SARDAR PATEL UNIVERSITY, BALAGHAT

School of Computer Application
Syllabus under NEP

Course: Bachelor of Computer Applications (BCA)　　　　**Semester: V**

Branch: Computer Science and Application　　　　**w.e.f. Academic Session: 2025-26**

Subject: PHP (BCAMA501T)

UNIT - I: Introduction to PHP

Web Basics: Difference between client-side and server-side scripting, role of PHP in web development. **Environment Setup**: Installing XAMPP/WAMP, configuring Apache server, PHP.ini settings. **PHP Syntax**: Embedding PHP in HTML, comments, echo/print statements. **Variables & Constants**: Declaring variables, data types, type casting, defining constants. **Operators**: Arithmetic, comparison, logical, assignment, string operators. **Control Structures**: if-else, switch-case, loops (for, while, do-while, foreach). **Practical**: Writing first PHP script, simple calculator program.

UNIT - II: Functions and Arrays

Functions: Built-in vs user-defined, parameter passing (by value, by reference), default arguments. **Scope**: Local, global, static variables. **Arrays**: Indexed arrays, associative arrays, multidimensional arrays. **Array Functions**: count(), sort(), array_merge(), array_search(), array_push(), array_pop(). **Iteration**: Traversing arrays using loops and foreach. **Practical**: Creating reusable functions, menu-driven array operations.

UNIT - III: Working with Forms and Strings

Forms: Designing HTML forms, capturing data with GET and POST. **Validation**: Required fields, numeric checks, email validation, sanitizing inputs. **String Handling**: strlen(), substr(), strpos(), str_replace(), explode(), implode(). **Regular Expressions**: Pattern matching, validation examples (phone number, email). **Security**: Avoiding cross-site scripting (XSS) in form handling. **Practical**: Login form validation, feedback form with regex validation.

UNIT - IV: File Handling and Sessions

File Handling: Opening, reading, writing, appending files; file pointer functions (fopen, fread, fwrite, fclose). **File Uploads**: Handling file uploads securely, checking file types and sizes. **Cookies**: Setting, retrieving, deleting cookies. **Sessions**: Starting sessions, storing session variables, destroying sessions. **Authentication**: Simple login/logout system using sessions. **Error Handling**: die(), trigger_error(), try-catch blocks for exceptions. **Practical**: Building a file-based guestbook, session-based shopping cart.

UNIT - V: Database Connectivity and Advanced Topics

Database Basics: Introduction to MySQL, creating databases and tables. **Connectivity**: Connecting PHP with MySQL using mysqli and PDO. **CRUD Operations**: Insert, Select, Update, Delete with examples. **Prepared Statements**: Preventing SQL injection, parameter binding. **OOP in PHP**: Classes, objects, constructors, inheritance, polymorphism. **Advanced Concepts**: Introduction to MVC architecture, overview of frameworks like Laravel/CodeIgniter. **Practical**: Building a student record management system with database integration.

Reference Books

1. **PHP and MySQL Web Development** – Luke Welling & Laura Thomson
2. **Learning PHP, MySQL & JavaScript** – Robin Nixon
3. **Programming PHP** – Rasmus Lerdorf, Kevin Tatroe & Peter MacIntyre

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PHP Lab

1. Write a PHP program to display "Hello World" message.

2. Create a PHP script to perform arithmetic operations (addition, subtraction, multiplication, division).

3. Write a program to check whether a number is even or odd.

4. Develop a PHP script to generate multiplication table of a given number.

5. Write a PHP function to calculate factorial of a number.

6. Create a function to check whether a string is palindrome or not.

7. Write a program to demonstrate associative arrays (store student names with marks and display them).

8. Develop a PHP script to sort an array in ascending and descending order.

9. Create a login form using HTML and validate it using PHP (username & password check).

10. Write a PHP script to validate an email address entered in a form.

11. Develop a feedback form and display submitted data using GET and POST methods.

12. Write a program to count the number of vowels and consonants in a given string.

13. Write a PHP script to read contents of a text file and display it on the browser.

14. Create a program to write user input into a file and then read it back.

15. Develop a file upload script that allows only image files (jpg, png).

16. Write a PHP program to demonstrate session handling (simple shopping cart example).

17. Connect PHP with MySQL and display all records from a "students" table.

18. Write a PHP script to insert new student records into the database using a form.

19. Create a program to update student marks in the database.

20. Develop a PHP script to delete a record from the database using student ID.

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Course: Bachelor of Computer Applications (BCA)   **Semester: V**

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Subject: Machine Learning (BCAMI502T)

UNIT - I: Introduction to Machine Learning

Foundations: Definition of ML, difference between AI, ML, and Deep Learning. **Types of Learning**: Supervised, Unsupervised, Semi-supervised, Reinforcement Learning. **Applications**: ML in healthcare, finance, e-commerce, social media, robotics. **Data Preprocessing**: Handling missing values (mean, median, mode imputation). Normalization and standardization. Encoding categorical variables (label encoding, one-hot encoding). **Python Ecosystem**: Introduction to NumPy, Pandas, Matplotlib, Scikit-learn. **Practical**: Loading datasets, cleaning data, plotting graphs for visualization.

UNIT - II: Supervised Learning

Regression Models: Simple Linear Regression, Multiple Linear Regression. Polynomial Regression. **Evaluation metrics**: Mean Squared Error (MSE), R^2 score. **Classification Models**: Logistic Regression. k-Nearest Neighbors (k-NN). Decision Trees and Random Forests. **Model Evaluation**: Confusion Matrix. Precision, Recall, F1-score. ROC curve and AUC. **Practical**: Predicting house prices using regression, classifying emails as spam/ham.

UNIT - III: Unsupervised Learning

Clustering: k-Means clustering algorithm. Hierarchical clustering (Agglomerative, Divisive). Evaluation of clusters (Silhouette score). **Dimensionality Reduction**: Principal Component Analysis (PCA). Feature selection vs feature extraction. **Association Rule Learning**: Apriori algorithm. Market basket analysis. **Applications**: Customer segmentation, anomaly detection, recommendation systems. **Practical**: Segmenting customers using k-Means, applying PCA to reduce dataset dimensions.

UNIT - IV: Neural Networks and Deep Learning Basics

Artificial Neural Networks (ANN): **Structure**: input layer, hidden layers, output layer. Perceptron model. Activation functions: sigmoid, tanh, ReLU, softmax. **Training Neural Networks**: Forward propagation. Backpropagation algorithm. Gradient descent optimization. **Deep Learning Overview**: Convolutional Neural Networks (CNN) basics. Recurrent Neural Networks (RNN) basics. **Applications**: Image recognition, natural language processing, speech recognition. **Practical**: Building a simple ANN for digit recognition (MNIST dataset).

UNIT - V: Advanced Topics and Applications

Ensemble Methods: Bagging, Boosting, AdaBoost, Gradient Boosting. **Support Vector Machines (SVM)**: Concept of hyperplane and margin. Kernel trick (linear, polynomial, RBF). **Reinforcement Learning Basics**: Agent, environment, reward, policy. Q-learning introduction. **Ethical Issues in ML**: Bias in datasets. Fairness and transparency. Privacy concerns. **Case Studies**: ML in healthcare (disease prediction). ML in finance (fraud detection). ML in e-commerce (recommendation engines). **Practical**: Implementing SVM for classification, experimenting with ensemble models.

Reference Books

1. **Machine Learning** – Tom M. Mitchell
2. **Introduction to Machine Learning** – Ethem Alpaydin
3. **Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow** – Aurélien Géron
4. **Pattern Recognition and Machine Learning** – Christopher M. Bishop
5. **Python Machine Learning** – Sebastian Raschka & Vahid Mirjalili

Course: Bachelor of Computer Applications (BCA)   **Semester: V**

Branch: Computer Science and Application   **w.e.f. Academic Session: 2025-26**

Subject: Database Concept with Oracle (BCAMI503AT)

UNIT - I: Introduction to Databases and Oracle

Database Fundamentals: Data, information, DBMS vs RDBMS, advantages of databases. **Oracle Architecture**: Instance, database, tablespaces, datafiles, redo logs, control files. **Data Models**: Hierarchical, network, relational, object-relational. **SQL Overview**: DDL, DML, DCL, TCL commands. **PL/SQL Introduction**: Block structure, advantages over SQL. **Practical**: Creating a simple database schema in Oracle, exploring SQL*Plus environment.

UNIT - II: SQL Basics in Oracle

Table Management: Creating, altering, dropping tables. **Data Types**: VARCHAR2, NUMBER, DATE, CHAR, CLOB, BLOB. **Constraints**: Primary key, foreign key, unique, not null, check constraints. **Basic Queries**: SELECT statements, filtering with WHERE, ORDER BY, DISTINCT. **Joins**: INNER, LEFT, RIGHT, FULL, SELF joins. **Operators**: Arithmetic, comparison, logical, set operators (UNION, INTERSECT, MINUS). **Practical**: Writing queries to retrieve student records, applying constraints, experimenting with joins.

UNIT - III: Advanced SQL Features

Aggregate Functions: COUNT, SUM, AVG, MIN, MAX. **Grouping**: GROUP BY and HAVING clauses. **Subqueries**: Single-row, multi-row, correlated subqueries. **Views**: Creating, updating, dropping views; advantages of views. **Indexes**: Types of indexes (B-tree, bitmap), performance considerations. **Sequences and Synonyms**: Auto-generating values, simplifying object references. **Practical**: Creating views for reporting, using subqueries for complex queries, designing indexes for performance.

UNIT - IV: PL/SQL Programming

PL/SQL Block Structure: Anonymous blocks, named blocks. **Variables and Constants**: Declaring and using different data types. **Control Structures**: IF-THEN-ELSE, CASE, LOOP, WHILE, FOR loops. **Cursors**: Implicit vs explicit cursors, cursor attributes, cursor FOR loops. **Exception Handling**: Predefined exceptions, user-defined exceptions. **Stored Procedures and Functions**: Creating, executing, advantages. **Practical**: Writing PL/SQL blocks for student grade calculation, cursor-based record processing, exception handling examples.

UNIT - V: Advanced Database Concepts

Triggers: Row-level vs statement-level triggers, BEFORE and AFTER triggers. **Packages**: Creating packages, package specification and body, advantages. **Transaction Management**: COMMIT, ROLLBACK, SAVEPOINT, ACID properties. **Normalization**: 1NF, 2NF, 3NF, BCNF; importance in database design. **Security in Oracle**: User creation, granting/revoking privileges, roles. **Performance Tuning Basics**: Query optimization, indexing strategies, analyzing execution plans. **Practical**: Implementing triggers for audit logging, designing normalized schemas, managing user privileges.

Course: Bachelor of Computer Applications (BCA)   **Semester: V**

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Reference Books

1. **Database System Concepts** – Abraham Silberschatz, Henry F. Korth, S. Sudarshan
2. **Oracle Database 12c: The Complete Reference** – Bob Bryla & Kevin Loney
3. **Database Management Systems** – Raghu Ramakrishnan & Johannes Gehrke
4. **Learning SQL** – Alan Beaulieu
5. **Oracle PL/SQL Programming** – Steven Feuerstein

Oracle Lab (BCADSE503ATP)

Basic Queries

1. Create a table STUDENT with attributes (ID, Name, Age, Course, Marks).
2. Insert 5 records into the STUDENT table.
3. Display all records from the STUDENT table.
4. Retrieve names of students whose marks are greater than 60.
5. Find students enrolled in the course "BCA".

Operators and Joins

6. Display students whose age is between 18 and 22.
7. Show students whose names start with 'A'.
8. Retrieve student details sorted by marks in descending order.
9. Perform an INNER JOIN between STUDENT and COURSE tables.
10. Display students who do not have any course assigned (LEFT JOIN).

Aggregate Functions

11. Find the total number of students.
12. Calculate the average marks of students.
13. Display the highest and lowest marks.
14. Count how many students are enrolled in each course (GROUP BY).
15. Show courses having more than 3 students (HAVING clause).

Advanced Queries

16. Create a view to display student names and marks only.
17. Write a query to update marks of a student with ID=101.
18. Delete a student record with ID=105.
19. Create a sequence to auto-generate student IDs.
20. Create an index on the Name column of the STUDENT table.

PL/SQL Program List

1. Write a PL/SQL block to calculate the factorial of a given number using a loop.
2. Accept student marks and display grade:
   Marks $\geq$ 75 $\rightarrow$ "Distinction", Marks $\geq$ 60 $\rightarrow$ "First Class", Marks $\geq$ 50 $\rightarrow$ "Second Class" Else $\rightarrow$ "Fail"
3. Use an explicit cursor to fetch and display all student names from the STUDENT table.
4. Write a PL/SQL block to divide two numbers and handle the exception if the denominator is zero.
5. Create a trigger that automatically logs changes (INSERT/UPDATE/DELETE) made to the STUDENT table into an AUDIT_LOG table.

Course: **Bachelor of Computer Applications (BCA)**   Semester: **V**

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Subject: ASP.NET (BCAMI503BT)

UNIT - I: Introduction to ASP.NET

Evolution of web technologies and role of ASP.NET. Overview of .NET Framework and CLR. ASP.NET architecture and features. Web Forms vs. MVC overview. ASP.NET page life cycle (events and methods). Creating and deploying a simple ASP.NET application.

UNIT - II: Web Controls and State Management

Standard server controls: TextBox, Button, Label, CheckBox, RadioButton, DropDownList, ListBox. **Rich controls:** Calendar, AdRotator, FileUpload. **Validation controls:** RequiredFieldValidator, RangeValidator, RegularExpressionValidator, CompareValidator, CustomValidator. Master pages, themes, and skins for consistent UI. **State management techniques:** ViewState, Session, Cookies, QueryString. Application state and caching.

UNIT - III: Data Access with ADO.NET

Introduction to ADO.NET architecture. Connection objects, Command objects, DataReader, DataAdapter, DataSet. Executing SQL queries and stored procedures from ASP.NET. Data binding with GridView, Repeater, DataList, FormView. CRUD operations (Insert, Update, Delete, Select) with databases. Working with XML data in ADO.NET.

UNIT - IV: Advanced ASP.NET Features

User controls and custom controls development. **Authentication and Authorization:** Forms authentication, Windows authentication, role-based security. Configuration using Web.config and Machine.config. **Error handling:** try-catch, custom error pages, tracing. Debugging techniques in Visual Studio. **Introduction to AJAX:** UpdatePanel, ScriptManager, asynchronous postbacks.

UNIT - V: ASP.NET MVC and Web Services

MVC architecture: Model, View, Controller. Creating controllers, views, and models. Routing in MVC applications. Strongly typed views and Razor syntax. **Introduction to Web Services:** SOAP and REST. Creating and consuming Web APIs in ASP.NET. JSON and XML data exchange.

Reference Books

1. **ASP.NET 4.5 in C# and VB** – Imar Spaanjaars
2. **Professional ASP.NET MVC 5** – Jon Galloway, Brad Wilson, K. Scott Allen, David Matson
3. **Beginning ASP.NET for Visual Studio 2015** – William Penberthy
4. **Pro ASP.NET Core MVC** – Adam Freeman
5. **ASP.NET Unleashed** – Stephen Walther
6. **Programming ASP.NET** – Dino Esposito
7. **Beginning ASP.NET 4.5 Databases** – Vidya Vrat Agarwal

ASP.NET Lab (BCADSE503BTP)

1. Create a simple ASP.NET Web Form that displays "Hello ASP.NET".
2. Design a webpage with different server controls (TextBox, Button, Label).
3. Demonstrate the ASP.NET page life cycle using Page_Load and Button_Click events.
4. Create a registration form with proper layout using Web Forms.
5. Implement a login form using TextBox and Button controls.
6. Use validation controls to validate user input (e.g., email, password length).
7. Create a webpage with Master Page and apply a theme.
8. Demonstrate ViewState by storing and retrieving values across postbacks.
9. Implement Session management for a shopping cart application.
10. Use Cookies to store user preferences (like background color).
11. Connect ASP.NET application to a SQL Server database and display records.
12. Perform Insert, Update, Delete operations using ADO.NET.
13. Bind data from a database to a GridView control.
14. Create a search form that retrieves data from a database using parameters.
15. Display student records using DataList and Repeater controls.
16. Create a User Control for a reusable login form.
17. Implement Forms Authentication with login and logout functionality.
18. Configure Web.config to restrict access to certain pages.
19. Implement error handling with try-catch and custom error pages.
20. Create an AJAX-enabled page with UpdatePanel to display live data without full refresh.

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Subject: Data Mining (BCAMD504T)

UNIT - I: Introduction to Data Mining

Definition, scope, and importance of data mining. Knowledge Discovery in Databases (KDD) process. Data mining vs. data warehousing. **Data mining functionalities:** characterization, discrimination, association, classification, clustering, outlier analysis. Challenges in data mining (scalability, data quality, privacy). **Applications:** business intelligence, healthcare, bioinformatics, web analytics.

UNIT - II: Data Preprocessing

Data cleaning: handling missing values, noisy data, outliers. **Data integration:** combining data from multiple sources. **Data transformation:** normalization, aggregation, generalization. **Data reduction:** dimensionality reduction (PCA), numerosity reduction, data compression. Discretization and concept hierarchy generation. Feature selection and extraction techniques.

UNIT - III: Association Rule Mining

Market basket analysis and frequent itemsets. **Measures of interestingness:** support, confidence, lift, conviction. **Apriori algorithm:** candidate generation and pruning. **FP-Growth algorithm:** frequent pattern tree construction. **Advanced association mining:** multilevel, multidimensional, and quantitative rules. Applications in retail, e-commerce, and recommendation systems.

UNIT - IV: Classification and Prediction

Introduction to supervised learning. Decision tree induction (ID3, C4.5, CART). Bayesian classification (Naïve Bayes, Bayesian networks). k-Nearest Neighbor (k-NN) method. Neural networks basics for classification. Support Vector Machines (SVM) overview. **Model evaluation:** accuracy, precision, recall, F-measure, ROC curves. Overfitting and model selection techniques.

UNIT - V: Clustering and Advanced Topics

Introduction to unsupervised learning. **Partitioning methods:** k-Means, k-Medoids. **Hierarchical clustering:** agglomerative and divisive approaches. **Density-based clustering:** DBSCAN, OPTICS. Grid-based clustering methods. Outlier detection techniques. Introduction to web mining, text mining, and social network analysis. Ethical issues in data mining (privacy, security, bias).

Reference Books

1. **Data Mining: Concepts and Techniques** – Jiawei Han, Micheline Kamber, Jian Pei
2. **Introduction to Data Mining** – Pang-Ning Tan, Michael Steinbach, Vipin Kumar
3. **Data Mining Techniques** – Arun K. Pujari
4. **Data Mining: Practical Machine Learning Tools and Techniques** – Ian H. Witten, Eibe Frank, Mark A. Hall
5. **The Elements of Statistical Learning** – Trevor Hastie, Robert Tibshirani, Jerome Friedman
6. **Data Mining Methods** – Radha Krishna Reddy, V. Rajaraman (Indian context)

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Subject: Artificial Intelligence (BCASEC505T)

UNIT - I: Introduction to Artificial Intelligence

Definition, scope, and importance of AI. History and evolution of AI (from symbolic AI to modern machine learning). Applications of AI in business, healthcare, robotics, gaming, education, and everyday life. **Intelligent agents:** structure, environment, rationality, and types (simple reflex, goal-based, utility-based, learning agents). **Problem-solving approaches in AI:** search, reasoning, learning. **Challenges in AI:** knowledge acquisition, representation, scalability, ethics.

UNIT - II: Problem Solving and Search Techniques

State space representation and problem formulation. **Uninformed search strategies:** Breadth-first search, Depth-first search, Uniform-cost search, Depth-limited search, Iterative deepening search. **Informed search strategies:** Heuristic search, Greedy search, A* algorithm. **Local search algorithms:** Hill climbing, Simulated annealing, Genetic algorithms. Constraint satisfaction problems (CSPs) and backtracking. Game playing.

UNIT - III: Knowledge Representation and Reasoning

Knowledge representation techniques: propositional logic, predicate logic. Syntax and semantics of logic, inference rules. Semantic networks, frames, and scripts. Production rules and rule-based systems. **Inference mechanisms:** forward chaining, backward chaining. **Reasoning under uncertainty:** probability theory, Bayesian networks. Fuzzy logic and approximate reasoning.

UNIT - IV: Machine Learning Basics

Introduction to machine learning and its relation to AI. **Supervised learning:** decision trees, k-Nearest Neighbor (k-NN), Naïve Bayes classifier. **Unsupervised learning:** clustering methods (k-Means, hierarchical clustering, DBSCAN). **Reinforcement learning basics:** agents, environment, rewards, Q-learning. **Introduction to neural networks:** perceptron, activation functions, backpropagation. Overfitting, underfitting, and model evaluation techniques.

UNIT - V: Advanced Topics in AI

Natural Language Processing (NLP): tokenization, stemming, parsing, sentiment analysis. **Expert systems:** architecture, knowledge base, inference engine, examples (MYCIN, DENDRAL). **Robotics and vision systems:** path planning, object recognition, sensor integration. **Introduction to deep learning:** convolutional neural networks (CNNs), recurrent neural networks (RNNs). **AI in real-world applications:** autonomous vehicles, smart assistants, medical diagnosis.

Reference Books

1. **Artificial Intelligence: A Modern Approach** – Stuart Russell & Peter Norvig
2. **Introduction to Artificial Intelligence** – Elaine Rich & Kevin Knight
3. **Artificial Intelligence** – Patrick Henry Winston
4. **Artificial Intelligence** – Saroj Kaushik (Indian context, simple explanations)
5. **Machine Learning** – Tom M. Mitchell

6. **Foundations of Artificial Intelligence** – Nils J. Nilsson

Subject: Indian Knowledge System (BCAAEC506T)

UNIT - I: Introduction to Indian Knowledge System

Meaning and scope of IKS. Historical development of knowledge traditions in India. Vedas, Upanishads, and classical texts as sources of knowledge. Contributions of ancient Indian scholars in mathematics, astronomy, medicine, and linguistics. Relevance of IKS in the modern world.

UNIT - II: Philosophical Foundations

Six schools of Indian philosophy (Darshanas): Nyaya, Vaisheshika, Sankhya, Yoga, Mimamsa, Vedanta. Concepts of Dharma, Artha, Kama, Moksha. Epistemology in Indian philosophy (**Pramanas:** perception, inference, comparison, testimony). Ethical and moral values in Indian traditions.

UNIT - III: Science and Technology in Ancient India

Mathematics: concepts of zero, decimal system, algebra, geometry (Aryabhata, Brahmagupta). **Astronomy:** planetary motion, eclipses, calendars. **Medicine:** Ayurveda, Charaka Samhita, Sushruta Samhita. Metallurgy, architecture, town planning (Harappan civilization, temple architecture). Environmental knowledge and sustainable practices.

UNIT - IV: Arts, Literature, and Education System

Classical literature: Ramayana, Mahabharata, Puranas. Sanskrit grammar and linguistics (Panini's Ashtadhyayi). **Performing arts:** music, dance, drama (Natya Shastra). **Ancient education system:** Gurukul tradition, Nalanda, Takshashila. Knowledge transmission methods in oral and written traditions.

UNIT - V: Contemporary Relevance of IKS

Indian Knowledge System in modern science and technology. Yoga and meditation for health and wellness. Traditional ecological knowledge and sustainable development. Indian contributions to computer science, AI, and modern disciplines. Integrating IKS with contemporary education and research.

Reference Books

1. **Indian Knowledge System** – Prof. B. Mahadevan (AICTE prescribed text)
2. **Foundations of Indian Culture** – Kapila Vatsyayan
3. **The Wonder That Was India** – A.L. Basham
4. **History of Science in India** – Debiprasad Chattopadhyaya
5. **Indian Philosophy** – S. Radhakrishnan
6. **Science and Technology in Ancient India** – V. Raghavan
7. **Indian Knowledge Systems: Concepts and Applications** – Bal Ram Singh

Subject: Digital Marketing (BCAVAC507T)

UNIT - I: Introduction to Digital Marketing

Definition, scope, and importance of digital marketing. Traditional vs. digital marketing. Components of digital marketing ecosystem. **Digital marketing channels:** search, social, email, display, mobile. Current trends and career opportunities in digital marketing.

UNIT - II: Search Engine Optimization (SEO)

Basics of search engines and how they work. **On-page SEO:** keywords, meta tags, content optimization, URL structure. **Off-page SEO:** backlinks, domain authority, social signals. **Technical SEO:** site speed, mobile optimization, XML sitemaps. SEO tools and analytics.

UNIT - III: Social Media and Content Marketing

Role of social media in digital marketing. **Platforms overview:** Facebook, Instagram, LinkedIn, Twitter, YouTube. Social media strategy and campaign planning. **Content marketing:** blogs, videos, infographics, podcasts. Influencer marketing and online reputation management.

UNIT - IV: Paid Advertising and Email Marketing

Introduction to Google Ads and PPC campaigns. Display advertising and remarketing. Social media advertising (Facebook Ads, Instagram Ads, LinkedIn Ads). **Basics of email marketing:** list building, segmentation, personalization. Tools for email marketing (Mailchimp, HubSpot, etc.). Measuring ROI in paid campaigns.

UNIT - V: Web Analytics and Emerging Trends

Introduction to web analytics. Google Analytics: traffic sources, user behavior, conversion tracking. KPIs and metrics for digital marketing performance. **Emerging trends:** AI in marketing, chatbots, voice search, video marketing. Ethical and legal issues in digital marketing (privacy, data protection). Case studies of successful digital marketing campaigns.

Reference Books

1. **Digital Marketing: Strategy, Implementation and Practice** – Dave Chaffey & Fiona Ellis-Chadwick
2. **Digital Marketing for Dummies** – Ryan Deiss & Russ Henneberry
3. **Social Media Marketing** – Tracy L. Tuten & Michael R. Solomon
4. **Marketing 4.0: Moving from Traditional to Digital** – Philip Kotler, Hermawan Kartajaya, Iwan Setiawan
5. **Digital Marketing Analytics** – Chuck Hemann & Ken Burbary
6. **The Art of Digital Marketing** – Ian Dodson