

General Guidelines:

1. Minimum 8 practicals are to be conducted covering entire syllabus.
2. The following list of practicals may be considered, but it is not limited to these.

Experiment List

- 1) Develop Java program using keywords, identifiers, operators & expressions.
- 2) Implementation of conditional, looping, and branching statements using Java Programming.
- 3) Implementation of encapsulation in Java Programming.
- 4) Perform Java program to demonstrate uses of constructors.
- 5) Demonstrate various types of inheritance using java programs.
- 6) Develop Java program to demonstrate polymorphism.
- 7) Demonstrate utilization of Packages in Java programs.
- 8) Develop Java program to demonstrate Exception Handling mechanism.
- 9) Demonstrate String handling mechanism in Java.
- 10) Develop Java program to implement data structures using Collection Framework.
- 11) Define JAVA. Write a program to print a message "Hello World. ..." Using Scanner Class
- 12) Illustrate use of arithmetic operators in java.
- 13) Make a use of different control statements in java.
- 14) Develop a Program on various ways to accept data through keyboard (Command Line Argument)
- 15) Build a program for constructor in java.
- 16) Test for arrays of objects in java.
- 17) Classify different types of inheritance and test for super keyword
- 18) Compare method overloading and method overriding.
- 19) Interpret the Abstract Class in java
- 20) Create a program for Exception Handling Mechanism.



Program:	B. Tech. (Computer Science and Engineering)				Semester:		III	
Course:	Data Structures and Algorithms				Code:		BTCSPC06CS3T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	0	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives:								
• To understand the linear and nonlinear data Structures and its memory representations. • To perform different operations on data structures such as insertion, deletion, searching and traversing. • To understand various data searching and sorting methods with its complexity. • To introduce various techniques for representation of the data in the real world.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Define primitive and non-primitive data structures and their applications.							L1
CO-2	Explain different operations on linear arrays, memory representation of array and apply algorithm to perform searching and sorting.							L2
CO-3	Demonstrate various operations on linked lists, its memory representation and evaluate problems on insertion and deletion operations.							L3
CO-4	Interpret numerous operations on stack and queue, memory representation of stack and queue and solve various computing problems.							L4
CO-5	Justify and assess different types of trees and solve problems involving trees and heaps.							L5
CO-6	Design and build solutions using graphs for solving different problems and implement various sorting algorithms.							L6

Unit I: Introduction to Data Structures

(6 Hrs.)

Introduction to Data structures, Data Structure Operations, Algorithmic Notation, Complexity of algorithms. String processing: storing strings, character data type, string operations, word processing, and pattern matching algorithms.

Unit II: Array & Record Structure

(6 Hrs.)

Linear arrays: Memory Representation of arrays, traversing linear arrays, insertion & deletion operations, Bubble sort, Linear search and Binary search algorithms. Multi-dimensional arrays, Pointer arrays. Record structures.

Unit III: Linked lists

(6 Hrs.)

Linked lists: Memory Representation of Linked List, traversing a linked list, searching a linked list. Memory allocation & garbage collection. Insertion & deletion operations on linked lists. Header linked lists, Two-way linked lists.

Unit IV: Stack & Queue

(6 Hrs.)

Stacks: Sequential Memory Representation of Stack, Arithmetic expressions: Polish notation. Quick sort, Recursion, Tower of Hanoi. Queues: Sequential Memory Representation of Queue, DeQueue, Priority queues.



Unit V: Trees

(6 Hrs.)

Introduction to Trees, Binary trees, Memory Representation of Binary Tree, Traversing binary trees, Header nodes, Binary Search Tree, Heap and heap sort, Path length & Huffman's algorithm.

Unit VI: Graphs & Sorting Algorithms

(6 Hrs.)

Introduction to Graphs, Sequential representation of graphs, Adjacency Matrix; Path Matrix, Warshalls' algorithm: Shortest Path, Linked representation of graph, Traversing a graph: Breadth First Search, Depth First Search. Sorting: Insertion Sort, Selection Sort, Radix sort, Merge Sort.

Total: 36 Hrs

Textbooks:

1. Seymour Lipschutz: Data Structures, Schaum's Outline Series, McGraw-Hill, International Editions.
2. Trembley, Sorenson: An Introduction to Data Structures with Applications, McGraw Hill.

Reference Books:

1. Ellis Horowitz, Sartaj Sahni: Fundamentals of Data Structures, CBS Publications.
2. Data Structure Using C, Balagurusamy

MOOC Links:

1. NPTEL Course: Data Structures and Algorithms:
<https://archive.nptel.ac.in/courses/106/102/106102064/>
2. NPTEL Course: Programming and Data Structure:
<https://archive.nptel.ac.in/courses/106/105/106105085/>



Program:		Computer Science and Engineering		Semester:	III	
Course:		Data Structures and Algorithms Lab		Code:	BTCSPC07CS3P	
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	0	2	1	30	20	50
Course Objectives: To apply and analyze data structures such as arrays, linked lists, stacks, queues, trees, and graphs; and implement algorithms for sorting, searching, and traversal operations.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level (L1 to L6)
CO1	Apply the concepts of array data structure for searching algorithms and pattern matching algorithm.					L3
CO2	Analyze and implement different sorting algorithms techniques.					L4
CO3	Understand and implement operations on Linked List data structure.					L2
CO4	Execute the concept of Stack, Queue data structure, and Recursion.					L3
CO5	Evaluate and examine the concept of Tree data structure.					L5
CO6	Design and implement the concept of Graph for DFS algorithm.					L6

General Guidelines:

- Minimum 8 experiments should be conducted covering entire syllabus.
- The following list of practicals may be considered, but it is not limited to these.

Experiment List

- Analyzing Big-O Notation Through Evaluation of Loops and Conditional Structures.
- Write a program to determine largest element from an array and its location.
- Implement Insertion and Deletion operations on Strings using Array Data Structures.
- Design a program to implement First Pattern Matching Algorithm.
- Develop a program to implement Binary Search algorithm and analyze its complexity.
- Implement Bubble Sort Algorithm using array.
- Study and implement various operations on singly linked list
 - Traversing a linked list
 - Searching a linked list
- Understand the Stack data structure and execute the push, pop operation on it.
- Study the Queue data structure and execute the insertion, deletion operation on it
- Design a program to implement Preorder Tree Traversal Algorithm.
- Understand the concept of Recursion and write a program to calculate factorial of a number using



recursion.

- 12) Implement concept of Insertion Sort algorithm using array.
- 13) Write a program for implementation of Selection Sort Algorithm.
- 14) Implement the concept of Depth First Search algorithm.
- 15) Design a program to implement Quick Sort Algorithm



Program:	B. Tech. (Computer Science and Engineering)			Semester:	III	
Course:	Computer Skill Lab-III			Code:	BTCSPC08CS3P	
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	-	2	1	30	20	50
Course Objectives: Master PHP basics, form handling, session management, and server configuration to develop dynamic web applications.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level (L1 to L6)
CO1	Understand PHP basics and how it integrates with HTML and the web server.					L2
CO2	Develop web pages that handle user inputs through forms.					L3
CO3	Apply control structures, arrays, and functions to solve programming tasks.					L3
CO4	Install, configure, and manage PHP in a server environment to run and test PHP scripts.					L4
CO5	Implement form handling, session tracking and cookies to manage user data and maintain state.					L4
CO6	Design, connect, and interact to perform various operations and develop complete applications.					L5

General Guidelines for Practical's

- Minimum 8 experiments should be conducted covering the entire syllabus.
- The following list of practicals may be considered, but it is not limited to these.

Experiment List

- Write a PHP script to demonstrate basic syntax, variables, and operators.
- Develop a form using HTML and retrieve form data using PHP (GET/POST methods).
- Write a PHP script using conditional statements and loops to perform operations like finding factorial, prime numbers, etc.
- Create a PHP script to demonstrate different types of arrays and perform operations.
- Write a script using built-in string functions (e.g., strlen, strrev, strpos, substr).
- Introduction to PHP and configure it to work with Apache Web Server.
- Create a login system using sessions and cookies in PHP.
- Write a PHP program to keep track of the number of visitors visiting the web page and to display this count of visitors, with proper headings.
- Write a PHP program to display a digital clock which displays the current time of the server.
- Design a basic calculator using HTML form and PHP for operations like addition, subtraction, multiplication, division.
- Develop a script to sort user-defined array using different PHP sorting functions (sort, rsort, asort, etc).
- Write a PHP script to upload an image file and validate its size and type.
- Create a feedback form that stores user input into a file or database.
- Develop a PHP script to fetch and display data from a MySQL database in a tabular format.
- Develop a mini-project that allows user registration, login, student data entry, and data retrieval using PHP and MySQL



Program:	B. Tech. (Computer Science and Engineering)			Semester:		III		
Course:	Management Information Systems			Code:		BTCSHM01CS3T		
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
2	-	2	2	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: To summarize the key principles of Information and Information Security.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Describe the role of MIS and its impact on management and digital organizations.							L2
CO-2	Analyze the structure of digital firms and differentiate key e-business components.							L4
CO-3	Classify types of information and evaluate their role in business intelligence.							L5
CO-4	Apply system concepts and design user-focused interfaces for real-time systems.							L3

Unit I: MIS in Digital Age

(6 Hrs.)

MIS in digital age, MIS Defined, Why MIS?, MIS coverage, MIS support to the Management, Evolving Business and MIS relationship, Changing role of MIS managers in the digital age, Constituents of MIS, Evolution of MIS development approaches - Two-Speed IT, Management effectiveness and MIS Organization as a system, MIS for a digital firm.

Unit II: E-business Enterprise: A digital firm

(6 Hrs.)

Introduction to E-business Enterprise: A digital firm, Organisation of Business in Digital Firm, Business, E-Commerce, E-Communication, E-Collaboration, Real Time Enterprise, What are the technology options for becoming a real time Enterprise?, Enterprise Social Platform (ESP), Customer Experience Management.

Unit III: Information, Knowledge, Business Intelligence

(6 Hrs.)

Information Concepts, Information: A quality Product, Classification of the Information, Methods of Data and Information Collection, Value of the Information, General Model of a Human as an Information Processor, Summary of Information Concepts and their Implications, Knowledge and Knowledge Management Systems, Business Intelligence, MIS and the Information and Knowledge.

Unit IV: Technology of Information System

(6 Hrs.)

Introduction, Data Processing, Transaction Processing, Application Processing, Information System Processing, TQM of Information System, Human Factors and User Interface, Real Time systems and Good Design, Case Tools and I-case.

Total: 24 Hrs



Textbooks:

1. "Management Information Systems: Text and Cases" by Waman S Jawadekar and Sanjiva Shankar Dubey, 6th Edition, McGraw Hill

Reference Books:

1. "Management Information Systems: Managerial Perspectives" by D P Goyal, MacMillan Publication, 4th Edition
2. "Management Information Systems: Managing the Digital Firm" by Kenneth C. Laudon and Jane P. Laudon, Pearson Publication, 17th edition, published in 2022
3. "Management Information Systems" by Ramesh Behl, 11th Edition, McGraw Hill
4. "MIS: Managing Information Systems in Business, Government, and Society" by Hossein Bidgoli, Cengage
5. MIS: Managing Information Systems in Business, Government, and Society by Rahul De, 2nd Edition

MOOC Links:

1. NPTEL Course : Management Information System
https://onlinecourses.nptel.ac.in/noc24_mg96/preview
2. edX : Introduction to Management Information Systems (MIS): A Survival Guide
<https://www.edx.org/learn/information-systems/universidad-carlos-iii-de-madrid-introduction-to-management-information-systems-mis-a-survival-guide>
3. Coursera : Information Systems Specialization
<https://www.coursera.org/specializations/information-systems>





Program:	B. Tech. (Computer Science and Engineering)				Semester:		IV	
Course:	Engineering Mathematics-III				Code:		BTCSBS07SH4T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Assignments, Class Attendance								
Course Objectives: To develop essential Mathematical, Numerical and Statistical Skills.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Apply Numerical methods to find roots of the nonlinear equation.							L3
CO-2	Demonstrate the knowledge of Numerical methods to solve differential equation & integral equation.							L2
CO-3	Analyse the data to fit Curves using statistical techniques.							L4
CO-4	Find measures of Central Tendency & interpret it.							L1
CO-5	Make use of Probability Concepts to solve Real-World Problems.							L3
CO-6	Identify various types of Partial Differential Equations to find its solution.							L3

UNIT I: Numerical Method 1: (6 Hrs.)
False Position Method, Newton-Raphson Method, Gauss-Seidel Method

UNIT II: Numerical Method 2: (6 Hrs.)
Numerical Differentiation: Picard's Method, Eulers Method,
Numerical integration: Trapezoidal Rule, Simpsons 1/3 Rule, Simpson's 3/8 rule

UNIT III: Statistics 1: (6 Hrs.)
Curve Fitting by Least Square Method (Straight Line & Second-degree Parabola),
Coefficient of Correlation, Lines of Regression

UNIT IV: Statistics 2: (6 Hrs.)
Mean, Mode, Median, Mean Deviation, Standard Deviation & Variance.

UNIT V: Probability: Probability, Conditional Probability, Bayes Theorem (6 Hrs.)

UNIT VI: Partial Differential Equation: (6 Hrs.)
Partial differential equation of first order of following types (i) $f(p, q) = 0$;
(ii) $f(p, q, z) = 0$; (iii) $f(x, p) = g(y, q)$; (iv) $Pp + Qq = R$ (Lagrange's Form);
(v) $z = px + qy + f(p, q)$, Transformation of variables (Reducible to all above forms).

Total: 36 Hrs

Textbooks:

1. A Text Book of Applied Mathematics Vol II by P.N. Wartikar, J.N. Wartikar.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publications.
3. Fundamentals of Mathematical statistics, S. C. Gupta, V. K. Kapoor



Reference Books:

1. Probability & Statistics by Murray R. Spiegel, John Schiller, R. Alu Srinivasan.
2. Numerical Methods by Dr. B.S. Grewal. Mathematical Statistics by J.N. Kapur & H.C. Saxena

MOOC Links:

1. NPTEL Course: Mathematics - Regression Analysis
<https://archive.nptel.ac.in/courses/111/105/111105042/>
2. NPTEL Course: Multidisciplinary - NOC:Numerical Methods for Engineers
<https://archive.nptel.ac.in/courses/127/106/127106019/>



Program:	B. Tech. (Computer Science and Engineering)				Semester:		IV	
Course:	Operating System				Code:		BTCSPC09CS4T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: To provide students with a comprehensive understanding of the fundamental concepts and working of operating systems.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Gain insight into the fundamental concepts and evolution of operating systems.							L1
CO-2	Analyse and compare various process scheduling algorithms.							L4
CO-3	Develop solutions for process synchronization and deadlock management							L6
CO-4	Implement memory management techniques and virtual memory concepts.							L3
CO-5	Explore file system architectures and manage file operations							L3
CO-6	Analyse storage management and disk scheduling techniques.							L4

Unit I: Introduction to Operating System

(6 Hrs.)

Introduction: Operating System definition, Operating System Evolution, Components and Services, Process Concept, Process Scheduling, Operations on Processes, Cooperating Processes, Interprocess Communication, Threads Overview, Multithreading Models, Threading Issues, Java Threads

Unit II: Process Scheduling

(6 Hrs.)

Foundation and Scheduling objectives, Types of Schedulers, Scheduling criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non-pre-emptive, FCFS, SJF, RR, Priority, Multilevel Queue, Multilevel Feedback Queue Scheduling

Unit III: Process Synchronization

(6 Hrs.)

Process Synchronization Basics: The Critical-Section Problem, Synchronization Hardware, Semaphores, Monitors, Deadlocks: Definition & Characterization, Deadlocks Prevention, Avoidance, Detection and Recovery from Deadlock

Unit IV: Memory Management

(6 Hrs.)

Memory Management Background, Swapping, Contiguous Memory Allocation Schemes, Paging, Segmentation, Virtual Memory Management: Background, Demand paging scheme, Process Creation, Page Replacement Policies, Allocation of Frames, Thrashing

Unit V: File System

(6 Hrs.)

File-System Interface; Directory Structure, File-System Mounting, File Sharing & Protection, File-



System Structure, File-System Implementation, Directory Implementation, Allocation Methods, Free-Space Management. File Recovery

Unit VI: Storage management

(6 Hrs.)

Mass-Storage Structure, Disk Structure, Disk Attachment, Disk Scheduling, System Protection: Goals, Principles, Domain of Protection, Access Matrix, Access Control

Total: 36 Hrs

Textbooks:

1. Avi Silberschatz, P. B. Galvin, G. Gagne: "Operating System Concepts" (9/e) John-Wiley & Sons.

Reference Books:

1. A.S. Tanenbaum "Modern Operating Systems" Pearson Education.
2. William Stallings "Operating Systems" Prentice-Hall.
3. D. M. Dhamdhare "Operating Systems" Tata McGraw-Hill.
4. P. Balkrishna Prasad: "Operating Systems" Scitech Publications (I) Pvt

MOOC Links:

1. NPTEL Course: Operating System
<https://archive.nptel.ac.in/noc/courses/noc21/SEM1/noc21-cs44/>
2. NPTEL Course: Operating System Fundamentals
<https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-cs88/>
3. NPTEL Course: Introduction to Operating Systems
<https://archive.nptel.ac.in/noc/courses/noc21/SEM2/noc21-cs72/>



Program:		B. Tech. (Computer Science and Engineering)		Semester:	IV	
Course:		Operating System Lab		Code:	BTCSPC10CS4P	
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	-	2	1	30	20	50
Course Objectives: To provide foundational knowledge of OS structure, functions, scheduling algorithms, and memory management.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level (L1 to L6)
CO1	Illustrate memory management issues like external fragmentation, internal fragmentation.					L2
CO2	Illustrate multithreading and its significance.					L2
CO3	List various protection and security mechanisms of OS.					L1
CO4	Analyze and solve the scheduling algorithms.					L4
CO5	Analyze the deadlock situation and resolve it.					L5
CO6	Compare various types of operating systems.					L4

General Guidelines for Practical's

- a) Minimum 8 experiments should be conducted covering the entire syllabus.
b) The following list of practicals may be considered, but it is not limited to these.

- 1) To study...
 - a. UNIX
 - b. Difference between LINUX and UNIX
 - c. UNIX system organization
 - d. Types of shell
- 2) Study of Unix Shell and Environment Variables
- 3) To study and execute basic commands related to open-source Ubuntu OS.
- 4) Write a program for parent creating child process by using fork system call.
- 5) To simulate First Come First Serve process scheduling algorithm
- 6) To simulate Shortest Job First process scheduling algorithm
- 7) To implement Priority Based Process Scheduling Algorithm
- 8) To simulate producer-consumer problem using semaphores
- 9) To implement various thread related concepts.
- 10) To implement following memory management techniques: FIRST Fit
- 11) To implement following memory management techniques: Best Fit
- 12) Simulate File Mounting and Unmounting
- 13) To simulate the Single level directory file organization technique
- 14) To implement FCFS Disk Scheduling algorithm
- 15) To implement SCAN Disk Scheduling algorithm
- 16) To implement LOOK Disk Scheduling algorithm



Program:	B. Tech. (Computer Science and Engineering)				Semester:		IV	
Course:	Introduction to Cyber Security				Code:		BTCSPC28CS4T	
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
2	-	2	2	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives:								
- Summarize the essential terminologies related to cybercrime and cyber offenses. - Evaluate access control, authentication, and intrusion detection techniques for system security.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Outline fundamentals of Cybercrimes and Cyber offenses.							L2
CO-2	Analyze cyber threats, attacks, vulnerabilities, and cybercrime on mobile and wireless devices.							L4
CO-3	Evaluate the access control and authentication process.							L5
CO-4	Apply intrusion detection and prevention techniques.							L3

Unit I: Introduction to Cybercrime: (6 Hrs.)
Introduction, Cybercrime and Information Security, Classifications of Cybercrimes, Cybercrimes: An Indian Perspective, Cybercrime and the Indian ITA 2000, Social Engineering, Cyberstalking, Botnets, Attack Vector, Cloud Computing

Unit II: Cybercrime: Mobile and Wireless Devices (6 Hrs.)
Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit Card Frauds in Mobile, Security Challenges posed by Mobile Devices, Attacks on Mobile/Cell Phones, Proxy Servers and Anonymizers, Phishing, Password Cracking, Key loggers and Spywares, Virus and Worms, Trojan Horses and Backdoors, Steganography, DoS and DDoS Attacks, SQL Injection, Buffer Overflow

Unit III: Access Control and Authorization: (6 Hrs.)
Definitions, Access Rights, Access Control Systems, Authorization, Types of Authorization Systems, Authorization Principles, Authorization Granularity, Web Access and Authorization.
Authentication: Definition, Multiple Factors and Effectiveness of Authentication, Authentication Elements, Types of Authentications, Authentication Methods

Unit IV: System Intrusion Detection and Prevention: (6 Hrs.)
Definition, Intrusion Detection, Intrusion Detection Systems (IDSs), Types of Intrusion Detection Systems, The Changing Nature of IDS Tools, Response to System Intrusion, Challenges to Intrusion Detection Systems, Implementing an Intrusion Detection System, Intrusion Prevention Systems (IPSs), Intrusion Detection Tools

Total:24 Hrs



Case Study 1: Cybercrime: The Legal Perspectives

A Global Perspectives on Cybercrimes

Case Study 2: Mobile Devices: Security Implementations for Organizations, Organizational Measures for Handling Mobile, Laptops

Textbooks:

1. Nina Godbole, Sunit Belapure, "Cyber Security: Understanding Cyber Crimes, Computer Forensics and Legal Perspectives", Wiley India Pvt Ltd, ISBN: 978-81- 265-21791,20132.
2. Joseph Migga Kizza, "A Guide to Computer Network Security", Springer 2009.

Reference Books:

1. V.K. Pachghare, "Cryptography and information Security", PHI Learning Private Limited, Delhi India.
2. Nina Godbole, "Information Systems Security", Wiley India, New Delhi
3. Kenneth J. Knapp, "Cyber Security & Global Information Assurance", Information Science Publishing.
4. James Graham, Richard Howard, Ryan Olson, "Cyber Security Essentials" CRC Press.
5. Jeetendra Pande, "Introduction to Cyber Security" Uttarakhand Open University, 2017.

MOOC Links:

1. NPTEL Course: Cyber Security and Privacy
<https://nptel.ac.in/courses/106106248>
2. Coursera: Foundations of Cybersecurity
<https://www.coursera.org/learn/foundations-of-cybersecurity>



Program:	B. Tech. (Computer Science and Engineering)			Semester:	IV			
Course:	Data Communication and Networking			Code:	BTCSPC29CS4T			
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
3	-	3	3	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: Understand fundamentals of data communication and networking along with structure and functions of data link, network, transport, and application layers.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Define and recall basic concepts of computer networks, network types, networking criteria, Internet architecture, and networking standards.							L1
CO-2	Describe data communication components, OSI and TCP/IP models, signal types, transmission media, and switching techniques.							L2
CO-3	Apply data link layer services, error detection and correction techniques, and data link layer protocols such as HDLC and PPP.							L3
CO-4	Analyze network layer performance issues, congestion control mechanisms, IPv4 and IPv6 addressing, and IP datagram format.							L4
CO-5	Evaluate routing techniques, congestion control strategies, and the role of network support protocols such as ARP, RARP, and ICMP.							L5
CO-6	Implement transport and application layer protocols such as TCP, UDP, HTTP, FTP, SMTP, and DNS for given networking applications.							L3

Unit I: Networking Fundamentals and Internetworking (6 Hrs.)
Computer Networks: Concepts and Definitions, Network Criteria: Performance, Reliability, Security Types of Networks: Local Area Network (LAN), Metropolitan Area Network (MAN), Wide Area Network (WAN), Physical Structures of Networks, Internetworking Concepts, The Internet Architecture, Protocols and Standards in Networking

Unit II: Introduction to Data Communication Models and Physical Layer (6 Hrs.)
Introduction to Data Communication Components, OSI & TCP/IP models, Analog & digital signals, Transmission media: Guided & Unguided, Switching: Circuit & Packet Switching.

Unit III: Data Link Layer (6 Hrs.)
Links services, Two categories of link, Two sub-layers, Error detection and correction, Data link control: DLC services, Data-Link Layer Protocol, HDLC, Point-To-Point Protocol

Unit IV: Network Layer (6 Hrs.)
Network Layer performance, Congestion Control, IPV4 Address, , IPV6 Address, Transition from IPV4 to IPV6: Strategies, Use of IP Addresses, Network Layer Protocols: Internet Protocol (IP), Datagram Format

Unit V: Routing, Congestion, and Network Support Protocols (6 Hrs.)



Routing Concepts, Static and Dynamic Routing (Conceptual), Distance Vector and Link State Routing (Overview), Congestion Control Techniques, Address Resolution Protocol (ARP), Reverse Address Resolution Protocol (RARP), Internet Control Message Protocol (ICMP)

Unit VI: Transport Layer and Application layer

(6 Hrs.)

Transport-Layer Services, Transport-Layer Protocols: UDP and TCP, Introduction to Application layer: Application-Layer Paradigms, Application Layer Protocols: HTTP, FDP, SMTP, DNS

Total: 36 Hrs

Textbooks:

1. Behrouz A. Forouzan: Data Communication and Networking, (5/e) (TMH).

Reference Books:

1. William Stallings: Data & Computer Communications, 6/e, Pearson Education.
2. William L. Schweber: Data Communication, McGraw Hill.
3. Douglas E. Comer: Computer Network & Internet, Addison Wesley.
4. Andrew S. Tanenbaum: Computer Networks, PHI (5E).
5. Leon Garcia & Widjaja: Communication Networks, TMH.

MOOC Links:

1. NPTEL Course: Computer Networks and Internet Protocol
https://onlinecourses.nptel.ac.in/noc25_cs15/preview
2. Udemy Course: Introduction to networking for complete beginners
<https://www.udemy.com/course/introduction-to-networking-for-complete-beginners/?srsltid=AfmBOorX9-nrcisar6Ew0kkWJVRRCGlrccm2eZtxONEFU6sf7ZEKmgwo>



Program:		B. Tech. (Comp. Sci & Engg.)		Semester:	IV	
Course:		Computer Skill Lab IV		Code :	BTCSPC13CS4P	
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
02	00	02	01	30	20	50
Course Objectives: Use Node.js to connect with databases, handle files, create APIs, and send emails.						
Course Outcomes: After completion of the course, the students will be able to:						
CO	Course Outcomes					BT Level (L1 to L6)
CO1	Recall basic Node.js concepts, environment setup, and syntax					L1
CO2	Understand the use of built-in and custom modules in Node.js					L2
CO3	Apply HTTP, URL, and File System modules to build basic server operations					L3
CO4	Analyze event-driven programming using events and EventEmitter					L4
CO5	Evaluate data interactions between Node.js and MySQL/MongoDB					L5
CO6	Create RESTful APIs using Express and JSON for real-time data Communication					L6

General Guidelines for Practical's

- Minimum 8 experiments should be conducted covering the entire syllabus.
- The following list of practicals may be considered, but it is not limited to these.

Experiment List

- Introduction to the Node.js and its installation to print "Hello World".
- To study built-in modules and implement the user defined built-in modules in the Node.js
- To study HTTP module and implement Node.js as a web server
- To study and implement Node.js File system module to read, write, create, update, delete and rename the file.
- To study and implement URL module of the Node.js.
- To convert the output "Hello World!" into upper-case letters by installing the "upper-case" package of NPM.
- To study event handling in Node.js and demonstrate it using event module and EventEmitter object.
- Send emails in Node.js using Nodemailer Package.
- To install MySQL and create connection with Node.js along with creation of database and tables.
- To execute database MySQL commands (Insert, Select, Where etc.) using Node.js.
- To install MongoDB and create connection with Node.js along with creation of database and collections.
- To execute database MongoDB commands (Insert, Delete, Update etc.) using Node.js.
- Create a JSON API.
- Use express.js to Create REST API.
- Mini -project (A simple web-based application where users (admin or staff) can add, update, view, and delete student records. The system will use Node.js for the backend, Express.js for routing, MySQL for storing student academic records, and MongoDB for storing additional student profile details (like hobbies, address, etc.).



Program:		B.Tech.(Computer Science and Engineering)		Semester:	IV	
Course:		Fundamentals of Networking		Code:	BTCSVS04CS4P	
Teaching Scheme				Evaluation Scheme		
Practical	Tutorial	Hours	Credit	INT	EXT	Total
2	1	3	2	50	-	50

Course Objectives:

- **Build and manage efficient, secure networks** by applying networking fundamentals, configuring IP settings, VLANs, static routes, VPNs, and implementing LANs using tools like Cisco Packet Tracer and GNS3.
- **Analyze and troubleshoot network performance** using diagnostic tools such as ping, traceroute, and Wireshark, while enabling resource sharing through DHCP, FTP, print servers, and wireless optimization.

Course Outcomes: After completion of the course, the students will be able to:

CO	Course Outcomes	BT Level (L1 to L6)
C01	Compare transmission media and build a LAN using Cisco Packet Tracer.	L2
C02	Configure IP addressing, troubleshoot with network tools, and explain OSI layers.	L2
C03	Identify network devices and configure VLANs for segmentation.	L3
C04	Apply static routing, create subnets, and secure a wireless network.	L3
C05	Analyze network traffic with Wireshark and simulate performance.	L4
C06	Create a secure LAN with VPN, FTP, and print server configurations.	L6

General Guidelines for Practical's

- Minimum 8 experiments should be conducted covering the entire syllabus.**
- The following list of practicals may be considered, but it is not limited to these.**

Experiment List

- Study of Transmission Media: Compare Ethernet, coaxial, and fiber-optic cables.
- Creating a LAN using a Switch in Cisco Packet Tracer.
- To connect the computers in Local Area Network.
- Troubleshooting connectivity using ping, traceroute, and ARP.
- Assign Static IP Addresses: Manually assign IP's to devices and verify connectivity using ping.
- Explore OSI Layers using Wireshark.
- Setup a DHCP Server.
- Familiarization with networking components and devices, such as LAN adapters, hubs, switches, and routers.
- Configuring VLANs on a switch.
- Implementing static routes between two subnets.
- Subnet Creation: Subdivide a network with a specific subnet mask.
- Configuration of TCP/IP Protocols in Windows or Linux.
- Setting up and securing a basic wireless network.



14. Capturing and analyzing packets with Wireshark.
15. Configuring a basic VPN for secure communication.
16. Simulating network performance with tools like Packet Tracer or GNS3.
17. Install Print server in a LAN and share the printer in a network.
18. Transfer files between systems in LAN using FTP Configuration.



Program:	B. Tech. (Computer Science and Engineering)			Semester:	IV			
Course:	Business Fundamental & Entrepreneur			Code:	BTCSHN02CS4T			
Teaching Scheme				Evaluation Scheme				
Lecture	Tutorial	Hours	Credit	TA	MSE-I	MSE-II	ESE	Total
2	-	2	2	10	15	15	60	100
Methods of Teacher Assessment (TA): Class Tests, Assignments, Quiz & Class Attendance								
Course Objectives: To develop an entrepreneurial mindset among learners.								
Course Outcomes: After completion of the course, the students will be able to:								
CO	Course Outcomes							BT Level
CO-1	Explain the fundamental concepts of entrepreneurship							L2
CO-2	Apply creative thinking techniques and innovation models to identify and develop viable business ideas.							L3
CO-3	Analyze the role of E-commerce and M-commerce in modern business practices							L4
CO-4	Evaluate different sources of funding and resource management strategies for setting up and running an entrepreneurial venture effectively.							L5

Unit I: Concept of Entrepreneurship

(6 Hrs.)

Concept of Entrepreneurship, Entrepreneurs as Agents of Change, Who are Entrepreneurs?, Nature of Entrepreneurship, Myths about Entrepreneurship, Entrepreneurs and Value Creation, Theories of Entrepreneurship, Entrepreneur Vs Manager, Role of Entrepreneurs in economic Development, Entrepreneurial Mindset and Decision Making, How Successful Entrepreneurs Think, Commitment, Determination and Perseverance, Disciplined and Determined to Achieve, Self-Confidence and Optimism, Tolerance for Failure, Opportunity Orientation, Initiative and Responsibility, Persistent Problem Solving, High Energy Levels and Intensity of Purpose, Strong Interpersonal Skills and Team-Building Abilities, Creativity and Innovation, Entrepreneurial Decision-Making Process

Unit II: Creativity and Innovation

(6 Hrs.)

Introduction, What is Creativity?, Components of Creativity, What is Creative Thinking?, Four Different Approaches to Creativity, Lateral Thinking, The Creative Process, Characteristics of Creative People, Increasing Creativity in Organizations, Innovation, Social and Commercial Entrepreneurship, The Concept of Business & Types of Business, Features of Private Limited and Public Limited Company, Facilitators, Inhibitors to Business.

Unit III: Role of E-commerce and M-commerce:

(6 Hrs.)

What is E-commerce?, Three Components of E-commerce Advantages of E-commerce, Disadvantages of E-commerce, T, M-commerce, M-commerce Applications, M-commerce: Key Drivers of Growth, Threats to E-commerce and Solutions, E-commerce: Future Scenario, M-commerce Benefits for Businesses, Benefits from M-commerce for Consumers, Limitations of M-commerce, M-commerce: The Future Scenario, Technological Innovations: Economic Viability and Ethical Issues: Introduction, Challenges of Innovation, Key Factors in Technology Decisions, Why Do Firms Fail to Innovate?, Generation of Business Ideas and Economic Viability, Principles of Innovation, The Ethical Side of Entrepreneurship, Ethical and Unethical Behaviour: Dilemmas, Creating an Ethical Workforce: Guidelines for Managers.



Unit IV: Generation and Utilization of Resources:

(6 Hrs.)

Introduction, Estimating Requirement of Funds, Equity Capital and Self Funding, Lease Financing, Angel Financing, Utilization of Funds, Business Plan Asset Management, The Concept of Market Introduction, What is a Market?, Evolution of Marketing Concept, Marketing and Marketing Concept, Marketing Functions, Benefits of Marketing, criticism of Marketing.

Total: 24 Hrs

Textbooks:

1. Business, Entrepreneurship and Management By V S P Rao, Vikas Publishing House Pvt Ltd.

Reference Books:

1. Entrepreneurship New Venture Creation By David H. Holt, Pearson Publication.

MOOC Links:

1. NPTEL Course: Business Fundamentals for Entrepreneurs
https://onlinecourses.nptel.ac.in/noc25_mg13/preview



Revision No	Revision Date	Nature of Change	Approved By
1	30/03/2026	Introduction to Cyber Security (BTCSPC11CS4T) Changed to Introduction to Cyber Security (BTCSPC29CS4T)	Academic Council
2	30/03/2026	Data Communication & Networking (BTCSPC12CS4T) Changed to Data Communication & Networking (BTCSPC30CS4T)	Academic Council