Second Year - Semester III
Name of the Programme : Bachelor of Computer Applications
Course Code : CSA - 200
Title of the Course : Data Structures
Number of Credits : 4 (3T + 1P)
Effective from AY : 2024-25

Prerequisites for the Course:	Knowledge of C programming language	
Course Objectives:	1. To understand the concept of Algorithms. 2. To discuss linear and non-linear data structure 3. To implement data structure concepts	
Units	**Content**	**No of hours**
I	**Algorithm Basics** – Algorithms and Data Structures, Pseudocode, Algorithm Features. **Data Structures:** Basic concepts, concepts of Linear and Non-Linear data structures, Array as data structure. Concept of ADT. **Searching and Sorting using array:** Searching (Linear & Binary) Sorting (Bubble Sort, Selection Sort & Insertion Sort).	**15**
II	**Stacks and Queues** (Using Arrays) Definition, Structure, Examples, Applications, and Basic Operations. **Linked Lists** (Linear and Doubly) Definition, Structure, Examples, Applications, and Basic Operations. Stacks and Queues using Linked List	**15**
III	**Trees:** Basic, Binary Tree and Binary Search Tree. **Graphs** – Graph Terminology, Representation, Traversals,	**15**
IV	**Practical Work** Using C programming language, data structure concepts to be covered in practicals are mentioned below.	**Practical Hours (30)**
Week 1 and 2	**Implement programs :** Array implementation - Creation, insertion, deletion	**04**
Week 3 to 5	**Searching and Sorting:** Searching (Linear & Binary) Sorting (Bubble Sort, Selection Sort & Insertion Sort).	**06**
Week 6 to 8	Stack & Queue data structure using arrays.	**06**
Week 9 to 12	Linked List data structure, Stack & Queue using linked list.	**08**
Week 13 to 15	Binary Search Tree.	**06**

Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2.Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 3.Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5.Show the different ways to solve the same problem and encourage the students to come up with their creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 7. To promote self-learning, give at least one assignment (equivalent to 50% assignment weightage) where they can complete one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.
References/ Readings:	**Main Reading :** 1. E. Balagurusamy.(2017). Data Structures using C. McGraw Hill Education. FirstEdition. 2. Yashavant Kanetkar(2019). Data Structures through C. BPB. Third Edition. **Additional Reading:** 1. Prabhakar Gupta(2011).Data Structures using C. Laxmi Publications.
Course Outcomes:	**On completion of the course, students will be able to:** 1. Remember the basic concepts of Data Structure. 2. Understandthe concept of linear and non-linear data structures. 3. Analyze various data structures types and its implementation.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-201
Title of the Course : Database Management Systems
Number of Credits : 4 (3T + 1P)
Effective from AY : 2023-24

Prerequisites for the Course:	None	
Course Objectives:	1. To understand the basic concepts of database management systems and the process of database design using ERD, Schema design, and relational / table design. 2. To learn normalization concepts, basic relational operations and transaction processing and concurrency control concepts. 3. To learn to define and manipulate the relational databases in SQL using a suitable RDBMS system.	
Units	**Content**	**No of hours**
I	**Introduction to DBMS** Data, Database, Database system, Database Management System, File oriented systems and its limitations; Three schema, levels of Data Abstraction, Database Architecture (Internal, Conceptual, View) and Data Independence Database Languages: Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL), Transaction Control Language (TCL) Database Users, DBMS functions, Advantages and Disadvantages Database Administration and Control: Functions Brief overview of Hierarchical, Network, Relational, Object-relational and Object-oriented data models **E-R Model** Data Modelling using Entity-Relationship Model ● ER Diagram Concepts & Terminologies ● Concept and Types of Entities, attributes, and relationship sets ● Key attribute, and domain of an attribute. ● Degree of a relationship set, cardinalities, ● Total and partial participation ● Generalization, specialization, aggregation ● integrity constraint, Referential integrity constraint and Key constraint. **Activity:***Apply the concepts learned to design the ERD of at least 3 to 4 basic and different types of applications.*	**15**
II	**Relational Data Model** Relational model concepts. Characteristics of relations;	**15**

	Types of keys-super key, candidate key, primary key, and foreign key Relational model constraints: Domain constraints, key constraints, primary and foreign key constraints, integrity constraints, and null values; Mapping Conceptual model into a normalized relational schema ***Activity:*** *Apply the concepts learned and convert the ERD designed in the previous Unit into a relational schema.* **Relational Operations** Basic/Fundamental Operations: Concept and Examples ● Select (σ) ● Project (∏) ● Union (∪) ● Set Difference (-) ● Cartesian product (X) ● Rename (ρ) Derived Operations: Concept and Examples ● Natural Join (⋈) ● Left, Right, Full outer join (⟕, ⟖, ⟗) ● Intersection (∩) ● Division (÷) Basic Concepts of Triggers, Views, and Procedures	
III	**Normalization** Anomalies in a database Functional dependencies ● Armstrong's axioms/properties of functional dependencies ● Types of Functional dependencies Normalization Rules - 1NF,2NF, 3NF and Higher NF First Normal Form:1NF, Why convert to 1NF, Conversion to 1NF Second Normal Form: 2NF Functional Dependency and Fully Functional Dependency Why convert to 2NF, Conversion to 2NF Third Normal Form: 3NF Transitive Dependency why convert to 3NF, Conversion to 3NF Boyce- Codd NF, Convert to BCNF Normalization considerations: Good and bad decomposition **Activity:** *Apply the concepts learnt to show the step-wise normalization process of tables from 1NF till BCNF by outlining appropriate reasoning of at least 3 basic and different types of applications.* **Transaction processing concepts**	**15**

	● Concept and state Diagram of Transactions ● ACID Properties ● Serializability: Conflict & View ● Schedule: Serial & Non- Serial ● Lock-based concurrency control ● Two-Phase Locking Protocol ● Transaction Recovery (log based)	
IV	**List of Practicals** To be done using any suitable RDBMS software like MYSQL	**Practical Hours (30)**
Week 1 & 2	1. Introduction and installation of DBMS Software 2. Database creation, alteration and deletion 3. Table creation, alteration, and Deletion 4. Identify and add appropriate data types to the fields 5. Add primary key and domain constraints to the table 6. Inserting data in the created tables 7. Data Manipulation language: Simple select query, Select with where clause	**04**
Week 3 to 7	8. Add Foreign key constraints to the table 9. Creating tables along with the primary key, foreign key, check, and other column constraints 10. To add rows in created tables, updating column(s) and performing deletions using truncate and delete should be done. 11. Group function and having clause 12. Operators 13. Aggregate Functions 14. Set operations 15. Sorting data	**10**
Week 8 to 10	16. Write SQL statements to perform operations using sub-queries for the following: ● Returning single-row ● Returning multiple rows ● Returning more than one column ● Correlated subquery	**06**
Week 11 to 13	17. Write SQL statements to implement the following types of SQL joins ● INNER JOIN ● LEFT OUTER JOIN ● RIGHT OUTER JOIN ● FULL OUTER JOIN Complex Queries using Joins, Aggregate Function and Correlated subqueries using set sub-queries & exist clause. 18. Write an SQL statement to show how VIEW can	**06**

	be created, altered, and dropped.	
Week 14 & 15	19. Demonstration and understanding on the following a. SQL statements to create simple triggers & stored procedures b. SQL statements to start a transaction, commit, rollback and define various save points in the queries. c. SQL statements to lock tables in read or write mode and also to perform unlock on the tables. d. SQL statements to assign and revoke privileges to/from users and user roles.	**04**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a) Video/Animation to explain various concepts. b) Collaborative, Peer, Flipped Learning etc. 2. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 7. To promote self-learning, give at least one assignment where they can complete at least one MOOCs (certificate or equivalent) course out of lecture hour. 8. Test their understanding through quizzes or presentations.	
References/ Readings:	**Main Reading** 1. Elmasri, R., & Navathe, S. B. (2015). *Fundamentals of Database Systems* (7th ed.). Pearson Education. 2. Silberschatz, A., Korth, H., & Sudarshan, S. (2013). *Database System Concepts* (6th ed.). McGraw Hill. **Additional Reading** 1. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition 2. Ramakrishnan, R., & Gehrke, J. (2002). *Database Management Systems* (6th ed.). McGraw Hill.	

Course Outcomes:	On completion of the course, students will be able to: 1. Remember the basic concepts and terminologies of DBMS, ERD, Normalization, and Transaction Processing. 2. Understand ER diagrams, Normalization, relational schema design, Relational Operations, Transaction Processing, and SQL concepts. 3. Apply & discuss the concepts of ER Diagram, Relational Model and Normalization. 4. Design relational database and formulate queries on the database and data using different SQL constructs mentioned in the syllabus.

Name of the Programme : **Bachelor of Computer Applications**
Course Code : **CSA-211**
Title of the Course : **Reasoning Techniques**
Number of Credits : **4 (3T+1 Tutorial)**
Effective from AY : **2024-25**

Prerequisite for the Course:	None	
Course Objectives:	1. To assess problem statement and make logical decisions 2. To interpret given data and derive conclusions 3. To understand Data interpretation and Data sufficiency 4. To solve problems using mathematical logic	
Units	**Content**	**No of Hours 60 (45T + 15 Tutorial)**
Tutorial Session Instructions	1. Tutorial lecture of 1 hour duration to be conducted each week. 2. Suggestive concepts/exercises needed to be discussed during tutorial hours every week are mentioned after Unit III. 3. These sessions may also be utilized for the doubt clearance	
I	**Statements & Arguments, Decision Making** ● Logic, Statements, Arguments, and Assumptions, Statements and Course of Action, Logical Venn Diagrams, Statements and Conclusions, Syllogism ● Seating Arrangement, Ranking & Time Sequence Test, Blood Relations, Direction Sense Test, Conditions & Grouping, Simple & Coded Inequality, Decision Making, Clocks and Calendar, Situation Reaction Test	**15**
II	**Data interpretation** ● Decision-making, Judgement, Problem-solving, Analogies, Analysis, Differences, Discrimination ● Arithmetic series, Similarities, Verbal & figure classification, Space visualization, Observation ● Simple Problems on Data interpretation and Data sufficiency	**15**
III	**Logic Building** ● Introduction, Statements, Logical Connectives and Compound Statements: Negation, Conjunction, Disjunction, Implication, Converse and Inverse, logical Equivalence, Tautologies: Contradiction, Contingency, Algebra of Propositions, Argument, Predicate and Quantifiers. ● Mathematical induction, deduction, proof by contradiction, program correctness.	**15**
Tutorial	List of suggested Tutorial Activities to be conducted in 15 weeks.	**15**
	● Solve Problems to be able to distinguish between Strong	

	and Weak arguments. (Statement and Argument) ● Problems to assess a given statement and decide which of the given assumptions is implicit in the statement. (Statement and Assumptions) ● Problems to find out which of the conclusions definitely follow from a given statement. (Statement and Conclusions) ● Problem to analyse the statement and decide course of action. (Statement and Course of Action) ● Problem to analyse relation and decipher the relationship. (Blood Relations) ● Problems to ascertain the final direction or distance between two points (Direction Sense Test) ● Problems to analyse a given situation and choose the best response. (Situation Reaction Test) ● Problems to relate a given group of items and illustrate it diagrammatically. (Logical Venn Diagram) ● Problems on Data Interpretation, Data Sufficiency. (Data Interpretation) ● Problems based on fragmentation of a figure into sample parts, pattern rearrangement. (Data Interpretation) ● Problems on Induction, Deduction, Constructing and Understanding Truth Tables. (Mathematical Logic)	
Pedagogy:	1. Lecture methods need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning etc. 2. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking. 3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyse information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 7. To promote self-learning, give atleast one assignment where they can complete at least one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.	
References/ Readings:	**Main Reading** 1. A.K. Gupta,. Logical and Analytical Reasoning. Ramesh Publishing House. 34th edition 2. Arun Sharma. How to Prepare for Logical Reasoning for the CAT.	

	McGraw Hill Education (India) Private Ltd. 8th edition **Additional Reading** 1. Peeyush Bhardwaj. Analytical & Logical Reasoning for CAT & Other Management Entrance Tests. Arihant Publications. 4th edition
Course Outcomes:	**On completion of the course, students will be able to:** 1. Remember basics rules of logic and reasoning 2. Understand various logic and reasoning concepts & techniques. 3. Apply the suitable reasoning techniques to solve real world problems 4. Analyze the obtained solution with suitable and relevant logic / reasoning.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-212
Title of the Course : Techpreunership Development
Number of Credits : 4 (3T + 1 Tutorial)
Effective from AY : 2024-25

Prerequisites for the Course:	None	
Course Objectives:	1. To understand the basic concepts of Technopreneurship and experience the entrepreneurial process from the generation of creative ideas. 2. To understand the market needs or provide a solution to a key problem. 3. To discuss Intellectual Property strategy to protect inventions and innovations of new ventures. 4. To create and present a business plan for a technology idea.	
Units	**Content**	**No of hours60**
I	**a. Introduction to Techpreunership** • Concept of Technopreneurship • Technopreneur Vs Entrepreneur • Traits and characteristics of Technopreneur • Importance of Technopreneurship • Successful Global and Local Technopreneurs • Challenges in Technopreneurship **b. Idea, Innovation & Creativity** • Opportunity identification and idea generation – Case studies, Case scenarios • Basic concepts in Idea, Innovation & Creativity • Characteristics of an Innovative or a Creative Individual • Principles of Innovation • Types of innovation: Product, Process, and Business model • Importance of Creativity and Innovation • Factors that impact Innovation and Creativity	**15**
II	**Introduction to Intellectual Property** • Needs of Intellectual Property • Types of Intellectual Property • Procedure to register • Intellectual Property of a product • Importance of Intellectual Property in business • Copyright & trademarks regulations • Patents, trade secrets, contracts, non -disclosure and non -compete agreements	**15**

III	**Market Research & Customers Identification** • Customer Needs, Pain Points and Demographics • Market Research and Validation • The Decision-Making Process (Rational Decision Making) • Customer Profiling – STP (Segmentation, Targeting and Processes) **Planning IT Business & Execution** • Principles and concepts of business ownership • Types of business ownership • Factors that influence in starting a new entrepreneurial venture • Roadmap for research, development, and production • Develop IT Business Plan • Importance of a Business Plan • Criteria of a good Business Plan • Determine business plan outline	**15**
IV	**Tutorial (case studies)** Tutorial lecture of 1 hour duration to be conducted each week.	**15 hours**
Week 1 & 2	**Case studies on successful Technopreneurs of Goa** • Analyze a specific case study(s) on successful technopreneurs, examining the key decisions, innovations, and challenges they faced. • Evaluate the impact of their entrepreneurial ventures on the technological landscape and the broader economy of the country.	**2**
Week 3 to 6	**Group Activities** • Imagine you are a founder of a tech startup, and you're facing a common challenge in the industry. Your team is tasked with coming up with an innovative solution. Discuss and outline a step-by-step process you would follow to encourage creative thinking and generate unique ideas within your startup environment. • Be sure to include specific methods, tools, or techniques you would employ, and explain how you would foster a culture of continuous innovation within your team. • Additionally, consider potential obstacles and how you would address them in the pursuit of turning innovative ideas into successful implementations.	**4**
Week 7 & 8	**Report- How can emerging tech startups effectively utilize market research techniques/methods to gain a competitive edge and understand customer needs**	**2**

	● Provide a detailed exploration of practical strategies, tools, and methodologies that tech startups can employ in their market research efforts to inform product development, target audience identification, and overall business strategy.	
Week 9 & 10	**IPR Patent Filing Process Report:** ● Provide a detailed exploration of the practical aspects involved, including documentation requirements, legal considerations, potential challenges, and strategies for a successful patent filing	**2**
Week 11 & 12	**Case studies on India Government policies towards supporting entrepreneurship** ● Using a specific case study(s), analyze the effects of these policies on the development, challenges, and opportunities for entrepreneurs, highlighting key strategies and outcomes.	**2**
Week 13 to 15	**Business Plan Creation- Create a business plan for an IT company with the following key considerations.** ● Develop a comprehensive guide outlining the essential components, market analysis, financial projections, and strategic planning necessary to establish a robust business plan tailored to the specific needs and goals of the imaginary IT company of your choice."	**3**
Pedagogy	1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding. 3. Adopt Problem-Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 5. Discuss how every concept can be applied to the real world - and when that'spossible, it helps improve the student's understanding.	
References/ Readings:	**Main Reading** 1. Arya Kumar (2012). Entrepreneurship Creating And Leading An Entrepreneurial Organization. PEARSON INDIA. 2. Mathur, C. A. (2021). Taxmann's Entrepreneurship – Simple, Systematic Explanations along-with Comprehensive Coverage of the Concept & Theories). Taxmann Publications Private Limited.	

	Additional Reading 1. Bruce R. Barringer, R.Duane Ireland (2020). Entrepreneurship: Successfully Launching New Ventures,Pearson Education. 2. Dr. Rakesh Kumar Singh, Arunabha Banerjee (2022). Intellectual Property Rights - A Textbook on IPR (Intellectual Property Rights). 3. Ramakrishna B & Anil Kumar H.S (2017). Fundamentals of Intellectual Property Rights : For Students, Industrialist and Patent Lawyers.
Course Outcomes:	**On completion of the course, students will be able to:** 1. Understand the importance of idea, innovation and requirements in starting a business 2. Explain the concepts of Intellectual Property Rights (IPR). 3. Analyze the Opportunities of a potential scalable business through market research. 4. Develop a business plan and implement their planning skills.

Name of the Programme : **Bachelor of Computer Application**
Course Code : **CSA-213**
Title of the Course : **Computer Organization & Architecture Fundamentals**
No. of credits : **4 (3T + 1P)**
Effective from AY : **2024-25**

Prerequisites for the Course:	None	
Course Objectives:	1. Conceptualize the basics of Computer Organizational and Architectural issues and classify the computers based on performance and machine instructions. 2. Learn various data transfer techniques and the I/O interfaces 3. Estimate and compare performances of various classes of memory 4. Understand the basics of ALU implementation, hardwired and micro-programmed control units, pipelining and parallel architectures	
Units	**Content**	**No of hours**
I	**Data representation**: Data Type Representation, Number System, Signed number, fixed, floating point, character representation, Addition, Subtraction, Multiplication - Shift and Add, Booth's Algorithm, Division Pseudo-code: Definition and its attributes, constructs, and Examples **Introduction to Computer Architecture**: Introduction to Computer Architecture, Flynn's Classification of Computers, Performance Metrics (like Latency, throughput), Fundamental Blocks of Computer (like CPU, I/O subsystems, memory, control unit), computer function, interconnection structures, Bus interconnections	**15**
II	**Memory Hierarchy**: Hierarchical memory organization, Types of Memory-internal and external, Cache memory, Memory interleaving, **Peripheral devices:** Types of Peripheral Devices, I/O subsystem,programmed I/O, Interrupt-driven I/O, DMA, I/O channels and processors	**15**
III	**Instruction Set Architecture (ISA):** Introduction to Instruction Set, Types of ISA; RISC, CISC; Processor Organization, Registers organization, Instruction Execution Cycle, Instruction formats, Addressing Modes; Register Transfer Language (RTL), Assembly Language Programming, X86-Architecture, ARM Architecture	**15**
IV	**Practical Work** Writing assembly language programs in 8086 using MASM or compatible assembler either in Windows or Linux.	**Practical Hours (30)**
Week 1 & 2	1. Introduction to 8086 architecture and instruction set 2. Find the sum of 1 + 2 + 3 + ……+ n	**04**
Week 3 & 4	3. Display the multiplication table of a number	**04**

	4. Store and retrieve numbers from memory	
Week 5 & 6	5. Block Transfer 6. Block Transfer in reverse order	**04**
Week 7, 8 & 9	7. Sort the numbers stored in the memory (Any two methods) 8. Searching methods	**06**
Week 10 & 11	9. Masking of bits 10. Counting of number of bits	**04**
Week 12 & 13	11. Count the number of even or odd numbers from a given set of numbers 12. Check if the number is a palindrome	**04**
Week 14 & 15	13. Count the number of positive and negative numbers from a given set of numbers 14. Generate a series like 1,3,5,7. up to n terms	**04**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** Lectures, Tutorials, Collaborative/peer learning, Hands-on assignments	
References/ Readings:	**Main Reading** 1. William Stallings. (9th Edition). Computer Organization and Architecture: Designing for performance. Prentice Hall of India. 2. John L. Hennessy & David Patterson. (5th Edition). Computer Architecture: A Quantitative Approach. Morgan Kaufmann.	
Course Outcomes:	On completion of the course, students will be able to: 1. Recall the basic concepts & terminologies of Computer Organisation. 2. Understand the concepts of data representation, computer & instruction set architecture, memory hierarchy, and peripheral devices. 3. Apply the concepts of data representation, Assembly Language, and performance matrices in solving basic problems. 4. Analyze multiplication & division algorithms at basic level and basic design issues in terms of speed, technology, cost, performance, CPU architecture.	

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA 231
Title of the Course : Cyber Law and Ethics
Number of Credits : 3T
Effective from AY : 2024-25

Prerequisites for the Course:	None	
Course Objectives:	1. To understand the basic concepts of cyber law, cyber security, and the need for privacy protection and intellectual property protection. 2. To comprehend the importance of ethics for IT professionals and IT organizations.	
Units	**Content**	**No of hours 45**
I	**Overview of Ethics, Ethics for IT Workers and IT Users** Ethics, Ethics in the Business World; Corporate Social Responsibility; Fostering Corporate Social Responsibility and Good Business Ethics; Improving Business Ethics; Ethical Considerations in Decision Making; Ethics in Information Technology; Managing IT Worker Relationship; Encouraging Professionalism of IT Workers — Professional Codes of Ethics, Professional Organizations, Certifications and Licensing; Encouraging Ethical Use of IT Resources among Users. **Ethical Decision in Software Development and Ethics of IT Organizations:** Software Quality and its Importance; Strategies for Developing Quality Software; Use of Contingent Workers; H-IB Workers; Outsourcing; Whistle-Blowing.	**15**
II	**Cyberattacks, Cybersecurity, and Cyber Law:** Threat Landscape — Computer Incidents, Types of Exploits; CIA Security Triad; Confidentiality, Integrity, Availability, Implementing CIA at Organizational, Network, Application, and End-User Level; Response to Cyber Attack – Incident Notification Protection of Evidence and Activity Logs Incident Containment Eradication Incident Follow-Up Using an MSSP, and Computer Forensics; Cyber Law; Provision of Cyber, Overview of IT Act 2000, Code of conduct for computer professionals, Amendments and Limitations of IT Act.	**15**
III	**Privacy, Freedom of Expression, Intellectual Property and Organizational Ethics:** Privacy Protection and the Law – Information Privacy, Privacy Laws, Applications, and Court Rulings; Key Privacy and Anonymity Issues Consumer Profiling, Electronic Discovery, Workplace Monitoring, Surveillance; First Amendment Rights; Freedom Expressions: Key Issues;	**15**

	Social Networking Ethical Issues. **Intellectual Property:** Intellectual Property, Copyright; Patent; Trade Secrets; Intellectual Property Issues: Plagiarism, Reverse Engineering, Open Source Code, Competitive Intelligence, Trademark Infringement, and Cybersquatting.	
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Adopt Problem-Based Learning (PBL), which fosters students' Analytical skills such as the ability to evaluate, generalize, and analyze information rather than simply recall it. 3. Show the different ways to analyze cyber laws and crimes. 4. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding	
References/ Readings:	**Main Reading** 1. George W. Reynolds,(2012) Sixth Edition. Ethics in Information Technology. Course Technology, Cengage Learning 2. Herman T. Tavani, John Wiley and Sons, Fifth Edition, 2016. Ethics and Technology: Controversies, Questions, and Strategies for Ethical Computing. Wiley **Additional Reading** 1. Michael J. Quinn, Pearson, (2015) Eighth Edition. Ethics for Information Age. Pearson	
Course Outcomes:	**On completion of the course, students will be able to:** 1. Understand the concepts of Cyber Law, Intellectual Property, and issues emerging in Cyberspace and the importance of Information Technology Act. 2. Apply knowledge in implementing IT ethics for users and organizations	

Name of the Programme : **Bachelor of Computer Applications**
Course Code : **CSA-232**
Title of the Course : **Digital Ecosystem**
Number of Credits : **3T**
Effective from AY : **2024-25**

Prerequisites for the Course:	None	
Course Objectives:	1. To understand the fundamentals of the Digital Ecosystem. 2. To analyze digital workspace concepts and the design practices. 3. To comprehend the architecture and the future of the Digital Ecosystem.	
Units	**Content**	**No of hours 45**
I	**Introduction to Digital Ecosystem:** Introduction, key elements of a Digital Ecosystem, importance, Types of digital ecosystems, working, digital ecosystem mapping, Challenges in building and managing a Digital Ecosystem, Examples of successful digital ecosystems **Approaches to Digital Ecology:** Concept of Information Ecology, Information Ecology as a Research Model, Digital business ecosystem, Digital publicity platforms **Computing of Digital Ecosystems:** Multi-Agent Systems, Evolutionary Computing, Service-Oriented Architectures, Distributed Evolutionary Computing	**15**
II	**Architecture of Digital Ecosystem:** Trends and rise of Technological Ecosystem, Ecosystem Viewpoints **Digital Workspace Concepts:** Introduction, Human-Machine interface, Contextualization of objects, places and actions, Digital User Experience (DUX) and Customer Experience (CX), Evolution of software techniques, Data analytical software development and techniques, Digital workspaces **Design Practices in Digital Enterprise:** Introduction, Example of a digital business model using digital workspaces, Design practices in digital enterprise, Future of intelligent workspaces.	**15**

III	**Reference Architecture for Digital Ecosystem (RADE)** Components of a digital ecosystem, RADE, principles in different areas of architecture; Layers of RADE- environment, Context and niche, Interaction, Adaptation to goals, Species integration and User integration; Security principles in RADE. **Case Studies** Digital ecosystem for the environment, Digital health ecosystem,Facebook ecosystem, Google ecosystem, E-Governance **Future of Digital Ecosystem** Risks in the current environment, Building a digital ecosystem for Planet, overcoming the risks, Future aspects.	**15**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, & analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 7. To promote self-learning, give at least one assignment where they can complete one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.	

References/ Readings:	**Main Reading** 1. Alessandra Lazazzara, Francesca Ricciardi, Stefano Za. (2019) Exploring Digital Ecosystems: Organizational and Human Challenges. Springer International Publishing 2. Jaydip Sen. (2018) Digital Technologies in the Digital Enterprise, Internet of Things: Technology, Applications and Standardization. IntechOpen 3. Mark Skilton (2016) Building Digital Ecosystem Architectures: A Guide to Enterprise architecting. Springer **Additional Reading** 1. Arnoud De Meyer, Peter J. Williamson, and Fiona H. Murray. (2020)Ecosystem Edge: Sustaining Competitiveness in the Face of Disruption. Stanford Business Books 2. Geoffrey G. Parker, Marshall W. Van Alstyne, and Sangeet Paul Choudary(2016) Platform Revolution: How Networked Markets Are Transforming the Economy—and How to Make Them Work for You. W. W. Norton & Company
Course Outcomes:	**On completion of the course, students will be able to:** 1. Remember key elements, types and working of Digital Ecosystem 2. Understand digital ecosystem fundamentals and computing concepts. 3. Acquire the knowledge of digital workspace and design practices in a digital enterprise 4. Analyze the architecture and the prospects of the digital ecosystem.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-233
Title of the Course : Website Design
Number of Credits : 3 (2T+1P)
Effective from AY : 2024-25

Prerequisites for the Course:	None	
Course Objectives:	1. To understand the basic principles and syntax of HTML and CSS. 2. To Effectively address common styling challenges and achieve desired visual effects through skillful use of CSS techniques. 3. To apply CSS features to create dynamic and engaging user interactions that enhance web experiences that seamlessly adapt to diverse devices and screen sizes. 4. To design simple webpages using HTML and CSS.	
Units	**Content**	**No of hours**
I	**Introduction to HTML** ● World Wide Web, URL, Domain, Text Editors used, Web Page and Website ● HTML Tags, Basic structure of an HTML document, Headings, Paragraphs, Line Breaks, Mark-up Tags ● Basic formatting tags, Hyperlinks, Images, and Multimedia, Marquee Elements ● Lists, Tables, Frames, Forms and controls (button,checkboxes,textboxes etc.), Audio and Video Tags	**10**
II	**Introduction to CSS** ● Creating Style Sheet, CSS Properties, inline and block elements ● CSS Selectors - Element Selector, ID Selector, Class Selector, Grouping Selectors, Universal Selector ● Text Properties - Letter-Spacing Property, Word-spacing Property, Text-align Property, Text-transform Property, Line-height Property, Text Decoration, and Font properties ● Table and List Properties **Advanced CSS Concepts** ● Box Model, Margins, Padding, Border, Color, Opacity ● Color Properties, Background Color, Layering Elements using Z-Index ● Animation using transitions ● Display - flexbox and grid ● Absolute and Relative Positioning, Align, Pseudo class, Pseudo-element, Responsive design - Media Queries	**20**
III	**List of experiments:**	**Practical Hours**

		(30)
Week 1	Create a simple HTML document with a title, heading, paragraph, list, and an image.	**02**
Week 2	Design a form with different types of input fields such as text, password, radio buttons, checkboxes, and a submit button.	**02**
Week 3	Style the HTML page created in Experiment 2 using CSS. Apply different font styles, sizes, and colors. Experiment with background colors and margins.	**02**
Week 4	Design a webpage with CSS focusing on text properties (letter-spacing, word-spacing, text-align, text-transform, line-height, text decoration, and font properties).	**02**
Week 5 & 6	Create an HTML document and apply CSS to style inline and block elements using various selectors (element, ID, class, grouping, universal). Experiment with color properties, background color, border color, opacity, margins, padding, and z-index.	**04**
Week 7 & 8	Implement basic animations using CSS transitions.	**04**
Week 9	Explore the use of Flexbox for layout design on a webpage.	**02**
Week 10	Create a webpage with a multi-column layout using CSS Grid. Experiment with grid properties to achieve different column structures and alignments.	**02**
Week 11	Experiment with absolute and relative positioning in CSS.	**02**
Week 12	Apply pseudo-classes and pseudo-elements to style specific states or parts of a webpage.	**02**
Week 13 to 15	Construct a webpage that adapts to different devices like desktops, tablets, and mobile phones based on screen sizes using media queries.	**06**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. Lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning etc. 2. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 3. Adopt Problem-Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and	

	when that's possible, it helps improve the students' understanding 7. To promote self-learning give at least one assignment (equivalent to 50% assignment weightage) where they can complete at least one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.
References:	**Main Reading** 1. Jonathan Fielding (2014). Beginning Responsive Web Design with HTML5 and CSS3; Apress. 2. Robin Nixon (2022). HTML5 and CSS3 Masterclass. BPB Publications **Additional Reading** 1. Ed Tittel, Chris Minnick (2013). Beginning HTML5 and CSS3 For Dummies, 1st Edition. For Dummies 2. Joe Attardi (2020) Modern CSS: Master the Key Concepts of CSS for Modern Web Development; Apress.
Course Outcomes:	**On completion of this course, students will be able to:** 1. Remember the basic concepts of HTML and CSS. 2. Understand and apply different HTML text formatting, images, hyperlinks and CSS selectors to web pages. 3. Apply CSS for styling and layout, ensuring a visually appealing and responsive design. 4. Design static webpages using Flexbox and grid layouts.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-234
Title of the Course : Enterprise Resource Planning (ERP)
Number of Credits : 3(2T+1P)
Effective from AY : 2024-25

Prerequisites for the Course:	None	
Course Objectives:	1. To study the basic concepts, evolution of ERP and its application in organization. 2. To study the life cycle/ activities of ERP. 3. To study various technologies related to ERP. 4. To analyze market trends on the usage of ERP and develop a process driven thinking towards business processes.	
Unit	**Content**	**No of hours**
I	**Introduction to ERP** ● Evolution of ERP ● What is ERP? ● Reasons for the Growth of ERP ● Modules of ERP ● Advantages and Disadvantages of ERP **An Overview of Enterprise** ● An Overview of Enterprise ● Management Information System ● Business Processes Integration ● Need of ERP for Small Business ● Business Process Mapping for ERP Module Design ● Implementation of ERP and concerns involving implementation **ERP and Information System** ● ERP and Information System ● Business Process and Business Process Reengineering (BPR) ● Management Information System (MIS) ● Executive Information System (EIS) ● Decision support System (DSS) ● Supply Chain Management ● Customer Relationship Management	**15**

II	**ERP Implementation Lifecycle** ● Issues in Implementing ERP Packages ● Pre-evaluation Screening ● Package Evaluation ● Project Planning Phase, Gap Analysis, Reengineering, Configuration, Implementation, Team Training, Testing, Going Live, End-User Training, Post Implementation (Maintenance Mode). **Advance Technologies** ● E-Procurement ● E-Logistics ● Internet Auctions ● E-markets ● Electronic Business Process Optimization ● Business Objects in SCM ● E commerce ● Customer Relationship Management	**15**
III	**Practicals** The concepts learned in the units from I and II are required to be implemented practically. The use of open source software (ERPNext, Odoo, Dolibarr, Tryton etc.) could be used to demonstrate the working of different modules used in ERP.	**Practical 30 hours**
Week 1 to 3	● Study and analyse need for Business Process re-engineering ● Case studies on ERP and their Functionalities	**06**
Week 4 to 6	● Solving Case studies/scenarios using ERP	**06**
Week 7 to 9	● Analyse, use and review any Open Source ERP softwares	**06**
Week 10 to 15	● Analyse and use the Open Source ERP System with the following modules: • Sales and Distribution (SD) • Materials Management (MM) • Production Planning (PP) • Financial Accounting (FI) • Human Capital Management (HCM) • Business Warehouse (BW)	**12**
Pedagogy:	Suggested strategies for use to accelerate the attainment of the various course outcomes. 1. Lecture methods need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. 2. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning etc.	

	3. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 4. Use of Case studies to illustrate concepts of ERP 5. Introduce Topics in manifold representations. 6. Discuss how every concept can be applied to the real world
References/ Readings:	1. Alexis Leon, (3rd or later Edition). ERP Demystified. Tata Mc Graw Hill. 2. Christian N. Madu. (July 2005) ERP and Supply Chain Management. Chi Pub.
Course Outcomes:	**On completion of the course, the students will be able to:** 1. Recall the basic concepts and issues of ERP systems. 2. Understand the concepts, techniques and processes of ERP System and its implementation. 3. Apply the basic concepts to design the ERP implementation strategies. 4. Analyse the strategic options for ERP identification and adoption.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-235
Title of the Course : LaTex
Number of Credits : 3(2T+1P)
Effective from AY : 2024-25

Pre-requisites for the Course:	None	
Course Objectives:	1. Familiarize students with the installation process and graphical user interface (GUI) of widely used typesetting software, particularly in the field of Mathematics. 2. Acquire proficiency in the application of mathematical formulae, drawing, and designing using LaTeX. 3. Recognize the significance of this software in publishing research articles, papers, project reports, and books, fostering comfort and confidence in its use.	
Units	**Content**	**HOURS 60 (30T + 30P)**
I	**Installation of LaTeX** i. Installation of Kile and MikeTeX ii. Class and packages iii. Latex programming and commands, sample packages iv. Error messages: Some sample errors, list ofLaTeX error messages **Formatting of output document** i. Fonts, symbols, indenting, paragraphs, line spacing, word spacing, titles and subtitles ii. Document class, page style, parts of the documents, table of contents iii) Command names and arguments, environments, declarations iii. Theorem like declarations, comments within text	**15**
II	**Mathematical formulae** i. Mathematical environments, math mode, mathematical symbols ii. Graphic package, multivalued functions, drawing matrices iii. Tables, tables with captions iv. References to figures and tables in text **Drawing with LaTeX** i. Picture environments ii. Extended pictures, other drawing packages iii. Preparing book, project report in LaTeX.	**15**
III	**Practical Work**	**Practical Hours (30)**
Week 1 to 3	Introduction to LaTeX i) Installation of LaTeX, Kile and MikeTeX	**06**

	ii) Class and packages iii) Latex programming and commands, sample packages iv) Error messages : Some sample errors, list of LaTeX error messages	
Week 4 to 7	Formatting of output document 1. Fonts, symbols, indenting, paragraphs, line spacing, word spacing, titles and subtitles 2. Document class, page style, parts of the documents, table of contents 3. Command names and arguments, environments, declarations 4. Theorem like declarations, comments within text	**08**
Week 8 to 11	Mathematical formulae 1. Mathematical environments, math mode, mathematical symbols 2. Graphic package, multivalued functions, drawing matrices 3. Tables, tables with captions 4. References to figures and tables in text	**08**
Week 12 to 15	Drawing with LaTeX 1. Picture environments 2. Extended pictures, other drawing packages 3. Preparing book, project report in LaTeX.	**08**
Pedagogy:	PowerPoint, Tutorials, Hybrid learning, Peer Learning	
References/ Readings:	**Main Reading** 1. Kopka, H., & Daly, P. W. (Year). *Guide to LaTeX* (4thEdition). Addison-Wesley. 2. Kumar, S. S. (2019). *LATEX - A Beginner Guide to Professional Documentation*. Laxmi Publications Pvt Ltd. **Additional Reading** 1. SwaminathanMurugan. (2022). *Latex For Beginners*. (1st edition). Notion Press	
Course Outcomes:	**At the end of the course, students will be able to:** 1. Successfully install the software and navigated its GUI, gaining a foundational understanding of its features. 2. Understand the role of LaTeX in academic publishing, and utilize the software for the preparation of scholarly documents. 3. Demonstrate the ability to effectively use LaTeX for typesetting mathematical content, creating accurate formulae, and incorporating drawings and designs within documents.	

Name of the Programme : **Bachelor of Computer Applications**
Course Code : **CSA-236**
Title of the Course : **Multimedia Essentials**
Number of Credits : **3(2T+1P)**
Effective from AY : **2024-25**

Prerequisites for the Course:	None	
Course Objectives:	1. To make the students aware of Color Models and Color harmony 2. Study basics of animation and to learn about 2D/3D animations 3. Develop creative social media ready videos with visual effects. 4. Develop and learn best practices for elements of design,audio and video editing.	
Units	**Content**	**Noof hours 60 (30T+30P)**
I	Multimedia - Introduction, Uses of Multimedia, Social & Ethical considerations, Digital Representation.	**15**
	Color Theory - Color Basics, Color Systems, Color Wheel, Complementary Colors, After Images, Color Combinations, Color & Contrast, Proportion & Intensity, Shades, Tones & Tints.	
	Introduction to Computer Graphics: Difference between Raster and Vector Graphics, Raster graphics: resolution, image compression, file formats, manipulation; Vector graphics fundamentals, file formats, shapes, transforms and filters	
	Text and Layout: character set, fonts & faces, using Text in Multimedia, Font Editing & Tools.	
II	Sound: Introduction, Digital Audio, MIDI Audio, Audio Codec & file formats, Making Digital Audio files.	**15**
	Animation: Principles of Animation, Types of Animation, Keyframe, Sprite, file formats.	
	Video: How Video Works and is Displayed, Aspect Ratio, Frame size, Frame Rate, Video Codec & File formats, Processing & Delivery.	
III	**Practical Work**	**Practical Hours (30)**
Week 1	**1.** Design a Brochure for given Product and details. Learn about different file formats	**2**
Week 2	2. Design a Brochure for given Product and details. Learn about different file formats	**2**
Week 3	3. Design a poster with given information and learn about image compression	**2**
Week 4 & 5	4. Edit the sound file and Learn about Effects and Filters of sound	**4**
Week 6 & 7	5. Record voice and learn about Audio Compression	**4**

Week 8 to 10	6. Learn Audio mixing and streaming of audio content	**6**
Week 11 to 13	7. Learn about Video editing. Prepare video with rough cut, Prepare video content with title and special effects.	**6**
Week 14 & 15	8. Record video content and learn about video compressions, Prepare Video content for vimeo / youtube. Note: -(Practical can be done using GIMP, Inkscape, Scribus, Photoshop, Illustrator, Flash, Blender, Audacity, Lightworks.)	**4**
Pedagogy:	1. Conventional Lecture method 2. Case based learning 3. Experiential Design Thinking 4. Formative and summative assessments 5. Live experimental projects	
References/ Readings:	**Main Reading:** 1. Chapman, N., & Chapman, J. (2004). *Digital Multimedia* (2nd ed.). Wiley. 2. Parekh, R. (2017). *Principles of Multimedia* (2nd ed.). McGraw Hill Education. 3. Tay, V. (2011). *Multimedia: Making it Work* (8th ed.). Tata McGraw-Hill.	
Course Outcomes:	**On completion of the course, students will be able to:** 1. To remember the fundamentals and underlying theories of Multimedia. 2. To understand animation and to design and develop 2D/3D animations 3. To analyze the best practices for elements of design, audio and video editing. 4. To create films, visual effects for the creative media.	

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-241
Title of the Course : Multimedia Applications
Number of Credits : 3 (1T + 2P)
Effective from AY : 2024-25

Pre-requisites for the Course:	None	
Course Objectives:	1. Introducing terminologies and technologies in multimedia. 2. Learning different types and forms of multimedia. 3. Learn storage and access mechanisms of each multimedia file type.	
Units	**Content**	**No of hours**
I	**Introduction to Multimedia & Graphic Design Fundamentals** • Definition and Characteristics of Multimedia • Evolution of Multimedia Technologies • Multimedia Elements: Text, Images, Audio, Video, Animation • Multimedia Hardware and Software • Principles of Graphic Design • Image Editing Techniques • Creating and Manipulating Vector Graphics **Audio ,Video Production and Animation Principles** ● Basics of Sound and Audio Editing ● Video Production Process ● Editing Techniques using Software ● Incorporating Sound and Music in Multimedia ● Basics of Animation ● 2D and 3D Animation Techniques **Virtual and Augmented Reality (VR/AR) & Multimedia in Social Media.** ● Basics of VR and AR Technologies ● Developing Multimedia Content for VR and AR ● Social Media Platforms and Trends ● Creating Multimedia-rich Content for Social Media ● Social Media Campaign Planning and Execution	**15**
II	**Practical Work**	**Practical Hours (60)**
Week 1 & 2	**Graphic Design** :- Practical exercises using graphic design software to create posters, banners, and digital artwork (task: designing a Banner for an event)	**8**
Week 3 to 5	**Audio Editing**:- Audio recording ,Audio storage and conversion , Audio mixing and rendering.	**12**
Week 6 to 9	**VideoEditing** :- Video Capturing and Editing, Effects and transitions,color correction, Video composition and rendering.	**16**
Week 10 to 12	**Animation :**- introduction to animation software and practical animation exercises (task: short animation sequence using a 2D	**12**

	/ 3D Sequence)	
Week 13 to 15	**Social Media Content Creation:** :- Planning and executing a social media campaign using the components of multimedia.	**12**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills . 3. Introduce Topics in manifold representations. 4. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 5. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 6. To promote self-learning, give at least one assignment (equivalent to 50% assignment weightage) where they can complete one MOOCs (certificate or equivalent) course out of lecture hour. 7. Practical shall be performed in the laboratory as indicated in the syllabus. 8. A softcopy of e-journal shall be maintained clearly mentioning the name of the experiment and other required information. 9. Mini-Project may be given as part of assessment	
References/ Readings:	**Main Reading:** 1. Brie Gyncild. (2012) Adobe Photoshop CS6. Pearson Education 2. Mischeal Hammel,(2012) The Artist's Guide to GIMP, 2nd Edition,No Starch Press 3. Ranjan Parekh, (2017) Principles of Multimedia.2nd Edition. McGraw Hill **Additional Reading** 1. Douglas Spotter Eagle ,(2004) Using Soundtrack , 1st Edition .CMP Books 2. Kusum Lata and Rishabh Anand (2015) ,Computer Graphics and Multimedia, Satya Prakashan	
Course Outcomes:	**On completion of the course, students will be able to:** 1. Remember the Multimedia elements 2. Understand methods for integrating different types of media seamlessly into multimedia projects 3. Apply design principles specific to multimedia , Ensuring visually appealing and effective communication 4. Implement and Execute multimedia projects applying design principles ensuring practical application of visual and interactive design concepts.	

Name of the Programme : **Bachelor of Computer Applications**
Course Code : **CSA-242**
Title of the Course : **Search Engine Optimisation**
Number of Credits : **3 (1T + 2P)**
Effective from AY : **2024-25**

Prerequisites for the course	None	
Course Outcomes:	1. Learn the concept of Search Engine, Search Engine Optimization and importance of Links in SEO. 2. Understand Web Analytics, Search Engine Optimization, and Search Engine Marketing. 3. Analyse data and assess reports on traffic to web sites; 4. Implement page ranking in order to improve website visibility in search engine listings.	
Units	**Content**	**No of hours 75 (15T+60P)**
I	**Introduction to SEO Basics** What is SEO and key factors determine the same, Components of SEO - onsite and off page, Keyword Planning, Long tail keywords; Art and science of tags - URL, title, meta, H1, alt text, etc, Write a good meta description; Page speed, All about links - broken, internal, Dealing with duplicate content, Robot.txt and Sitemap **Linking Strategies** Importance of Links, Inbound and Outbound, PageRank, Internal links and external links, Need to link to forum, blogs and social media sites link farm. **Content Design and Page Optimization** Correcting source code of the website, Mobile Optimization and responsiveness of a site, Choosing the best writing style, Creating unique content, building infographics, Rewriting content in avoid duplication or plagiarism issues to avoid Search engine penalization **Decompile a Competitor's Website** Ways to beat the competition, Using Google Chrome, Firefox, IE as a research tool, find your competition, Find why they have good search engine rankings, check the number of cached pages of the website, analyze their site architecture, find the keywords, finding who links to them. **SEO Tools** Setup and use a Google Webmaster Account, Verify your	**15**

	website, Setup and register a Google sitemap Produce and install a robots.txt file **SEM** Introduction to SEM, Link building, blogging, social media, Viral marketing, PPC, PPA campaigns, ad campaigns, Email marketing, Affiliate marketing, Podcasting,, Rich media, Managing Ad Campaign, Campaign Targeting, PPC management and SEO Major ad networks, "Content network" vs search advertising, Writing effective ads, Creating a landing page, Conversions and calls-to-action. A/B Testing.	
II	**List of Practicals:**	**Practical Hours (60)**
Week 1	Assign a website with significant traffic for analysis to Decompile a Competitor Website: ● How to beat the competition How to use Google Chrome as a research tool ● How to find your competition ● How to find why they have good search engine rankings ● How to check the number of cached pages ● How to analyse their site architecture ● How to find the keywords they use ● How to find who links to them	**4**
Week 2	Create a relevant website to host keeping in mind: ● CSS vs table-based design ● Understanding website frames ● How to choose the best domain name ● How to choose the best hosting company ● How to validate your website pages	**4**
Week 3 & 4	Improve poorly focused pages of the website: ● Take an existing site/page and begin to optimize it with enhanced content and design. ● optimize page and file names ● Choose the appropriate website theme ● structure your page content Correct the code, optimize Meta tags, optimize page title tags, optimize Meta descriptiontags, optimize Meta keywords, optimize h tags, optimize li tags, optimize p tags, optimize alt tags, optimize title attribute tags, avoid the misuse of header tags ● Assess your site for calls-to-action ● optimize your keywords ● Rewrite the content, using longtail keywords ● integrate social media • Build Mobile responsive pages • Choosing the best writing style • Review for duplicate content	**8**

	• Avoid penalization	
week 5	Reviewing website for duplicate content issues across other sites to avoid penalization	**4**
Week 6	Apply robot controls (produce and install robots.txt file).	**4**
Week 7	Use Keyword tools to find relevant and niche keywords and analyze competitors' keywords.	**4**
Week 8	Create Inbound(backlinks) and Outbound links • Reviewing Page ranks so the best source links are utilized to build rank for your website(websites, forums, blogs, social media) • build a link farm	**4**
Week 9 & 10	Use Google Tag Manager to configure and deploy Google Analytics into your website Google. • Monitor traffic , and sessions and generate reports by analyzing the data, concentrating on different metrics used.	**8**
Week 11	Setup Google Search Console Tools and Yahoo! Site Explorer	**4**
Week 12	Setup and Register site to Google, Yahoo! And Bing: URL and Sitemaps	**4**
Week 13	Implement a comprehensive 301 redirect strategy to ensure smooth and SEO-friendly transitions when restructuring a website	**4**
Week 14 & 15	Improve load time of websites: Implement measures for Negative SEO attacks	**8**
Pedagogy	Course delivery pattern, evaluation scheme, prerequisite shall be discussed at the beginning. 1. Lectures preferably to be conducted with the aid of multimedia projector, black board, group activities, charts, cases, etc. 2. One internal written exam would be conducted as a part of internal theory evaluation. 3. One assignment based on the course content may be given to the students to evaluate how learning of objectives was achieved. It can incorporate designing of problems and analysis of solutions submitted by the student's groups. E.g. 4. Give an individual Final semester Project to select/build a site built by students to apply analytics, SEO and SEM strategies. o Complete initial SEO of individual project site 5. Write a 1-page summary of organic traffic on group site. 6. Discuss the effect of designs on organic traffic. 7. Complete landing page Complete tweaks to site to improve your conversion rate 8. Track analytics	

References/ Readings:	**Main Reading:** 1. Danny Dover and Erik Dafforn; (2011) Search Engine Optimization (SEO) Secrets, Wiley Publication,1st edition 2. Peter Kent;(2015) Search Engine Optimization for Dummies , Wugnet Publications, 6th Edition. **Additional reading** 1. Eric Enge , Stephan Spencer, Jessie C. Stricchiola(2016),The Art of SEO: Mastering Search Engine Optimization 3rd Edition.Oreilly & Associates Inc 2. Peter Kent (2020).SEO For Dummies: Going Beyond the Buzzword to Continuously Drive Growth, Improve the Bottom Line, and Enact Change. 1st edition. For Dummies.
Course Outcomes:	**On completion of the course, students will be able to:** 1. Understand the concept of Search Engine, Search Engine Optimization and importance of Links in SEO. 2. Apply Google Analytics and other metrics / tools to monitor progress in achieving search engine marketing goals and Create Pay-Per-Click Campaigns. 3. Analyse websites and implement optimal Search Engine and marketing strategies for improved revenue generation. 4. Create Web pages designed to be easily crawled and optimally indexed by search engines and Attract inbound Links from other Web Sites.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-243
Title of the Course : 3D Animation
Number of Credits : 3 (1T + 2P)
Effective from AY : 2024-25

Pre-requisites for the Course:	Basic concepts of animation	
Course Objectives:	1. Understand the basic concept of 3D animation and the its applications 2. Illustrate the importance of each process in 3D animation production pipeline . 3. Construct 3D models by employing textures, UVs, and shaders provided within a 3D modeling software. 4. Create an animation project by applying rigging, visual effects ,lighting, camera and rendering techniques provided within a 3D animation software.	
Units	**Content**	**No of hours**
I	**Introduction to 3D Animation** • Defining 3D Animation • Exploring 3D animation Industry • The History of 3D Animation **Getting to Know the Production Pipeline** • Working in 3D Animation Preproduction : Idea/Story , Script/Screenplay, Storyboard, Animatic/Pre-visualization ,Design . • Working in 3D Animation Production : Layout , Research and Development ,Modeling ,Texturing , Rigging/Setup, Animation ,3D Visual Effects ,Lighting, Rendering. • Working in 3D Animation Postproduction: Compositing , 2D Visual Effects/Motion Graphics , Color Correction , Final Output Using Production Tools , Production Bible . **Understanding Modeling and Texturing** • Introduction to Modeling • Modeling Workflows : Primitive modeling, Box Modeling, Boolean Modeling • Texturing : Applying Textures • UVs : Unwrapping UVs & mapping texture • Shaders : Basic shader attributes- Color, Ambience, Transparency, Reflectivity, Refraction, Translucency, Specular highlights, Glow. **Rigging and Animation** ● Rigging - Parenting , Skeleton System ,Constraints. ● Animation – Keyframe, Timeline, Graph Editor , Function Curves, Dope Sheet , Tracking Marks and Ghosting. **Understanding Visual Effects, Lighting, Camera and Rendering** ● Visual Effects -- Particles , Hair and Fur , Fluids , Rigid	**15**

	Bodies , Soft Bodies (Cloth) ● Lighting -- Light Types : Spot, Point, Infinite, Area . Light Attributes – Color, Intensity, Shadows . Lighting Techniques - Three-Point Lighting, Two-Point Lighting One-Point Lighting. ● Camera – Camera View, Camera Attributes-Lens type: Perspective, Orthographic, Focal Length. ● Rendering – Render engines, Basic Rendering Methods	
II	**Practical Work** Using any suitable 3D Animation software like Blender, the concepts learned in the units are required to be implemented practically. The broad area of practical problems is mentioned below.	**Practical Hours (60)**
Week 1 & 2	Introduction to 3D Animation Software, exploring the Interface Basic Modeling Tools.	**8**
Week 3 & 4	Creating various 3D models with modeling tools, Editing Polygon Mesh, Curves and NURBS.	**8**
Week 5	Applying textures and materials to 3D Models.	**4**
Week 6	Working with UV maps	**4**
Week 7	Working with Shaders	**4**
Week 8	Working with Rigs and Constraints.	**4**
Week 9	Keyframe Animations.	**4**
Week 10	Working with Graph Editor, Function Curves, Dope Sheet to create 3D animations .	**4**
Week 11	Working with Lights - Adding Lights to the scene, Light Types, World Settings and Attributes of Lights.	**4**
Week 12	Working with Cameras- Adding Cameras, Camera Navigation, Camera Properties, Animating and Switching cameras.	**4**
Week 13	Rendering – Explore Rendering Methods.	**4**
Week 14 & 15	Mini Project- Creating a short 3D Animation Scene.	**8**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills . 3. Introduce Topics in manifold representations. 4. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 5. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 6. To promote self-learning, give at least one assignment (equivalent to 50% assignment weightage) where they can complete one	

	MOOCs (certificate or equivalent) course out of lecture hour. 7. Practical shall be performed in the laboratory as indicated in the syllabus. 8. A softcopy of e-journal shall be maintained clearly mentioning the name of the experiment and other required information. 9. Mini-Project may be given as part of assessment
References/ Readings:	**Main Reading:** 1. Beane, A. (2012). *3D Animation Essentials.* (1st ed.). John Wiley & Sons. 2. Kerlow, I. V. (2009). *The Art of 3D Computer Animation and Effects*. 3. Williams, R. E. (2009). *Animator's Survival Kit*. **Additional Reading:** 1. Park, J. E. (2004). *Understanding 3D Animation Using Maya*. 2. Blain, J. M. (2024). *The Complete Guide to Blender Graphics: Computer Modeling and Animation: Volume 1* (8th ed.).
Course Outcomes:	**On completion of the course, students will be able to:** 1. Understand various aspects of 3D Animation and understand the 3D animation production pipeline 2. Apply 3D techniques that demonstrate characters with realistic motion 3. Create sophisticated 3D models within a 3D environment 4. Design and develop 3D animation scene

Second Year - Semester IV

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-202
Title of the Course : Web App Development
Number of Credits : 4 (3P + 1 Tutorial)
Effective from AY : 2024-25

Pre-requisites for the Course:	Basic Programming, Object-Oriented Concepts and DBMS Courses	
Course Objectives:	1. To understand the Fundamentals of client-side and server-side technologies 2. To understand dynamic and interactive web experiences using JavaScript and client-side frameworks. 3. To design web applications using server-side technologies and databases. 4. To apply secure web application deployment and maintenance.	
Units & Weeks	**Content**	**No of hours**
Tutorial Session Instructions	**Tutorial lecture of 1 hour duration to be conducted each week.** 1. Concepts needed for the conduct of Practical Sessions to be discussed. 2. These sessions may also be utilized for the doubt clearance 3. Suggestive client-side scripting language: JavaScript 4. Suggestive server-side scripting language: PHP 5. Suggestive frameworks for client-side scripting: Bootstrap, Zurb Foundation. 6. Suggestive frameworks for server-side scripting: Laravel, Code Igniter 7. Suggestive Database: MYSQL or MariaDB 8. Suggestive FTP Tool: FileZilla, cyberduck 9. Suggestive Control Panels: Plesk, CPanel 10. Suggestive Web server: Xampp, Wamp, EASYPHP	
I	**Client-side scripting language**	**35 (30 + 05)**
Week 1	● Introduction to client-side scripting language ● Naming convention for variables ● Operators ● Conditional statements	**7**
Week 2	● Loops ● Functions- named functions, anonymous functions, and arrow functions	**7**
Week 3	● DOM (Document Object Model) ● DOM Tree ● DOM Manipulation ● Accessing elements using DOM	**7**
Week 4	● Event Handling - Attaching events to HTML elements, Common events	**7**

Week 5	• AJAX- XMLHttpRequest Object, Working with Data Formats • Cookie(get,set) • Localstorage, • Session storage	**7**
II	Client-side framework	**21**
Week 6	• Introduction to CSS frameworks • Integrating Bootstrap into web application • Understanding Bootstrap grid system	**7**
Week 7	• Bootstrap containers • Bootstrap carousel, navbar, glyphicons	**7**
Week 8	• Bootstrap tables • Bootstrap forms • Bootstrap images • Bootstrap typography • Bootstrap color	**7**
III	**Server-side framework and Database connectivity**	**21**
Week 9	• Introduction to server-side scripting language • Input/output statements • Decision statements • Looping statements	**7**
Week 10	• Database connectivity, CRUD (Create, Update, Read and Delete) • Introduction to server-side frameworks • Downloading and installing server-side framework • Directory structure, modules, libraries • APIs, configuring database connections	**7**
Week 11	• Handling database migrations and schema changes • CRUD operations (Create, Read, Update, Delete) using framework	**7**
IV	**Data Representation and Web Hosting**	**28**
Week 12	• Data representation using XML • Data representation using JSON	**7**
Week 13	• Web Hosting (Windows/Linux) • Configuring Name Server • Configuring email service • Understanding Web Hosting file manager • Cache Management • Understanding and integrating SSL certificate into web application (OpenSSL)	**7**
Week 14 & 15	• Create a simple web application integrating client-side framework for styling and web interface, server-side scripting language and database connectivity with CRUD operations.	**14**

Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. Lecture methods need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning etc. 2. Ask at least three HOT (Higher-order Thinking) questions in the class, which promotes critical thinking. 3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 6. Discuss how various concepts can be applied to the real world - and when that's possible, it helps improve the students' understanding 7. To promote self-learning give atleast one assignment (equivalent to 50% assignment weightage) where they can complete atleast one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations. 8. One internal practical exam will be conducted as a part of internal evaluation. 9. Practical shall be performed in the laboratory as indicated in the syllabus. 10. A Hand written Hard Copy (or digital copy) of the journal shall be maintained clearly mentioning the name of the experiment and other required information.
References:	**Main Reading :** 1. Harold, E. R., & Means, W. S. (2004). XML In A Nutshell (3rd ed.). O'Reilly. 2. Haverbeke, M. (2018). Eloquent JavaScript: A Modern Introduction to Programming (3rd ed.). No Starch Press. 3. Welling, L., & Thomson, L. (2016). PHP and MySQL Web Development (5th ed.). Pearson Education. **Additional Reading :** 1. Fielding, J. (2014). Beginning Responsive Web Design with HTML5 and CSS3. Apress. 2. Stauffer, M. (2023). Laravel: Up & Running: A Framework for Building Modern PHP Apps (3rd ed.). O'Reilly. 3. Sullivan, B., & Lui, V. (2012). Web Application Security, A Beginner's Guide. McGraw-Hill Education. 4. Deitel, P. (2018). Internet and World Wide Web-How to Program (5th ed.). Pearson Education.

Course Outcomes:	**On completion of the course, students will be able to:** 1. Understand and utilize JavaScript for dynamic web behaviors, including DOM manipulation and event handling. 2. Apply a client-side framework for responsive, mobile-first web design components, and grid system to deliver visually appealing and user-friendly web experiences across various devices and screen sizes 3. Compare and setup web hosting environments, generate and install SSL certificates, and integrate them with their websites. 4. Design dynamic and interactive web applications to process user requests, interact with databases, manage server-side logic, and generate dynamic content.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-203
Title of the Course : Agile Methodologies
Number of Credits : 4(3T+1P)
Effective from AY : 2024-25

Prerequisites for the Course:	None	
Course Objectives:	1. To remember the practices and philosophies of Agile methodologies. 2. To understand agile development and testing techniques. 3. To apply best practices of agile methodologies for software development and testing.	
Units	**Content**	**No of hours 75 (45T + 30P)**
I	**Introduction to Agile and Scrum** **Agile Methodology** Agile Software Development, Traditional Model vs. Agile Model, Classification of Agile Methods, Agile Manifesto and Principles, Agile Project Management, Agile Team Interactions, Ethics in Agile Teams, Agility in Design, Agile Documentations, Agile Drivers, Capabilities and Values. **Agile Processes:** Work Products, Roles, and Practices - SCRUM, SCRUM Meetings, SCRUM Artifacts, SCRUM Events, Scrum Ceremonies, Crystal, Feature Driven Development, Adaptive Software Development,Kanban, Extreme Programming, Lean Production.	**15**
II	**Agility and Knowledge Management:** Agile Information Systems, Agile Decision Making, KM in Software Engineering, Managing Software Knowledge, Challenges of Migrating to Agile Methodologies, Agile Knowledge Sharing, Role of Story-Cards, Story-Card Maturity Model (SMM). **Agility and Requirement Engineering:** Impact of Agile Processes in RE, Current Agile Practices, Variance, Overview of RE Using Agile, Managing Unstable Requirements, Requirements Elicitation, Agile Requirements Prioritization. Agile Product Development, Agile Metrics, feature-driven development (FDD).	**15**
III	**Extreme Programming :** Introduction, Values, Principles, Practices (Customer Testing, Refactoring, Pair Programming, Collective Ownership, TDD, Continuous Integration) **Agile Testing:** Testing - Aim and objectives, verification - validation: Testing	**15**

	Levels & Testing Strategies ● Behaviour Driven Testing ● Integration - top-down, bottom-up, bi-directional ● CI/CD Agile Approach to Quality Assurance, Test Driven Development, Agile Approach in Global Software Development.	
IV	**Practical Work** Using suitable Agile Software Development tools (JIRA, Zephyr recommended), the concepts learned in the units are required to be implemented practically. The broad area of practical problems is mentioned/suggested below.	**Practical Hours (30)**
Week 1 & 2	To understand the background and driving forces for taking an Agile approach to Software Development.	**4**
Week 3	Understand the business value of adopting an agile approach.	**2**
Week 4 & 5	Installation, Configuration, and Understanding the various features of automated tools for Agile Software Development. (JIRA recommended)	**4**
Week 6 to 8	Agile workflow 1)Build a fitness tracker app that allows users to set fitness goals, track their progress, and receive personalized workout recommendations. Begin with features such as user registration, goal setting, and basic workout tracking. Iterate on the app by adding features like meal tracking, social sharing, and integration with wearable devices. 2)Develop an online learning platform. Start by creating user accounts, browsing courses, and enrolling in them. Implement features for course instructors to upload content and for students to interact through forums and quizzes. Enhance the platform with features like progress tracking, certificates upon completion, and peer-to-peer reviews. The above mentioned Projects to be created i. Creation of Project, SCRUM. ii. Creation of Backlog.	**6**
Week 9 & 10	iii. Creation of Sprint iv. Add stories to Sprint	**4**
Week 11 to 13	Test Management Activities i. Create a Test case for the above-mentioned projects. ii. Test Cases iii. Test Cycles iv. Update Test cases(passed/failed)	**6**
Week 14 & 15	i. Report Bugs ii. Reports	**4**

Pedagogy:	Suggested strategies for use to accelerate the attainment of the various course outcomes. 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning etc. 2. Ask at least three HOT(Higher-Order Thinking) questions in the class that promote critical thinking. 3. Adopt problem-based learning(PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyse information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with creative ways to solve them. 6. Discuss how every concept can be applied to the real world and when that's possible, it helps improve the students' understanding. 7. To promote self-learning, give at least one assignment where they can complete at least one MOOC (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.
References/ Readings:	**Main Reading** 1. Anderson, D. J., & Schragenheim, E. (2003). Agile Management for Software Engineering: Applying the Theory of Constraints for Business Results. Prentice Hall. 2. Hazza, & Dubinsky. (2009). Agile Software Engineering, Series: Undergraduate Topics in Computer Science. Springer. **Additional Reading** 1. Desouza,K.C.,(2007). Agile Information Systems: Conceptualization, Construction, and Management. Butterworth-Heinemann. 2. Larman, C. (2004). Agile and Iterative Development: A Manager's Guide. Addison-Wesley.
Course Outcomes:	**At the end of the course the students will be able to :** 1. Remember the practices and philosophies of Agile methodologies. 2. Understand agile development and testing techniques. 3. Apply best practices of agile methodologies for software development and testing.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-204
Title of the Course : Object-Oriented Concepts
Number of Credits : 4 (3T + 1P)
Effective from AY : 2024-25

Prerequisites for the Course:	Knowledge of any basic Programming Language	
Course Objectives:	1. To remember Object-Oriented Programming concepts. 2. To understand object-oriented paradigms: abstraction, encapsulation, inheritance, polymorphism, and apply them in problem-solving 3. To apply object-oriented solutions for real-world problems. 4. To implement appropriate OO concepts in applications.	
Units	**Content**	**No of hours 75 (45T+30P)**
I	**Introduction to OO Programming** Introduction to Object-oriented programming Problems/Limitations of Procedure-Oriented Programming Comparison of Procedure-Oriented and Object-Oriented Paradigms Object Oriented Programming Paradigms i. Classes & Objects ii. Inheritance iii. Polymorphism iv. Abstraction v. Encapsulation **Variables, scope, methods and Class Diagram** Introduction to variables, scope of variables-local, instance and class variables, Objects, Class, attributes, methods, static methods Relationship between Classes/ Objects using class diagrams and Aggregation	**15**
II	**Constructors, Destructors, and Polymorphism** **Constructors** Introduction, Types of Constructors and concepts used as Destructors, Compile and run time polymorphism **Operator and Function Overloading** Introduction Examples **Inheritance** Introduction, Base class and derived classes Private, Public and Protected members Types Of Inheritance i. Single Inheritance ii. Multilevel Inheritance	**15**

	iii. Multiple Inheritance iv. Hierarchical Inheritance v. Hybrid Inheritance	
III	**Method overriding** Virtual base classes (concept only) Abstract classes and Interfaces **Exception Handling** Introduction Types of errors Exception types-checked and unchecked Exception Handling Mechanism: Using try catch and multiple catch Nested try, throw, throws, and finally Creating user-defined Exceptions	**15**
IV	**Practical Work** The use of an object-oriented programming language for the concepts learned in the units from I to III is required to be implemented practically. The broad area of practical problems is mentioned below.	**Practical Hours (30)**
Week 1 to 3	**Introduction to Java** Application/Use of language, Simple Programs, arithmetic, logical and relational operators, Data types, Control statements, and Java Packages (Scanner, math), break and continue in loops. Predefined Java String and math functions Examples of programs: Create a simple program to print “Hello World” For if structure: -Using user input from the user check if an individual can vote or not For loop structure : -for, while, and do-while display the series 2,4,6,8,10 -Display Good Morning five times using a loop -Fibonacci series and Factorial of a number For menu-driven program : -display the area of squares, triangles, circles, and rectangles. -display appropriate object if a user selects a vowel (eg. A-apple, E-elephant). Use switch case and do-while loop. More programs may be given to the learners to complete and practice as part of their Practice Work.	**06**

Week 4 & 5	Implementing Classes and objects, Array of Objects Examples of programs: ● Create a class dog with data members' breed, size, color, and age. Create 2 dog objects and display the details. ● Create a class book with data members' brands, pages, and prices. Use an array of objects. Create 6 books. Take user input. ● More programs may be given to the learners to complete and practice as part of their Practice Work.	**04**
Week 6 to 8	Reading and writing data using methods, Modes of Parameter passing, and Return keyword. Examples of programs: ● create a class book with data members' brands, pages, and prices. using the concept of initializing by method to give values to the objects. Create 2 books. ● create a class purse with data members' color, brand, pockets, and price. using the concept of initializing by reference to give values to the objects. Create 2 purses. ● implement a program using the return keyword. More programs may be given to the learners to complete and practice as part of their Practice Work	**06**
Week 9 & 10	Constructors: Default, Parameterized, and Copy Examples of programs: ● Create a class rectangle with attributes length, breadth, and color. Create a rectangle using a default constructor. ● Create a class bag with attributes price, brand, color, and type(eg. college/office) Create 2 bags using one default and one parameterized constructor. ● Create a class shoe with data members' size, price, and color. create 3 shoes using default, parameterized, and copy constructors. More programs may be given to the learners to complete and practice as part of their Practice Work.	**04**
Week 11 & 12	Polymorphism: Function Overloading and function overriding, super keyword Examples of programs: ● Create class shapes with respective data members. Also, create classes of triangles and circles and calculate areas. Use the concept of polymorphism. Inheritance: Single, Multilevel, Multiple, Hierarchical, Hybrid, Method Abstract classes and interfaces Examples of programs: ● For single inheritance: Create a class vehicle with data members as the base class. Create a derived class motorbike from the vehicle.	**04**

	• For multilevel inheritance: Create a class wristwatch with data members as the base class. Create a class custom_belt_wristwatch as the intermediary class. Create a class custom_bracelet_wristwatch as the derived class. More programs may be given to the learners to complete and practice as part of their Practice Work.	
Week 13 to 15	**Exception Handling in Java** • Syntax for Exception Handling, Throwing and Catching mechanism, rethrowing exceptions, multiple catch, Nested try, throw, throws, and finally • User-defined Exceptions Examples of programs: Execute exceptions for arithmetic- division by zero, array index out of bounds, null pointer, string index out of bounds, etc. More programs may be given to the learners to complete and practice as part of their Practice Work	**06**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 7. To promote self-learning, give at least one assignment (equivalent to 50% assignment weightage) where they can complete one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.	
References/ Readings:	**Main Reading:** 1. Bhave, M., & Patekar, S. (2008). Programming with Java (1st ed.). Pearson. 2. Balagurusamy, E. (2010). Object-oriented programming with Java (4th ed.). Tata Mc Graw Hill Publishing House.	

	3. Schildt, H. (2017). The Complete Reference JAVA2 (10th ed.). Tata Mc Graw Hill Publishing House.
Course Outcomes:	**On completion of the course, students will be able to:** 1. Remember Object-Oriented Programming concepts. 2. Understand object-oriented paradigms: abstraction, encapsulation, inheritance, polymorphism, and apply them in problem-solving 3. Apply object-oriented solutions for real-world problems. 4. Implement appropriate OO concepts in applications.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-205
Title of the Course : Web Technology
Number of Credits : 2T
Effective from AY : 2024-25

Prerequisites for the Course:	Basic understanding of using the internet and web browsers.	
Course Objectives:	1. To introduce the fundamentals of web technology, scripting languages, and web publication. 2. To create dynamic and interactive web experiences using JavaScript and client-side frameworks. 3. To apply client and server-side programming language that can be used to create websites and web applications. 4. To explore MVC Architecture for dynamic and interactive user interfaces using views and templates.	
Units	**Content**	**No of hours 30**
I	**Introduction to web technology** ● Internet, world wide web, web 2.0 ● Client/Server paradigm ● Protocols (TCP, IP, UDP, HTTP, HTTPS, FTP, TFTP, SMTP, MIME in brief) ● Functions and features of web servers and web browsers **Introduction to client-side scripting** ● Basics of JavaScript- syntax and data types ● DOM ● Accessing and modifying HTML elements with JavaScript ● Control structures (Conditional Statement, loops) ● Functions and events	**15**
II	**Introduction to server-side scripting** ● Overview of PHP, features ● PHP syntax and variables ● Input/Output statements ● Decision Statements ● Looping Statements ● Server-side validations Database Connectivity ● CRUD (Create, Update, Read and Update) operations ● Report Generation ● Session and cookies **MVC Architecture** ● Understanding the Model-View-Controller (MVC)	**15**

	architecture ● Role of Models, Views, and Controllers in web applications ● Views and templates: Creating dynamic and interactive user interfaces ● Implementing data models: Connecting to databases, retrieving and storing data **Web Publication** ● Hosting your Site ● ISP ● Domain Names ● Name Servers	
Pedagogy:	1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 3. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding.	
References/ Readings:	**Main Reading** 1. Luke Welling, Laura Thomson (2016). PHP and MySQL Web Development, 5th Edition, Pearson Education. 2. Paul Deitel (2018). Internet and World Wide Web- How to Program, 5th Edition, Pearson Education. **Additional Reading** 1. David Flanagan (2020). JavaScript: The Definitive Guide: Master the World's Most-Used Programming Language. 2. Prof. Satish Jain , M. Geetha Iyer (2020). O Level Made Simple – Web Designing & Publishing.	
Course Outcomes:	**On completion of the course, students will be able to:** 1. Learn the fundamentals of web technology, scripting languages and web publication. 2. Explain the concepts of creating dynamic and interactive web experiences using client-side scripting language. 3. Apply client and server-side programming language that can be used to create websites and web applications. 4. Analyze MVC Architecture for dynamic and interactive user interfaces using views and templates.	

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA 221
Title of the Course : Digital Marketing
Number of Credits : 4 (3T + 1P)
Effective from AY : 2024-25

Prerequisites for the Course:	None	
Course Objectives:	1. To learn basic principles and concepts of digital marketing & advertising 2. To understand and familiarize the students with the concept of Digital Marketing and Search Engine Optimization. 3. to Analyze Marketing techniques like Adwords, search advertising, display advertising.	
Units	**Content**	**No of hours 75 (45T + 30P)**
I	**Fundamentals of Digital Marketing** Marketing in the digital world; Integrated marketing- The Phygital; Global trends in Digital Marketing; Digital channels- Paid, Owned and Earn; Fundamentals on the primary asset- your website; Careers in digital marketing; Skill development in digital marketing, Understanding Pay-per-click Advertisement; ; Keywords - planning, matching and combination , Keywords – significance and planning; Using Keyword Planner and other tools; Keyword matches and their usage.	**15**
II	**AdWords Fundamentals** Significance and evolution of AdWords in PPC, Bing Ads V/s Google Ads- overview; AdWords Certification- Overview, Benefits and Preparation; Google Ad Networks; Different Ad Formats, Campaign Structure and Organisation Quality, Rank and Relevance of Ads; Bidding and budget; Targeting Setting Extensions and their usage; Ad policies and approvals; Reports and Analysis, Metrics; Conversion Tracking; Campaign Optimisation **Search & Display Advertising with Adwords** Search with Adwords; Specifications of an Ad and how to put it to good use; Managing Invalid Clicks; Ad extensions and usage; Dynamic search ads; Landing page - your virtual front; AdWords APIs; AdWords editor- Benefits and usage; Managing multiple accounts. Display with Adwords, Google Display Network and Partnerships; Doubleclick Ad Exchange and AdSense, Campaign Creation and Structuring for display; Keyword	**15**

	and targeting through display network; Campaign Metrics: Analysis and optimization	
III	**SEO Basics** How search engines work; Different Search results and significance; Query types and significance; What is SEO and key factors determining the same; Components on SEO - onsite and off page; Keyword Planning; Using tools to get effective keywords; Long tail keywords - the hidden gems; Art and science of tags - URL, title,meta, H1, alt text, etc.; Write a good meta description; Page speed - its impact and improvement areas; All about links - broken, internal et al; Dealing with duplicate content; Robot.txt and Sitemap; Structured data and schema.org **SEO Advanced Concepts** Link building basics; Avoiding harmful links; Finding and leveraging link building opportunities; Creating a link building plan; Major Google updates and their implications on SEO; Using Search Console for SEO; KPIs of SEO; Tools for SEO; Moz SEO Products; SEMrush Competitive Research and Business Intelligence Software; Competition Analysis for SEO; Overall planning for SEO; Understanding nuances of local and international SEO; Accelerated mobile pages and SEO; Artificial Intelligence, Voice search and SEO – what to look forward	**15**
	List of Practicals	**30 Hours**
Week 1 & 2	1. Introduction to Digital Marketing and its Implementation in Business Scenarios. 2. Do a comparative analysis of their landing pages 3. Do a comparative analysis of their call to action (CTA) 4. Do a comparative analysis of website loading and websitenavigation 5. Find the rankings of Amazon, Flipkart, Snapdeal using Alexa.com	**04**
Week 3 & 4	6. Create the Digital Marketing Webpage 7. Go to any Web Hosting site and analyse the different kind of domain names, hosting options offered there. 8. Go to Wix.com and create a promotional web page in a shared hosting service	**04**
Week 5 & 6	9. Conducting Search Engine Optimization and Search Engine Marketing. 10. Use Google Adwords Keyword Planner - Select a Topic - Get Keyword Ideas	**04**

Week 7 to 9	11. Using Google Analytics to analyse website performance - Create a Google Analytics account - Install a tracking code in your Website. - Generate reports through Google Analytics - Unique Visitors, Sessions, Page Views, Referrer, Landing Page, Click through rate, Bounce rate and Exit rate, Conversion, Acquisition	**06**
Week 10 & 11	12. Creating Promotional banner through Canva. 13. Facebook Promotion using banners.	**04**
Week 12 & 13	14. Creating YouTube Channel for Markting 15. Email, YouTube and Instagram Marketing.	**04**
Week 14 & 15	16. Digital Marketing Analysis and Reports. - Analyze the change in ranking of your Web Promotion Page - Analyze the performance of your Facebook and Instagram Page - Analyze the performance of your YouTube Video,X and E-Mail Campaign - Create a comprehensive digital marketing strategy to reach out to your targeted customers in an effective manner.	**04**
Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Ask at least three HOT (Higher-Order Thinking) questions in the class, which promotes critical thinking. 3. Adopt Case Studies Based Learning , which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Test their understanding through quizzes or presentations.	
References/ Readings:	**Main Reading** 1. Ben Hunt (2011). Convert!:(Designing Websites For Traffic and Conversions, John Wiley & Sons 2. Dave Chaffey & Fiona Ellis-Chadwick,(2019) Digital Marketing: Strategy, Implementation and Practice, Pearson Education 3. Ekaterina Walter,(2014) The Power of Visual Storytelling, McGraw-Hill Education **Additional Reading** 1. Anglona's Books. (2022). *Google Adwords 2022: A Beginner's Guide*	

	to BOOST YOUR BUSINESS Use Google Analytics, SEO Optimization, YouTube and Ads. 2. Marshall, P., Rhodes, M., & Todd, B. (2020). *Ultimate Guide to Google Ads.* December 10, 2020.
Course Outcomes:	**On completion of the course student will be able to** 1. Understand digital landscape and build a case to leverage online channels 2. Analyze online campaigns successfully and develop and design Online Advertising campaigns, AdWords Campaign Management and Campaign Basics across search. 3. Evaluate organic traffic through Search Engine Optimization and 4. Apply advance concept of Search Engine Optimization to capture the right intent

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA 222
Title of the Course : Data Analysis
Number of Credits : 4 (3T +1P)
Effective from AY : 2024-25

Prerequisite for the Course:	None	
Course Objectives:	1. To understand the fundamentals of Data Analysis. 2. To learn concepts of Data Visualization and Statistical Inference. 3. To perform Regression on a dataset. 4. To implement a comprehensive data analysis project based on a real-world scenario or dataset.	
UNIT	**Content**	**No of Hours 75 (45T+30P)**
I	**Foundations of Data Analysis** **Introduction to Data Analysis** ● Definition, importance, and applications of data analysis. ● Overview of the data analysis process. **Data Types and Sources** ● Types of data (categorical, numerical). ● Sources of data: structured vs. unstructured data. **Data Exploration and Descriptive Statistics** ● Descriptive statistics. ● Data visualization techniques. **Data Cleaning and Preprocessing** ● Handling missing data. ● Dealing with outliers. ● Data transformation. ● Feature scaling and normalization.	**15**
II	**Exploratory Data Analysis (EDA) and Statistical Inference** **Exploratory Data Analysis (EDA)** ● Univariate and bivariate analysis. ● Correlation and covariance. ● Outlier detection. **Data Visualization and Statistical Inference** ● Introduction to data visualization libraries (e.g., Matplotlib, Seaborn). ● Creating effective visualizations. ● Hypothesis testing. ● Confidence intervals. **Introduction to Data Modeling** ● Types of models (linear regression, logistic regression, decision trees, etc.). ● Model evaluation metrics.	**15**

III	**Regression Models** **Simple and Multiple Linear Regression** ● Estimating the Coefficients ● Assessing the accuracy of the Coefficient estimate ● Assessing the accuracy of the Model ● Estimating the Regression Coefficients **K-Nearest Neighbour** ● K-NN Demonstration with example ● Compare LR with k-NN ● Evaluation for regression ● Model selection and over-fitting	**15**
IV	**PRACTICAL WORK**	**30**
	List of practical :	
Week 1	Installing the software (R/Python/MS-Excel) and understanding the GUI and various menu options	**2**
Week 2	Types and sources of data	**1**
Week 3	Data Exploration and Descriptive Statistics	**2**
Week 4 & 5	**Data Cleaning and Preprocessing** 1. Introduce missing values and outliers to a dataset. 2. Implement techniques to handle missing data (e.g., imputation) and outliers (e.g., removal or transformation). 3. Normalize and scale numerical features.	**5**
Week 6 & 7	**Exploratory Data Analysis (EDA) using R/Python** ● Univariate and bivariate analysis. ● Correlation and covariance. ● Outlier detection.	**5**
Week 8 to 10	**Data Visualization (R/Python/Tableau)** 1. Explore the library for data visualization. 2. Create advanced visualizations, such as heatmaps and pair plots. 3. Apply data visualization techniques to a new dataset.	**7**
Week 11 & 12	**Regression Analysis** 1. Implement linear regression using a dataset. 2. Visualize the regression line and predictions.	**7**
Week 13 to 15	**Mini Project** 1. Formulate a data analysis project based on a real-world scenario or dataset. 2. Apply data cleaning, exploration, and modeling techniques. 3. Create a presentation or report summarizing the analysis and findings.	**6**

Pedagogy	1. At the start of course, the course delivery pattern, evaluation scheme, prerequisite will be discussed. 2. Lectures to be conducted with the aid of multi-media projector, black board, etc. 3. One internal written exam will be conducted as a part of internal theory evaluation. 4. One assignment based on the course content for each unit will be given to the student and evaluated at regular interval. 5. The course has lab component as integral part, where students have an opportunity to build an appreciation for the concepts being taught in Theory. 6. Experiments to be performed in the laboratory as suggested in the syllabus. 7. Mini Project applying all the learnt concepts.
References	**Main Reading** 1. Jiawei Han, Micheline Kamber, 3rd Edition, (2011), Data Mining Concepts and Techniques, Morgan Kaufmann. 2. K.P. Soman, Shyam Diwakar and V. Ajay, (2016), Insight into Data mining Theory and Practice, Prentice Hall of India. 3. Pang-Ning Tan, Michael Steinbach, Vipin Kumar,, (2016), Introduction to Data Mining, Pearson Education.
Course Outcomes	**On completion of the course, the students will be able to:** 1. Demonstrate comprehension of core concepts and principles in data analysis, emphasizing foundational skills. 2. Acquire proficiency in visualizing data effectively and making informed statistical inferences, showcasing an ability to interpret and communicate insights visually. 3. Demonstrate competence in selecting and applying regression techniques to analyze relationships within datasets, interpreting results, and drawing meaningful conclusions. 4. Design and implement a data analysis project, showcasing the ability to apply learned concepts to solve real-world problems, effectively communicating findings and insights.s

Name of the Programme : **Bachelor of Computer Applications**
Course Code : **CSA 223**
Title of the Course : **Advanced JavaScript**
Number of Credits : **4 (3T+1P)**
Effective from AY : **2024-25**

Prerequisites for the Course	Basic Programming	
Course Objectives	1. To understand and execute JavaScript code in both browser and command-line environments. 2. To perform numerical operations, handle string manipulations, and apply Boolean logic. 3. To analyze nested objects, object methods and property deletion. 4. To Apply ES5 and beyond features of JavaScript.	
Units	**Content**	**No of Hours 75 (45T+30P)**
I	**Overview of JavaScript:** Brief history. Common use-cases (Eg: data validations, notifications etc). Runtime environments. ECMAScript standards. Overview of language features. Running JavaScript in the browser and at the command line. Debugging JavaScript in the browser. The console and REPL. **Basic syntax:** Values and literals. Primitive types. Numbers. Integer and floating point as a single type. Special floating point numbers. Rounding errors. The Math library. Strings. Immutability of strings. + and [] operators. toString. Common string utilities. Booleans. Ternary operator. Truth-y and False-y values. null and undefined. Regular expressions. Dynamic typing. Weak typing. The typeof operator. The === and !== operators. Control statements	**15**
II	**Arrays and Objects: Arrays.** Array insertion and deletion. Array length. Sparse arrays. Multidimensional arrays. Object as maps. Object creation, modification and lookup syntax. Nested objects. Object methods. The delete keyword. The for... in statement, and the hasOwnProperty method. The global window object. Object references. Aliasing. Pass-by-reference-copy semantics. **Functions:** Function declaration and invocation syntax. Anonymous functions. Functions as data. The arguments object. Variadic functions. Optional parameters. Named parameters. Function overloading. Duck typing.	**15**

III	**ES5 and beyond** Strict Mode, JSON (JavaScript Object Notation) New Array Methods: forEach(), map(),filter(), every(), some(), indexOf(), lastIndexOf() Object.create(), Function.prototype.bind(), Getters and Setters, Array.isArray(), String.trim() Arrow Functions, Let and Const, Template Literals, Destructuring Assignment, Default Parameters, Classes, Promises, Async/Await, Modules, Rest and Spread Operators, Map and Set, Proxy and Reflect.	**15**
IV	**Practical Work** Using javascript programming language, the concepts learned in the units from I to III are required to be implemented practically. The broad area of practical problems is mentioned below.	**Practical Hours (30)**
Week 1	Write simple JavaScript with HTML for arithmetic expression evaluation and message printing.	**2**
Week 2	Develop JavaScript to use decision making and looping statements	**2**
Week 3	Develop JavaScript to implement Array functionalities	**2**
Week 4	Develop Javascript to implement functions	**2**
Week 5	Develop JavaScript to implement Strings.	**2**
Week 6	Create web page using Form Elements and perform Validations	**2**
Week 7	Create web page to implement Form Events	**2**
Week 8	Develop a web page for creating sessions and persistent cookies. Observe the effects with browser cookies settings.	**2**
Week 9	Develop javascript to implement validations using regular expressions.	**2**
Week 10 to 15	Practicals based on ES5 and beyond features of JavaScript	**12**
Pedagogy:	Suggested strategies for use to accelerate the attainment of the various course outcomes. 1. Lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a) Video/Animation to explain various concepts. b) Collaborative, Peer, Flipped Learning etc. 2. Ask at least three HOT (Higher-Order Thinking) questions in the class,	

	which promotes critical thinking. 3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, develop design thinking skills such as the ability to design, evaluate, generalize, & analyse information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the students to come up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world 7. To promote self-learning, give atleast one assignment where they can complete at least one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.
References/ Readings:	**Main Reading** 1. David Flanagan (2020). JavaScript: The Definitive Guide. O.Reily. 2. Minnick (2023). JavaScript All-in-One For Dummies. John Wiley & Sons Inc **Additional Reading** 1. Zachary Shute (2019). Advanced JavaScript. Packt Publishing. 2. Laurence Lars Svekis, Maaike Van Putten, Rob Percival (2021). JavaScript from Beginner to Professional. Packt Publishing.
Course Outcomes	**On completion of the course, students will be able to:** 1. Recall basic and advanced concepts and features of JavaScript. 2. Understand the concepts and features of JavaScript. 3. Apply JavaScript concepts to create and validate interactive web pages. 4. Analyze the use and working of JavaScript to meet industry standards.

Name of the Programme : Bachelor of Computer Applications
Course Code : CSA-261
Title of the Course : Digital Media Marketing & Analytics[Exit Internship Course - 2]
Number of Credits : 4 (2T + 2P)
Effective from AY : 2024-25

Pre-requisites for the Course:	Website Designing and Programming knowledge	
Course Objectives:	1. To understand the concepts and techniques of Search Engine Optimization and Social Media Marketing. 2. To learn Web & Social Media Analytics, Inbound Marketing and emerging trends. 3. To apply the understanding of Search Engine Optimization, Social Media Marketing, web analytics and inbound marketing. 4. To analyze case studies of successful digital marketing campaigns and apply it in real-world scenario.	
Units	**Content**	**No. of Hours 90 (30T+ 60P)**
I	**Search Engine Optimization** ● Introduction to SEO - How do Search Engines work?, Organic Search vs. Paid Search Results, Keyword Research ● On-page optimization - On-page SEO Elements, Technical SEO, Mobile SEO, Schema Markup ● Off-page optimization - Link Building, Social SEO, Local SEO, Backlink Audits using SEMrush ● SEO Audit, Tools, Measurement - SEO Audit, Algorithm Updates, Measurement with Google Analytics, SEO Resources, Careers in SEO **Social Media Marketing** ● Introduction to Social Media Marketing ● Creating Content for Facebook & Social Media, Tools for Content Creation ● Facebook Marketing - Facebook for Business, Facebook Insight, Facebook Pages and Post Best Practices, Facebook Ads – Campaign Objectives, Facebook Ads – Targeting Audiences, Facebook Ads – Impactful Creatives, Facebook Avatar, Apps, Live, Hashtags, Optimization and Reporting, Facebook Ad Policies, Facebook Messenger, Facebook Shop, Building Brand Awareness, Driving In-store Footfall, Facebook Pixel, Driving Online Sales, Generating Leads ● LinkedIn Marketing - Importance of LinkedIn presence, LinkedIn Strategy, Content Strategy, LinkedIn analysis, Targeting, Ad Campaign	**15**

	● Instagram Marketing, X (Twitter) & Snapchat Marketing ● Social Media Marketing Tools, Crafting a Successful Social Media Strategy	
II	**Web and Social Media Analytics** ● Introduction to web analytic - What's analysis?, Is analysis worth the effort?, Small businesses, Medium and Large scale businesses, Analysis vs intuition ● Google Analytics -Getting Started With Google Analytics, How Google Analytics works?, Accounts, profiles, and users navigating Google Analytics, Basic metrics, Main sections of Google Analytics reports, Traffic Sources Direct, referring, and search traffic Campaigns AdWords, Adsense. ● Content Performance Analysis- Pages and Landing Pages, Event Tracking and AdSense, Site Search. ● Visitor Analysis- Unique visitors, Geographic and language information, Technical reports, Benchmarking. ● Social Media Analytics- Facebook insights, Twitter analytics, YouTube analytics, Social Ad analytics /ROI measurement. ● Actionable Insights **Inbound Marketing** ● Attracting your potential customers into the conversion funnel ● Converting your prospects into leads using emails ● Landing Page ● Conversion Optimization, Conversion Optimization Patterns for Engaging website Visitors ● Lifecycle Emails **Emerging Trends - An Introduction** ● AI and machine learning in digital marketing, Voice search optimization, Chatbots and conversational marketing, Augmented Reality (AR) and Virtual Reality (VR) marketing	**15**
III	**Practical Activities - To be carried out along in sync with the concepts mentioned in Unit I & II respectively.** 1. To learn to optimize web content for better search engine visibility, Perform keyword research using tools like Google Keyword Planner or SEMrush and optimize a webpage accordingly. 2. To understand the importance of content planning and creation, develop a content calendar for a hypothetical business, create blog posts or articles, and schedule their publication.	**35**

	3. To gain hands-on experience in managing social media accounts and creating engaging content, create social media profiles for a business on platforms like Facebook, Instagram, and LinkedIn, and develop a social media content calendar. 4. To gain practical experience in launching and optimizing PPC advertising campaigns, set up a Google Ads campaign targeting specific keywords relevant to a business, create ad copies, and monitor the campaign's performance. 5. To collect and interpret data to measure the effectiveness, set up Google Analytics for a website, track key metrics such as traffic sources, user behavior, and conversions, and generate a report analyzing the data. 6. To gain practical experience in strategic planning and decision-making, develop a comprehensive digital marketing strategy for a fictional business, including setting objectives, identifying target audiences, allocating budgets, and selecting appropriate digital marketing channels. 7. To explore innovative ways to incorporate emerging trends, experiment with emerging technologies like AI-powered chatbots or virtual reality experiences and evaluate their potential applications in digital marketing.	
IV	**Case Studies** Analyze case studies of successful digital marketing campaign, like 1. ICICI Bank: Building India's Most Social Bank on facebook 2. Barclays Business Banking SEO Campaign **Mini - Project** Develop a mini-project applying the insights gained from the case studies to a real-world scenario. **Optional -***Prepare for industry-recognized certifications by taking practice exams, completing online courses, and participating in certification programs offered by platforms like Google, Facebook, or HubSpot. It will enhance the credentials and increase the employability in the digital marketing field.*	**25**
Pedagogy:	Suggested strategies for use to accelerate the attainment of the various course outcomes. 1. A plan is to be developed by the student/s in consultation with the teacher incharge and to be approved. 2. One or methods mentioned below may be used for learning purposes.	

	a. Intensive training / teaching b. Online or offline training (approved by the college or instructor) c. Approved MOOCS Courses d. Workshops - on-campus or off-campus e. Self-learning means & methods f. Enquiry-based learning 3. A work diary to be maintained where all the learning & work carried out to maintained and certified by the teacher incharges. 4. All deliverable & artifacts to be submitted in the college for evaluation and assessments.
References/ Readings:	**Main Reading:** 1. Alhlou, F., Asif, S., & Fettman, E. (2016). Google Analytics Breakthrough: From Zero to Business Impact.(1st ed.). [Kindle Edition]. Wiley. 2. Deiss, R., & Henneberry, R. (2020). *Digital Marketing for Dummies.* [Paperback]. Wiley. 3. Enge, E., Spencer, S., & Stricchiola, J. (2023). *The Art of SEO.*(4th ed.). O'Reilly Media. 4. Gupta, Seema. (2022). *Digital Marketing*(3rd ed.). [Paperback]. McGraw Hill. 5. Rai, A. K. (2014). Social Media Marketing: Theories and Applications. Pearson Education India. **Additional Reading:** 1. Chaffey, D., Ellis-Chadwick, F., Johnston, K., & Smith, P. R. (2019). Digital Marketing: Strategy, Implementation, and Practice. Pearson. 2. Dover, D., & Agrawal, A. (2016). Search Engine Optimization (SEO) Secrets. Wiley. 3. Kumar, V. (2018). Analytics in Digital Marketing. Wiley. 4. Ratan, A. (2019). Digital Marketing: Concepts and Strategies. Oxford University Press.
Course Outcomes:	Oncompletionofthecourse,studentwill be able to 1. Understand the concepts and techniques of Search Engine Optimization, Social Media Marketing, Web & Social Media Analytics, Inbound Marketing. 2. Apply Search Engine Optimization, Social Media Marketing, web analytic and inbound marketing strategies. 3. Analyze the performances of digital marketing campaigns. 4. Create and run a small digital marketing campaign successfully.