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-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
ML307	BS	Environmental Management and Sustainability	60	20	20	0	0	4	0	0	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.	To create awareness towards various environmental problems.
2.	To create awareness among students towards issues of sustainable development.
3.	To expose students towards environment friendly practices of organizations.
4.	To sensitize students to act responsibly towards environment

COURSE OUTCOMES:	
Upon completion of the subject, students will be able to:	
1.	The course will give students an overview of various environmental concerns and practical challenges in environmental management and sustainability.
2.	Emphasis is given to make students practice environment friendly behavior in day-to-day activities.

SYLLABUS

UNIT I	**10 HOURS**

Introduction to Environment Pollution and Control:

1. Pollution and its types (Air, Water, and Soil): Causes, Effects and Control measures
2. Municipal Solid Waste: Definition, Composition, Effects
3. Electronic Waste: Definition, Composition, Effects
4. Plastic Pollution: Causes, Effects and Control Measures

UNIT II	**8 HOURS**

Climate Change and Environmental Challenges:

1. Global Warming and Green House Effect
2. Depletion of the Ozone Layer
3. Acid Rain
4. Nuclear Hazards

UNIT III	**9 HOURS**

Environmental Management and Sustainable Development:

1. Environmental Management and Sustainable Development: An overview
2. Sustainable Development Goals (17 SDGs)
3. Significance of Sustainable Development

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-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
ML307	BS	Environmental Management and Sustainability	60	20	20	0	0	4	0	0	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. Environment Friendly Practices At Workplace and Home (Three Rs' of Waste Management, Water Conservation, Energy Conservation)

UNIT IV — **8 HOURS**

Environmental Acts:

1. The Water (Prevention and Control of Pollution) Act, 1974: Objectives, Definition of Pollution under this act, Powers and Functions of Boards
2. The Air (Prevention and Control of Pollution) Act, 1981:Objectives, Definition of Pollution under this act, Powers and Functions of Boards
3. The Environment (Protection) Act, 1986: Objectives, Definition of important terms used in this Act, Details about the act.
4. Environmental Impact Assessment: Concept and Benefits.

UNIT V — **7 HOURS**

Role of Individuals, Corporate and Society:

1. Environmental Values
2. Positive and Adverse Impact of Technological Developments on Society and Environment
3. Role of an individual/ Corporate/ Society in environmental conservation
4. Case Studies: The Bhopal Gas Tragedy, New Delhi's Air Pollution, Arsenic Pollution in Ground Water (West Bengal), Narmada Valley Project, Cauvery Water Dispute, Fukushima Daiichi Disaster (Japan), Ozone Hole over Antarctica, Ganga Pollution, Deterioration of TajMahal. Uttarakhand flash floods.

TEXTBOOKS:

1. Rogers, P.P., Jalal, K.F., Boyd, I.A. *An Introduction to Sustainable Development*, Earthscan.
2. Kalam, A.P.J., *Target 3 Billon: Innovative Solutions Towards Sustainable Development,* Penguin Books

REFERENCE:

1. Kaushik A. and Kaushik, *Perspectives in Environmental Studies*, New Delhi: New Age International Publishers.
2. Dhameja, S.K., *Environmental Studies,* S.K. Kataria and Sons, New Delhi
3. Bharucha E., *Environmental Studies for Undergraduate Courses*, New

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-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
ML307	BS	Environmental Management and Sustainability	60	20	20	0	0	4	0	0	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.	Delhi: University Grants Commission.
5.	Wright R.T., *Environmental Science: towards a sustainable future,* New Delhi: PHL Learning Private Ltd.
6.	Rajagopalan R., *Environmental Studies*, New York: Oxford University Press.

COURSE OBJECTIVES:

The student will have ability to:

1.	To differentiate among the various database system according to their function.
2.	To understand the process to develop database model and database design.
3.	To understand managing a database using Structured Query Language.
4.	To expand an understanding of necessary DBMS concepts such as: Database Transactions, Database Security, Integrity, Concurrency.
5.	To understand and build a straightforward database system and show competence with the fundamental tasks involved with modeling, designing, and implementing a DBMS.

COURSE OUTCOMES:

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

1.	Construct conceptual data models by identifying the entities and relationships.
2.	Evaluate the normality of a logical data model, and correct any anomalies.
3.	Develop physical data models for relational database management systems.
4.	Implement relational databases using a RDBMS.
5.	Work as a valuable member of a database design and implementation team.

SYLLABUS

UNIT I — 10 HOURS

Introduction: Concept & Overview of DBMS, Three Schema Architecture of DBMS, Database Approach v/s Traditional File Accessing Approach, Advantages of Database Systems, Data Models, Schema and Instances, Data Independence, Data Base Language and Interfaces, Functions of DBA and Designer, Database Users.

Entity-Relationship Model: Basic concepts, Design Issues, Mapping Constraints, Keys, Entity- Relationship Diagram, Weak Entity Sets and Extended E-R features. ER Diagram to Relational Table conversion.

UNIT II — 9 HOURS

Relational Model: Structure of Relational Databases, Relational Algebra, Relational Calculus, Extended Relational Algebra Operations, Joins and its type. Integrity Constraints. Referential Integrity, Intension and Extension.

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-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTCS401N	DCC	Data Base Management Systems	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**
SQL and PL/SQL: SQL commands, Set operations, Aggregate Functions, Null Values, Domain Constraints, Assertions, Views, Nested Sub Queries, Stored Procedures and Triggers, Database Security, Application development using PLSQL. **Relational Database Design:** Functional Dependency, Database Anomalies, Normalization and its forms, Multi-Valued Dependencies, 4NF, Join Dependency, 5NF.	
UNIT IV	**7 HOURS**
Transaction and Concurrency Control: Physical Data Structures, Query Optimization, Transaction Model properties, State Serializability, Concurrency control protocols, Multiple Granularities, Granularity of Data Item. Multi version schemes, Database Recovery Methods, Recovery in Multi-Database System and Database Backup and Recovery from Catastrophic Failure.	
UNIT V	**8 HOURS**
File Organization and Index Structure: File & Record Concept, Placing file records on Disk, Types of Records, Types of Single-Level Index, Multilevel Indexes, Dynamic Multilevel Indexes using B tree and B+ tree. Mongo DB, NoSQL types, Features and tools.	

TEXTBOOKS:

1. Henry F. Korth and Silberschatz Abraham, *Database System Concepts*, Mc.GrawHill, 6th Ed., 2015.
2. Raghu Ramakrishnan and Johannes Gehrke, *Database Management Systems,* McGraw- Hill Education, 2003.

REFERENCE:

1. Kahate, Atul, *Introduction to Database Management Systems,* Pearson Education India, 2006.
2. C J Date, *An Introduction to Database System*, Pearson Educations, 8th Edition, 2004.
3. Ivan Bayross, *SQL, PL/SQL - The Programming Language of Oracle*, BPB Publications 4th Revised Edition, 2010.
4. Elmasri, Navathe, *Fundamentals of Database Systems*, Pearson Educations 7th Edition, 2016.
5. Seema Kedar, *Database Management System*, Technical Publications, 2009.
6. Rajiv Chopra, *Database Management System (DBMS) A Practical Approach*, Kindle Edition, S Chand (December 1, 2010), 2017.

LIST OF PRACTICALS

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-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTCS401N	**DCC**	**Data Base Management Systems**	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.

1.	Design a Database and create required tables. For e.g. Bank, College Database.
2.	Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3.	Write a SQL statement for table and record handling like implementing INSERT statement, using SELECT and INSERT together, DELETE, UPDATE, TRUNCATE statements and DROP, ALTER statements.
4.	Write the queries for Retrieving Data from a Database Using the WHERE clause, using Logical Operators in the WHERE clause , Using IN, BETWEEN, LIKE, ORDER BY, GROUP BY and HAVING Clause, Using Aggregate Functions and Combining Tables Using JOINS.
5.	Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ().
6.	Write the query to implement the concept of Integrity constrains.
7.	Write the query to create the views.
8.	Perform the queries for triggers.
9.	Perform the following operation for demonstrating the insertion, updating and deletion using the referential integrity constraints.
10.	Write the query for creating the users and their role. Using GRANT and REVOKE operations.
11.	Develop a small application for a patient admitted in a hospital which has capability of inserting, deleting, updating, and the patient record. The application should also be able to search the patient's record by its id.

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-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTCS302N	DCC	Analysis & Design of Algorithms	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.	To learn the algorithm analysis techniques.
2.	To critically analyze the efficiency of alternative algorithmic solutions for the same problem
3.	To understand the limitation of algorithm power.
4.	To understand different algorithm design techniques.

COURSE OUTCOMES:

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

1.	Define the basic concepts of algorithms and analyze the performance of algorithms.
2.	Explain different standard algorithm design techniques, namely, divide & conquer, greedy, dynamic programming, backtracking and branch & bound.
3.	Demonstrate standard algorithms for fundamental problems in Computer Science.
4.	Design algorithms for a given problem using standard algorithm design techniques.
5.	Analyze and compare the efficiency of various algorithms of a given problem.
6.	Identify the limitations of algorithms in problem solving.
7.	To identify the types of problem, formulate, analyze and compare the efficiency of algorithms.

SYLLABUS

UNIT I — 10 HOURS

Algorithms Designing: Algorithms, Analyzing Algorithms, Asymptotic Notations, Heap Sort, Sorting and Searching Algorithms and their Analysis in terms of Space and Time Complexity.

Divide and Conquer: General Method, Binary Search, Merge Sort, Quick Sort, Selection Sort, Strassen's Matrix Multiplication Algorithms.

UNIT II — 9 HOURS

Greedy Method: General Method, fractional Knapsack Problem, Job Sequencing with Deadlines, Minimum-Cost Spanning Tree - Prim's and Kruskal's algorithm, Single Source Shortest Paths.

UNIT III — 8 HOURS

Dynamic Programming: General Method, Optimal Binary Search Trees, O/1 Knapsack, multistage graph, Traveling Salesperson Problem, All Pairs Shortest Paths.

UNIT IV — 7 HOURS

Backtracking: General Method, 8-Queens Problem, Graph Coloring, Hamiltonian Cycles, sum of Subsets.

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-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTCS302N	DCC	Analysis & Design of Algorithms	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.

Branch and Bound: General Method, O/1 Knapsack Problem, Traveling Salesperson Problem.	
UNIT V	**8 HOURS**
NP Hard and NP Complete Problems: Basic Concepts, Cook's Theorem, NP Hard Graph and NP Scheduling Problems, Some Simplified NP Hard Problems.	
TEXTBOOKS:	
1.	Ellis Horowitz and Sartaj Sahni, *Fundamental of Computer Algorithms*, 2nd Edition, Galgotia Publication, 2001.
2.	Thomas H Cormen, Charles E Leiserson and Ronald L Rivest, *Introduction to Algorithms*, 3rd Ed., MIT Press. 2009.
REFERENCE:	
1.	Donal E Knuth, *Fundamentals of Algorithms: The Art of Computer Programming*, Vol l, 3rd Ed., Pearson Education, 1997.
2.	Goodman, S.E. & Hedetnieni, *Introduction to Design and Analysis of Algorithm*, Tata McGraw Hill, 1977.
3.	S. Dasgupta, C. H. Papadimitriou, and U. V. Vazirani, *Algorithms*, Tata McGraw Hill, 2006.
4.	J.E Hopcroft, J.D Ullman, *Design and analysis of algorithms*, TMH Publication.
LIST OF PRACTICALS	
1.	Write a program for Iterative and Recursive Binary Search.
2.	Write a program for Merge Sort.
3.	Write a program for Quick Sort.
4.	Write a program for Strassen's Matrix Multiplication.
5.	Write a program for minimum spanning trees using Kruskal's algorithm.
6.	Write a program for minimum spanning trees using Prim's algorithm.
7.	Write a program for single sources shortest path algorithm.
8.	Write a program for Floyd-Warshal algorithm.
9.	Write a program for traveling salesman problem.
10.	Write a program for Hamiltonian cycle problem.

ShriVaishnavVidyapeethVishwavidyalaya, Indore

ShriVaishnav Institute of Information Technology

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

B.Tech. (CSE-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTIBM602N	DCC	Artificial Intelligence	60	20	20	30	20	2	0	2	3

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 evolution and relevance of AI in the world today.
2.	Explore opportunities brought by the intersection between human expertise and machine learning.
3.	Understand AI technology building blocks, including natural language processing, machine and deep learning, neural networks, virtual agents, autonomics and computer vision.
4.	Develop a deeper understanding of machine learning techniques and the algorithms that power those systems.
5.	Engage in role-playing challenge-based scenarios to propose real-world solutions to different industries using AI and design thinking.

COURSE OUTCOMES:	
Upon successful completion of the course the student will be able to:	
1.	Describe the field of AI and its subfields machine learning, NLP and computer vision
2.	Describe how Watson technology is being applied to solve real world problems
3.	List the Watson services available on the IBM Cloud
4.	Describe the purpose of training the various Watson services to adapt them to a closed-domain
5.	Describe how to build a chatbot by using the IBM Watson Conversation service

SYLLABUS	
UNIT I	
AI LANDSCAPE AI impact in the world today, History and Evolution of AI, AI Explained, AI Technologies, Applications of A.I. Summary & Resources	
UNIT II	**12 HOURS**
AI INDUSTRY ADOPTION APPROACHES AI Industry Impact, Autonomous Vehicles, SmartRobotics, Future Workforce and AI, Applications of AI. Main focus of AI, Summary & Resources.	
UNIT III	**8 HOURS**
FUTURE TRENDS FOR AI Artificial Intelligence Trends, Limits of machine and human, AI predictions in the next 5 years, Summary and Resources.	
UNIT IV	**16 HOURS**
MACHINE LEARNING AND DEEP LEARNING Explained, Deep learning ecosystem, Experiments, Explain what neural networks are and why they are important	

ShriVaishnavVidyapeethVishwavidyalaya, Indore

ShriVaishnav Institute of Information Technology

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

B.Tech. (CSE-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTIBM602N	DCC	Artificial Intelligence	60	20	20	30	20	2	0	2	3

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.

in today's AI's field Explain what domain adaptation is and its applications Summary& Resources. data, Improving Efficiency.	
UNIT V	**10 HOURS**
NATURAL LANGUAGE UNDERSTANDING AND COMPUTER VISION NLP Overview, NLP Explained, Virtual Agents Overview, Virtual Agents for the Enterprise, Summary and Resources, Computer Vision Overview, AI Vision through Deep Learning, Computer Vision for the Enterprise, Experiments. Summary and Resources **COMPUTER VISION** Define computer vision, History of computer vision Tools and Service of completed vision, Use cases of computer vision. Describe cognitive system, Summary and Resources.	
TEXTBOOKS:	
1.	IBM Courseware
References:	
1.	A Modern Approach‖ by Norvig and Russell
LIST OF PRACTICALS	
1.	**SETTING UP YOUR CLOUD ACCOUNT** • Obtain an IBM cloud account • Apply promotion code • Uses the various services of IBM
2.	**CREATING A MODEL USING MACHINE LEARNING** • Apply Algorithms • Train the model • Test The Model
3.	**CREATING AN AI VIRTUAL ASSISTANT** • Create a dialog skill • Create a virtual assistant • Load virtual assistant with various dialog skills • Integrate your assistant
4.	**CREATE A CHATBOT USING PYTHON** • Use python Library • Train the ChatBot • Test The ChatBot
5.	**CREATE AN APPLICATIN USING OPEN CV** • Understand the Open CV Library • Train The images and test

ShriVaishnavVidyapeethVishwavidyalaya, Indore

ShriVaishnav Institute of Information Technology

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

B.Tech. (CSE-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTIBM602N	**DCC**	**Artificial Intelligence**	**60**	**20**	**20**	**30**	**20**	**2**	**0**	**2**	**3**

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.	**EDGE DETECTION CONCEPT** • Canny Algorithm • How to detect the edges
7.	**BASIC UNDERSTANDING OF Tkinter, CREATE A GUI USING PYTHON** • Create an interface for the project • Use the buttons and drop down
8.	**BASIC UNDERSTANDING OF NLTK** • Concept of Tokenization • Concept of Lematization

ShriVaishnavVidyapeethVishwavidyalaya, Indore

ShriVaishnav Institute of Information Technology

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

B.Tech. (CSE-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTIBM507N	SEC	Programming with Python	0	0	0	0	50	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 develop proficiency in creating based applications using the 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 the subject, students will be able to:

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

SYLLABUS

UNIT I — 10 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 — 9 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 — 8 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 — 10 HOURS

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.

ShriVaishnavVidyapeethVishwavidyalaya, Indore

ShriVaishnav Institute of Information Technology

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

B.Tech. (CSE-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTIBM507N	SEC	Programming with Python	0	0	0	0	50	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.

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

UNIT V	**8 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.	JohnVGuttag.“IntroductiontoComputationandProgrammingUsingPython”,Prentice Hall of India.
2.	Allen Downey, Jeffrey Elkner and Chris Meyers "How to think like a Computer Scientist, Learning with Python", Green Tea Press.
3.	Mark Lutz "Learning Python "O' Reilly Media; 5 edition.
4.	David Beazley "Python Cookbook, Third edition "O' Reilly Media.

REFERENCE:

1.	Python Essential Reference, 4thEdition Addison-Wesley Professional.
2.	Mark Lutz "Programming Python: Powerful Object-Oriented Programming.
3.	"David Beazley "Python Cookbook" Third edition, O'Reilly Media.

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.
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.

ShriVaishnavVidyapeethVishwavidyalaya, Indore

ShriVaishnav Institute of Information Technology

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

B.Tech. (CSE-Artificial Intelligence-IBM)

SEMESTER-IV(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*				
BTIBM507N	**SEC**	**Programming with Python**	**0**	**0**	**0**	**0**	**50**	**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.

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 d. Type of elements in array
19.	Write a python program to concatenate the dataframes with two different objects
20.	Write a Python program to Demonstrate how to Draw a Scatter Plot, Bar Graph and Pie Chart using Matplotlib.