Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. CSE in Specialization with Mobile Application in association with AATCE

SEMESTER-V (2024-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMA510	SEC	Flutter Programming	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce the fundamentals of the Dart programming language, including its syntax, data types, and basic constructs.
2. To develop problem-solving skills using control structures, functions, and modular programming in Dart.
3. To provide knowledge of data handling techniques using collections such as lists, sets, and maps along with exception handling.
4. To impart understanding of object-oriented programming concepts such as classes, inheritance, polymorphism, and encapsulation in Dart.
5. To enable learners to build efficient applications using advanced features like asynchronous programming, streams, generics, and file handling

COURSE OUTCOMES:

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

1. Describe and explain the fundamental concepts of the Dart programming language, including syntax, data types, and control structures.
2. Apply Dart programming constructs to develop simple programs using functions, loops, and collections.
3. Analyze and implement object-oriented programming concepts such as classes, inheritance, and polymorphism in Dart.
4. Evaluate different programming approaches and handle exceptions effectively in Dart applications.
5. Design and develop efficient Dart applications using advanced features like asynchronous programming, streams, and generics.

SYLLABUS

UNIT I — 6 HOURS

Introduction & Dart Programming: Introduction to mobile app development, Native vs cross-platform frameworks, Introduction to Flutter, Features and advantages of Flutter, Introduction to Dart, Dart basics: variables, data types, operators, Control statements (if, loops), Functions and OOP concepts.

UNIT II — 6 HOURS

Flutter Fundamentals & UI Design: Flutter architecture and project structure, Widgets: Stateless & Stateful, Widget tree and lifecycle, Layouts: Row, Column, Container, Stack, Designing UI with Material Design, Themes, fonts, and assets, Responsive design.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. CSE in Specialization with Mobile Application in association with AATCE

SEMESTER-V (2024-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMA510	SEC	Flutter Programming	0	0	0	30	20	0	0	2	1

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT III — 6 HOURS

Navigation & State Management: Navigation and routing, Forms and user input handling, State management basics (setState), Advanced state management: Provider, BLoC (Business Logic Component), Handling dynamic UI updates

UNIT IV — 6 HOURS

Data Handling & Backend Integration: Working with JSON data, REST API integration (HTTP requests), Local storage: Shared Preferences, SQLite, Introduction to Firebase, Authentication and database basics.

UNIT V — 6 HOURS

Advanced Dart Concepts: Animations and transitions, Custom widgets, Packages and plugins, Testing and debugging, Performance optimization, Building APK/IPA files, App publishing (Google Play Store)

TEXTBOOKS:

1. E. Windmill, *Flutter in Action*. Shelter Island, NY, USA: Manning Publications, 2020, ISBN: 978-1617296147.
2. M. Katz, K. D. Moore, and V. Ngo, *Flutter Apprentice: Learn to Build Cross-Platform Apps*, 3rd ed. Raleigh, NC, USA: Razeware LLC, 2022, ISBN: 978-1950325740.
3. A. Miola, *Flutter Complete Reference: Create Beautiful, Fast and Native Apps for Any Device*. Birmingham, U.K.: Packt Publishing, 2021.

REFERENCE:

1. Kodeco Team, K. D. Moore, V. Ngo, S. Patterson, and A. U. Fallas, *Flutter Apprentice: Learn to Build Cross-Platform Apps*, 4th ed. Raleigh, NC, USA: Kodeco Inc., 2026, ISBN: 978-1950325924.
2. S. Alessandria, *Flutter Cookbook: Over 100 Proven Techniques and Solutions for App Development with Flutter and Dart*. Birmingham, U.K.: Packt Publishing, 2021.
3. C. Coyle, *Dart and Flutter in Action: Build Modern, Cross-Platform Apps Step-by-Step with Dart and Flutter*. Seattle, WA, USA: Amazon Digital Services LLC, 2025

LIST OF PRACTICALS

1. Create a simple “Hello World” app using Flutter.
2. Design a basic UI using widgets (Text, Image, Icon).
3. Create a layout using Row, Column, and Container.
4. Build a login screen with username and password fields.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B.Tech. CSE in Specialization with Mobile Application in association with AATCE

SEMESTER-V (2024-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMA510	**SEC**	**Flutter Programming**	**0**	**0**	**0**	**30**	**20**	**0**	**0**	**2**	**1**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

5. Implement navigation between two screens.
6. Create a form with validation (TextFormField).
7. Develop a counter app using set State ().
8. Create a dynamic list using ListView. Builder.
9. Design a responsive UI for different screen sizes.
10 Fetch and display data from a REST API.
11. Parse JSON data and show it in a list.
12. Store and retrieve data using Shared Preferences.
13. Create a simple SQLite database app (CRUD operations).
14. Integrate Firebase for authentication (login/signup).
15. Develop a mini project (e.g., To-Do List / Notes App / Weather App).

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT) - All Programs

SEMESTER-V (2024-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS501N	DCC	Theory of Computation	60	20	20	-	-	3	1	-	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Introduce concepts in automata theory and theory of computation.
2. Identify different formal language classes and their relationships.
3. Design grammar and recognizers for different formal languages.

COURSE OUTCOMES:

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

1. Relate practical problems to languages, automata, and computability.
2. Demonstrate an increased level of mathematical sophistication.
3. Apply mathematical and formal techniques for solving problems.

SYLLABUS

UNIT I — 10 HOURS

Introduction: Alphabets, Strings and Languages; Automata and Grammars, Deterministic finite Automata (DFA)-Formal Definition, Simplified notation: State transition graph, Transition table, Language of DFA, Nondeterministic finite Automata (NFA), NFA with epsilon transition, Language of NFA, Equivalence of NFA and DFA, Minimization of Finite Automata, Distinguishing one string from other, Myhill- Nerode Theorem.

UNIT II — 8 HOURS

Regular Expression (RE): Definition, Operators of regular expression and their precedence, Algebraic laws for Regular expressions, Kleen's Theorem, Regular expression to FA, DFA to Regular expression, Arden's Theorem, Non Regular Languages, Pumping Lemma for regular Languages. Application of Pumping Lemma, Closure properties of Regular Languages, Decision properties of Regular Languages, FA with output: Moore and Mealy machine, Equivalence of Moore and Mealy Machine, Applications and Limitation of FA.

UNIT III — 9 HOURS

Context Free Grammar (CFG) and Context Free Languages (CFL): Definition, Examples, Derivation, Derivation trees, Ambiguity in Grammar, Inherent ambiguity, Ambiguous to Unambiguous CFG, Useless symbols, Simplification

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS501N	DCC	Theory of Computation	60	20	20	-	-	3	1	-	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

of CFGs, Normal forms for CFGs: CNF and GNF, Closure properties of CFLs, Decision Properties of CFLs: Emptiness, Finiteness and Membership, Pumping lemma for CFLs.

UNIT IV **9 HOURS**

Push Down Automata (PDA): Description and definition, Instantaneous Description, Language of PDA, Acceptance by Final state, Acceptance by empty stack, Deterministic PDA, Equivalence of PDA and CFG, CFG to PDA and PDA to CFG.

UNIT V **9 HOURS**

Turing machines (TM): Basic model, definition and representation, Instantaneous Description, Language acceptance by TM, Variants of Turing Machine, TM as Computer of Integer functions, Universal TM, Church's Thesis, Recursive and recursively enumerable languages, Halting problem, Introduction to un decidability, un decidable problems about TM, NP hard and NP complete problem, Post correspondence problem (PCP), Modified PCP, Introduction to recursive function theory.

TEXTBOOKS:

1. J. E. Hopcraft, R. Motwani and J. D. Ullman, *Introduction to Automata Theory, Languages, and Computation*, 3rd Ed., Pearson, 2013.
2. P. Linz, S. H. Rodger, *An Introduction to Formal Languages and Automata*, 7th Ed., Jones & Bartlett Learning, 2023.

REFERENCE:

1. J. C. Martin, *Introduction to Languages and Theory of Computations*, 4th Ed., Tata McGraw Hill, 2010.
2. C. Papadimitriou, and C. L. Lewis, *Elements of the Theory of Computation*, PHI, 1997.
3. M. Sipser, *Introduction to Theory of Computation*, 3rd Ed., Cengage Learning, 2013.
4. https://onlinecourses.nptel.ac.in/noc26_cs85/preview
5. https://www.youtube.com/watch?v=_2w9UX17m_k&list=PLbRMhDVUMngcwWkzVTm_kFH6JW4JCtAUM (NPTEL)

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT), B.Tech CSE (ES, MA, AI-IBM, DS-IBM, MLCC-Google, ICS, BDCE- Impetus)

SEMESTER-V (2024-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS503M	DCC	Network Security & Cryptography	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Understand the different aspects of Network Security.
2. Learn about different Cryptography Encryption and Decryption Technique.

COURSE OUTCOMES:

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

1. Understand Need of Security in and type of threats.
2. Understand Security mechanism and basic and Advance Ciphers.
3. Understand Advance encryption Techniques.
4. Understand the Key exchange protocols used in Public Key Cryptography.
5. Understand the Authentication and Steganography concept.

SYLLABUS

UNIT I — 10 HOURS

Introduction to Network Security: Computer Security Concept, Need for Security, Security in Networks: Threats in networks, Network Security Controls – The OSI Security Architecture, Fundamental Security Design Principle, Security Attacks, Security Services, Security mechanism, Attack Surface and Attack trees, A Model of Network Security Content Integrity, Strong Authentication, Access Controls, Wireless Security, Honey pots. Proxy Servers and Anonymizers, Firewall, Types of firewall, Password Cracking Techniques.

UNIT II — 8 HOURS

Cryptography: Concepts & Techniques: Introduction, Plaintext & Cipher text, Creaser Cipher, Substitution Techniques, Substitution Boxes (S-Boxes), Permutation Cipher, Transposition Techniques, Encryption & Decryption, Symmetric & Asymmetric key Cryptography, Key Range & Key Size, Cryptographic Attacks.

UNIT III — 9 HOURS

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT), B.Tech CSE (ES, MA, AI-IBM, DS-IBM, MLCC-Google, ICS, BDCE- Impetus)

SEMESTER-V (2024-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS503M	DCC	Network Security & Cryptography	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Symmetric Key Algorithm: Introduction of Block Ciphers, Overview of Symmetric Key Cryptography, DES(Data Encryption Standard) algorithm, Double DES Triple DES, AES, IDEA(International Data Encryption Algorithm) algorithm.

UNIT IV **9 HOURS**

Asymmetric Key Algorithm: Overview of Asymmetric key Cryptography, RSA algorithm, Symmetric & Asymmetric key Cryptography together, Random Oracle Model, Diffie-Hellman Key Exchange, Digital Signature, Basic concepts of Message Digest and Hash Function. Man in Middle Attack, DoS and DDoS Attacks.

UNIT V **9 HOURS**

Internet Security Protocols: User Authentication Basic Concepts, SSL Architecture, SSL protocol Authentication Basics, Password, Authentication Token, Certificate based Authentication, Biometric Authentication. Steganography it's importance. Basics of mail security, Pretty Good Privacy, S/MIME, ISAKMP.

TEXTBOOKS:

1. W. Stallings, Cryptography and Network Security, 2nd ed. Singapore: Pearson Education Asia, 2000.
2. C. Kaufman, R. Perlman, and M. Speciner, *Network Security: Private Communication in a Public World*. Upper Saddle River, NJ, USA: Pearson, 2002.

REFERENCE:

1. A. Kahate, *Cryptography and Network Security*. New Delhi, India: Tata McGraw-Hill, 2003.
2. W. Stallings, *Cryptography and Network Security: Principles and Practice*, 4th ed. Upper Saddle River, NJ, USA: Pearson Education, 2006.
3. W. Mao, *Modern Cryptography: Theory and Practice*. Upper Saddle River, NJ, USA: Prentice Hall PTR, 2004.
4. W. Stallings, *Network Security Essentials: Applications and Standards*. Upper Saddle River, NJ, USA: Prentice Hall, 2000.
5. D. R. Stinson, *Cryptography: Theory and Practice*. Boca Raton, FL, USA: CRC Press, 2006.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/ IT), B.Tech CSE (ES, MA, AI-IBM, DS-IBM, MLCC-Google, ICS, BDCE- Impetus)

SEMESTER-V (2024-28)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS503M	**DCC**	**Network Security & Cryptography**	**60**	**20**	**20**	**30**	**20**	**3**	**0**	**2**	**4**

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

6. E. D. Zwicky, S. Cooper, and D. B. Chapman, *Building Internet Firewalls*, 2nd ed. Sebastopol, CA, USA: O'Reilly Media, 2000.

LIST OF PRACTICALS

1. Write a Program to implement Ceaser Cipher.
2. Write a Program to implement Substitution Cipher with equation c=3x+12.
3. Write a Program to implement polyalphabetic Cipher.
4. Write a Program to implement Rail fence technique.
5. Write a Program to implement Simple Columner Transposition technique
6. Write a Program to implement Advanced Columner Transposition technique.
7. Write a Program to implement Rotation Cipher
8. Create a Virtual Private Network.
9. Write a Program to implement Simple RSA Algorithm with small numbers.
10. Write a Program to implement Simple Diffie- Hellman Key Exchange Algorithms with small numbers.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT), B. Tech CSE(ES/MA/ICS/BDCE)

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS510	DCC	Machine Learning Fundamentals	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To introduce the conceptual framework of Machine Learning and its real-world impact.
2. To provide a foundational understanding of supervised and unsupervised learning logic.
3. To master the mechanics of regression and classification without immediate code complexity.
4. To understand how ensemble methods and model evaluation work in professional practice.
5. To explore the discovery of patterns in large datasets through Association Mining.

COURSE OUTCOMES:

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

1. Categorize engineering problems into specific ML tasks (Regression, Classification, or Clustering).
2. Explain the mathematical mechanics behind linear and logistic models.
3. Construct decision trees and understand the logic of "wisdom of the crowd" in ensemble learning.
4. Evaluate model reliability using statistical metrics like Precision, Recall, and ROC curves.
5. Apply Association Rule Mining to identify hidden correlations in transactional data.

SYLLABUS

UNIT I — 9 HOURS

Introduction, Applications, and Use Cases: - What is Machine Learning? The ML Pipeline: From Data Collection to Insights. Application Domains: Smart Agriculture (Crop prediction), Healthcare (Disease diagnosis), and E-commerce (Recommendations). Engineering Use Cases: Predictive Maintenance in factories and Cyber Security (identifying Phishing). Difference between Supervised, Unsupervised, and Reinforcement Learning.

UNIT II — 9 HOURS

Supervised Learning - Linear and Logistic Models: - The intuition of Regression: Predicting continuous values (e.g., Temperature, Price). Linear Regression: The concept of Best Fit Line, Cost Functions, and Gradient Descent. Logistic Regression: Moving from numbers to categories; The Sigmoid Function and Decision Boundaries.

UNIT III — 9 HOURS

Decision Trees and Ensemble Learning: - The logic of "If-Then" rules: Decision Trees (Entropy, Information

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS510	DCC	Machine Learning Fundamentals	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Gain, and Gini Index). Over fitting vs. Under fitting. Ensemble Methods: Why a forest is better than a tree; Bagging (Random Forests) and Boosting (XG Boost logic). The Bias-Variance Tradeoff.

UNIT IV 9 HOURS

Unsupervised Learning and Evaluation: - Finding patterns without labels. Clustering: K-Means (Centroid logic) and Hierarchical Clustering. Dimensionality Reduction: The concept of PCA (Principal Component Analysis). Model Evaluation: How to know if a model is good? Confusion Matrix, Precision, Recall, and ROC/AUC analysis.

UNIT V 9 HOURS

Association Rule Mining: - Discovery of hidden relationships in data: Market Basket Analysis. Fundamental metrics: Support, Confidence, and Lift. Algorithms for finding frequent patterns: The Apriori Algorithm (The join and prune logic) and FP-Growth. Applications in retail, inventory management, and cross-selling strategies.

TEXTBOOKS:

1. T. M. Mitchell, *Machine Learning*. New York, NY, USA: McGraw-Hill, 1997.
2. E. Alpaydin, *Introduction to Machine Learning*, 4th ed. Cambridge, MA, USA: MIT Press, 2020.

REFERENCE:

1. J. Han, M. Kamber, and J. Pei, *Data Mining: Concepts and Techniques*, 3rd ed. Waltham, MA, USA: Morgan Kaufmann, 2011.
2. S. J. Russell and P. Norvig, *Artificial Intelligence: A Modern Approach*, 4th ed. Upper Saddle River, NJ, USA: Pearson, 2020.
3. B. Ratner, *Statistical and Machine Learning Data Mining*, 3rd ed. Boca Raton, FL, USA: CRC Press, 2017.

LIST OF PRACTICALS

1. **Case Study Mapping:** Identify 5 problems in Indore (traffic, agriculture, etc.) and categorize them as Regression or Classification.
2. **Manual Regression:** Given a small dataset, manually calculate the best-fit line using the Least Squares method.
3. **Decision Tree Logic:** Create a manual flowchart for a "Loan Approval" system based on age, income, and credit score.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech (CSE/IT), B. Tech CSE(ES/MA/ICS/BDCE)

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCS510	DCC	Machine Learning Fundamentals	60	20	20	30	20	3	1	2	5

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

4. **Data Preprocessing:** Clean a provided Excel dataset by identifying missing values and handling outliers.
5. **Comparison Lab:** Use a GUI-based tool to run SVM and Random Forest on the same data and compare their Confusion Matrices.
6. **Clustering Analysis:** Group a set of "Customer Profiles" into clusters based on annual spend and visit frequency.
7. **Feature Importance:** Identify which 3 features in an agricultural dataset are most responsible for crop failure.
8. **ROC Analysis:** Plot a manual ROC curve based on different threshold values for a binary classifier.
9. **Apriori Lab:** Manually find frequent item sets for a small transaction list (e.g., Bread, Milk, Diapers).
10. **Final Evaluation:** Perform a full "Model Audit" on a pre-trained model to check for bias and accuracy.
11. **Capstone Project**

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech CSE/IT, CSE (ES, MA, AI-IBM, DS, FSDB MLCC)

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE511M	DSE	Image Processing	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Understand the image processing system.
2. Analyze different transformation and segmentation techniques
3. Apply feature extractions from images.

COURSE OUTCOMES:

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

1. Define key concepts and terminologies related to image processing systems and their applications
2. Apply intensity transformations for image enhancement
3. Develop a comprehensive understanding of image processing theories and techniques
4. Demonstrate an understanding of transform and similarity measures

SYLLABUS

UNIT I — 8 HOURS

Introduction: Image processing systems and its applications. Basic image file formats. **Image formation:** Geometric and photometric models; Digitization - sampling, quantization; Image definition and its representation, neighborhood metrics.

UNIT II — 8 HOURS

Intensity transformations and spatial filtering: Enhancement, contrast stretching, histogram specification, local contrast enhancement; Smoothing, linear and order statistic filtering, sharpening, spatial convolution, Gaussian smoothing, DoG, LoG.

UNIT III — 10 HOURS

Segmentation: Pixel classification; Grey level thresholding, global/local thresholding; Optimum thresholding - Bayes analysis, Otsu method; Derivative based edge detection operators, edge detection/linking, Canny edge detector; Region growing, split/merge techniques, line detection, Hough transform.

UNIT IV — 10 HOURS

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE511M	DSE	Image Processing	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Image/Object features extraction: Textural features - gray level co-occurrence matrix; Moments; Connected component analysis; Convex hull; Distance transform, medial axis transforms, skeletonization/ thinning, shape properties.

Registration: Mono-modal/multimodal image registration; Global/local registration; Transform and similarity measures for registration; Intensity/pixel interpolation.

UNIT V — 9 HOURS

Colour image processing: Fundamentals of different colour models - RGB, CMY, HSI, YCbCr, Lab;False colour; Pseudocolour; Enhancement; Segmentation. **Morphological Filtering Basics:** Dilation and Erosion Operators, Top Hat Filters.

TEXTBOOKS:

1. R. C. Gonzalez and R. E. Woods, Digital Image Processing. Upper Saddle River, NJ, USA: Prentice Hall, 2008.

REFERENCE:

1. M. Petrou and P. Bosdogianni, *Image Processing: The Fundamentals*. Chichester, U.K.: John Wiley & Sons, Ltd., 1999.
2. K. R. Castleman, *Digital Image Processing*. Englewood Cliffs, NJ, USA: Prentice Hall, 1996.
3. A. Blake and A. Zisserman, *Visual Reconstruction*. Cambridge, MA, USA: MIT Press, 1987.
4. A. N. Netravali and B. G. Haskell, *Digital Pictures: Representation, Compression, and Standards*. New York, NY, USA: Plenum Press, 1995.
5. A. B. Watson, *Digital Images and Human Vision*. Cambridge, MA, USA: MIT Press, 1993.

LIST OF PRACTICALS

1. Image File Format Comparison Load, display, and save images in different formats (JPEG, PNG, BMP) using a programming library. Analyze and compare the compression quality and file size.
2. Histogram Equalization Implement histogram equalization to enhance the contrast of a given image. Visualize the original and equalized histograms to show the effect of the transformation.
3. Spatial Filtering: Smoothing and Sharpening Apply various spatial filters (mean, median, Gaussian) for

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE511M	DSE	Image Processing	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

smoothing and different sharpen filters (Laplacian, Sobel) to an image. Compare and analyze the results.

4. Image Segmentation Using Thresholding Implement global and adaptive thresholding to segment an image. Use Otsu's method to determine the optimal threshold and evaluate the effectiveness of the segmentation.
5. Edge Detection Techniques Implement several edge detection operators (e.g., Sobel, Prewitt, Canny) on the same image. Compare their performance visually and quantitatively (e.g., using precision and recall).
6. Texture Feature Extraction Use the gray level co-occurrence matrix to extract texture features from an image (contrast, correlation). Compare textures from different regions of the same image.
7. Image Registration Perform mono-modal image registration by aligning two images of the same scene taken at different times. Implement a technique to measure similarity (SSD, correlation) using transformations.
8. Color Space Conversion Convert a color image from RGB to different color spaces (HSV, YCbCr, Lab). Visualize the changes and select one space to perform color-based segmentation.
9. Morphological Operations: Dilation and Erosion Apply morphological operations (dilation and erosion) on binary images. Analyze how these operations affect the structure of the objects in the images.
10. Canny Edge Detector Implementation Implement the Canny edge detection algorithm from scratch. Break down the steps involved.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech CSE/IT- All Programs

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE512N	DSE	Software Testing and Quality Assurance	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Develop a skill in developing good quality in the software product.
2. Develop methods and procedures for software development that can scale up large systems and that can be used to consistently produce high-quality software at low cost and with a small cycle time.
3. Learn systematic approach to the operation, maintenance, and retirement of software.
4. Learn how to use available resources to develop software, reduce cost of software and how to maintain quality of software.
5. Methods and tools of testing and maintenance of software.

COURSE OUTCOMES:

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

1. Apply approach to Software Testing & QA concepts.
2. Apply modern software testing processes in relation to software development and project management.
3. Create test strategies and plans, design test cases prioritize and execute them.
4. Manage defects within a project.
5. Contribute to efficient delivery of software solutions and implement improvements in the software development processes.

SYLLABUS

UNIT I — 10 HOURS

BASIC CONCEPTS: Basic Testing Vocabulary, Quality Assurance versus Quality Control, The Cost of Quality, Software Quality Factors, Software Defect, The Multiple Roles of the Software Tester(People Relationships), Scope of Testing, Testing Constraints, Various software development Life cycles (SDLC), Independent Testing, QA Process, Levels of Testing, The "V" Concept of Testing.

UNIT II — 9 HOURS

WHITE BOX TESTING: White box testing techniques - Statement coverage - Branch Coverage - Condition coverage - Decision/Condition coverage - Multiple condition coverage - Dataflow coverage - Mutation testing - Automated code coverage analysis.

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE512N	DSE	Software Testing and Quality Assurance	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

UNIT III — 8 HOURS

BLACK BOX TESTING: Black box testing techniques - Boundary value analysis - Robustness testing - Equivalence partitioning -Syntax testing - Finite state testing - Levels of testing – Unit testing- Integration Testing.

UNIT IV — 9 HOURS

SYSTEM TESTING - Functional testing-non-Functional testing-acceptance testing-performance testing –Factors and Methodology for Performance testing, Regression testing-Methodology for Regression-testing. Five Views of Software Quality, McCall's Quality Factors and Criteria, Quality Factors, Quality Criteria, Relationship between Quality Factors and Criteria, Quality Metrics, Quality Characteristics, Software Quality Standard.

UNIT V — 9 HOURS

ADVANCE SOFTWARE TESTING METHOD (OBJECT ORIENTED TESTING): Syntax testing - Finite State testing - Levels of testing - Unit, Integration and System Testing. Challenges - Differences from testing non-OO Software - Class testing strategies - State-based Testing Software quality Assurance: ISO 9000; CMM and Test Management Issues; Quality Assurance personnel Issues.

TEXTBOOKS:

1. K. Naik and P. Tripathy, *Software Testing and Quality Assurance: Theory and Practice*. Hoboken, NJ, USA: John Wiley & Sons, Inc., 2008.
2. D. Meiraj, *Software Testing and Quality Assurance: A Comprehensive Guide to Strategies, Techniques, and Best Practices*. Peacock Books, 2023.

REFERENCE:

1. M. P. Navale, S. S. Mane, and S. C. Sethi, *Software Testing and Quality Assurance (SPPU Curriculum Edition)*. Nirali Prakashan, 2022.
2. Mathur, *Foundations of Software Testing and Quality Assurance*. Springer, 2024.
3. R. Black, *Advanced Software Testing – Vol. 3: Guide to the ISTQB Advanced Certification as Test Manager*. Rocky Nook, 2025.
4. Springer Editors, *Software Quality Journal – Special Issues on AI-driven QA*. Springer Nature, 2025.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech CSE/IT- All Programs

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE512N	DSE	Software Testing and Quality Assurance	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

LIST OF PRACTICALS

1. Design test cases using Boundary value analysis by taking quadratic equation problem.
2. Design test cases using Equivalence class partitioning taking triangle problem.
3. Design test cases using Decision table taking triangle problem.
4. Design independent paths by calculating cyclometer complexity using date problem.
5. Design independent paths by taking DD path using date problem.
6. Design the test cases for login page of AMIZONE.
7. Manual Testing for PAN card verification.
8. Generate test case for ATM machines.
9. Overview of Testing process using Rational Robot.
10. Write a script to record verification points using Rational Robot (For GUI testing of single click on Windows).
11. Write a script to record verification points for Clip Board and alphanumeric values using Rational Robot.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech CSE/IT- All Programs

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE513N	DSE	Next Generation Telecommunication Networks	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. Understand the importance of QoS and resource management in next generation wireless networks.
2. Describe and compare the network and protocol architectures of GPRS and EDGE and the two principle 3G cellular based wireless standards: UMTS and cdma2000.
3. List and provide a high-level discussion on the key enabling technologies for next generation wireless networks.
4. Identify the relationship between WiFi, WiMAX, and 3G cellular-based wireless networks. In addition, the student will be able to outline and discuss the potential impact of these technologies upon wireless network evolution.

COURSE OUTCOMES:

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

1. Outline the main architectural elements of a Next Generation Network and explain the logic behind it.
2. Understand the concept of Voice over IP (VoIP) and explain how full featured telephony can be provisioned over an IP network.
3. Understand the portfolio of broadband access mechanisms in a fixed network and be able to explain the relative merits of each type.
4. Understand the principles of connection-orientated and connectionless packet switching and the protocols available to enable such networks.
5. Understand the principles of mobile networks and they relate to NGN.

SYLLABUS

UNIT I — 10 HOURS

Introduction: Basic history of Mobile Computing Architecture for mobile computing, Three tier architecture, design considerations for mobile computing, mobile computing through internet, Wireless network architecture, Applications, Security, Concerns and Standards, Benefits, Future. Evolution of mobile computing.

UNIT II — 9 HOURS

Next Generation Networks (NGN): Principles and definition of an NGN, The NGN architecture, Outline of

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE513N	DSE	Next Generation Telecommunication Networks	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

technology choices, Network and implementation issues with NGN, Numbering & Addressing.

UNIT III 8 HOURS

Wireless Networks and Technologies: Introduction, Different generations. Introduction to 1G, 2G, 3G and 4G, Bluetooth, Radio frequency identification(Rfid),Wireless Broadband, Mobile IP: Introduction, Advertisement, Registration, TCP connections, two level addressing, abstract mobility management model, performance issue, routing in mobile host, Adhoc networks, Mobile transport layer: Indirect TCP, Snooping TCP, Mobile TCP, Time out freezing, Selective retransmission, transaction oriented TCP, IPv6.

UNIT IV 9 HOURS

Next Generation Core Network: The role of the core network, Enabling Control and Reconfigurability, Packet Switching (ATM, IP, MPLS, Ethernet), IP Multi-Media System (IMS), Principles of control for IP networks, Concept of IMS.

UNIT V 9 HOURS

NGN Service Aspects: Services on an NGN, Service compatibility with PSTN and IN, Use of APIs and service provider interfaces, Brief review of the principles of mobile networks, Relationship of mobile developments to NGN.

TEXTBOOKS:

1. R. Valdar, *Understanding Telecommunications Networks*. London, U.K.: IET Telecommunications Series 52, 2006.
2. J. Bannister, P. Mather, and S. Coope, *Convergence Technologies for 3G Networks: IP, UMTS, EGPRS and ATM*. Chichester, U.K.: John Wiley & Sons, Ltd., 2004.

REFERENCE:

1. K. Telukder and R. R. Yavagal, *Mobile Computing*. New Delhi, India: Tata McGraw-Hill, 2005.
2. T. SahaMisra, *Wireless Communications and Networks: 3G and Beyond*. New Delhi, India: Tata McGraw-Hill, 2009.
3. M. Carugi, "Introduction to the ITU-T NGN focus group release 1: target environment, services, and capabilities," *IEEE Communications Magazine*, vol. 43, no. 10, pp. 42–48, Oct. 2005.

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTDSE513N	DSE	Next Generation Telecommunication Networks	60	20	20	30	20	3	0	2	4

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

4. C.-S. Lee and D. Knight, “Realization of the next-generation networks,” *IEEE Communications Magazine*, vol. 43, no. 10, pp. 34–41, Oct. 2005.

LIST OF PRACTICALS

1. Selection and study of various PN code (MLS, GOLD, BARKER).
2. Generate (spreading) DS-SS modulated signal.
3. To demodulate (dispreading) DS-SS modulated signal.
4. Selection & comparative study of various code modulation techniques: BPSK/QPSK/OQPSK.
5. Modulation and Demodulation using internal generation of 2047 bit PN sequence as modulator Input and Unpopulated carrier.
6. Spreading and Dispreading using Additive white Gaussian Noise Generator and frequency offset.
7. Voice communication using DSSS.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech CSE/IT, CSE (ES, MA, MLCC, ICS, BDCE)

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT507M	SEC	Programming with Python	0	0	0	60	40	0	0	4	2

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

COURSE OBJECTIVES:

The student will have ability to:

1. To develop proficiency in creating based applications using Python Programming Language.
2. To be able to understand the various data structures available in Python programming language and apply them in solving computational problems.
3. To be able to do testing and debugging of code written in Python.
4. To be able to draw various kinds of plots using PyLab.
5. To be able to use generators for generating series like fibonacci.

COURSE OUTCOMES:

Upon completion of this course, the student will be able to apply technical knowledge and perform specific technical skills, including:

1. Ability to create robust applications using the Python programming language.
2. Ability to test and debug applications written using Python programming language.
3. Ability to create applications for solving computational problems using the Python Programming Language.

SYLLABUS

UNIT I — 6 HOURS

Introduction to Python: The basic elements of Python, Branching programs, Strings and Input, Iteration. Functions, Scoping and Abstraction: Functions and Scoping, Specifications, Recursion, Global variables, Modules, Files.

UNIT II — 6 HOURS

Testing and Debugging: Testing, Debugging. Structured Types, Mutability and Higher order Functions: Tuples, Lists and Mutability, Functions as Objects, Strings, Tuples and Lists, Dictionaries.

UNIT III — 6 HOURS

Exceptions and assertions: Handling exceptions, Exceptions as a control flow mechanism, Assertions. Classes and Object-oriented Programming: Abstract Data Types and Classes, Inheritance, Encapsulation and information hiding.

UNIT IV — 6 HOURS

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT507M	SEC	Programming with Python	0	0	0	60	40	0	0	4	2

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

NumPy and Pandas: Python list vs NumPy arrays, creating a NumPy Array, Basic ndarray, Shape of NumPy array, Size of NumPy array, Random numbers in ndarray, The Shape and Reshaping of NumPy Array, Dimensions of NumPy array, Reshaping a NumPy array, Flattening a NumPy array, Transpose of a NumPy array, Indexing and Slicing of NumPy Array.

Pandas Series, Pandas Data Frames, Common Operations in Pandas, How to Deal With Missing Data in Pandas, How To Merge Data Frames in Pandas, How To Join Data Frames in Pandas, How to Concatenate Data Frames in Pandas. Data Input and Output in Pandas, How to Save Pandas Data Frames. Data visualization

UNIT V — 6 HOURS

Matplotlib: Matplotlib Introduction, Line Chart, Scatter Plot , Bar Graph, Histogram, Subplots , Pie Chart , Pyplot, Matplotlib with Pandas and Numpy. Specify Color, Markings and Lline Styles, Adjust Thickness, Label Tilte, and Legend.

TEXTBOOKS:

1. E. Matthes, *Python Crash Course*, 3rd ed. San Francisco, CA, USA: No Starch Press, 2023.
2. Sweigart, *Automate the Boring Stuff with Python*, 3rd ed. San Francisco, CA, USA: No Starch Press, 2025.

REFERENCE:

1. L. Ramalho, *Fluent Python*, 2nd ed. Sebastopol, CA, USA: O'Reilly Media, 2022.
2. B. Slatkin, *Effective Python: 125 Specific Ways to Write Better Python*, 3rd ed. Boston, MA, USA: Addison-Wesley, 2024.
3. W. McKinney, *Python for Data Analysis*, 3rd ed. Sebastopol, CA, USA: O'Reilly Media, 2022.
4. D. Beazley and B. K. Jones, *Python Cookbook*, 3rd ed. Sebastopol, CA, USA: O'Reilly Media, 2013.

LIST OF PRACTICALS

1. Write a Python Program to Print Hello world!
2. Write a program to demonstrate different number data types in Python.
3. Write a program to perform different Arithmetic Operations on numbers in Python.
4. Write a Program to Swap Two Variables.
5. Write a Program to Convert Celsius to Fahrenheit.
6. Write a Program to Find the Largest Among Three Numbers.

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Information Technology

Choice Based Credit System (CBCS) in the light of NEP-2020

B. Tech CSE/IT, CSE (ES, MA, MLCC, ICS, BDCE)

SEMESTER-V (2024-2028)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME					L	T	P	CREDITS
			THEORY			PRACTICAL					
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTIT507M	SEC	Programming with Python	0	0	0	60	40	0	0	4	2

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit; ***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

7. Write a Program to Check Prime Number.
8. Write a Program to Find the Factorial of a Number.
9. Write a Program to Print the Fibonacci sequence.
10. Write a program to create, append, and remove lists in python.
11. Write a program to demonstrate working with tuples in python.
12. Write a program to demonstrate working with set in python.
13. Write a program to demonstrate working with dictionaries in python.
14. Write a program to find reverse of given number using function.
15. Write a python Program to call data member and function using classes and objects
16. Write a program to read 3 subject marks and display pass or failed using class and object.
17. Write a program in Python to handle user defined exception for given problem
18. Write a program using a Numpy module to create an array and check the following:
    a. Type of array b. Axes of array c. Shape of array c. Type of elements in array
19. Write a python program to concatenate the data frames with two different objects
20. Write a Python program to Demonstrate how to Draw a Scatter Plot, Bar Graph and Pie Chart using Matplotlib.