DAIHC-1-04T: Python Programming for AI

Total Marks: 100
External Marks: 70
Internal Marks: 30
Credits: 4

Detailed Contents:

Module	Module Name	Module Contents	Lectures /Tutorials Hours
Module-I	Python Programming Foundations	• Introduction to Python: Syntax, variables, and data types • Control structures: if-else, loops (for, while), loop control statements • Functions and scope: def, arguments, return types, lambda functions • Introduction to Object-Oriented Programming: Classes and objects, Constructors and destructors, Inheritance and polymorphism • Error handling and exceptions	15
Module-II	Data Structures and File Handling in Python	• Data structures: Lists, Tuples, Sets, Dictionaries – operations and use-cases in AI workflows • String manipulations and pattern matching • File I/O operations: Reading/writing text and CSV files • Working with JSON and XML data • Introduction to working with healthcare data files (e.g., patient records, EHR snippets)	15
Module	**Module Name**	**Module Contents**	**Lectures /Tutorials Hours**
Module-III	Data Analysis and Visualization using Python	• NumPy: Arrays, indexing, broadcasting, mathematical operations • Pandas: Series and DataFrames, importing datasets, data wrangling • Data cleaning techniques (handling missing values, outliers) • Matplotlib & Seaborn: Line plots, bar plots, scatter plots, histograms, heatmaps • Use-cases with healthcare datasets (e.g., disease frequency plots, patient statistics)	15

Module-IV	Python for AI and Machine Learning Basics	• Introduction to scikit-learn: Key features and workflows • Basic machine learning tasks in Python: Classification (Logistic Regression, KNN), Clustering (K-Means), Regression (Linear Regression), Train-test split, model fitting, and prediction • Evaluation metrics: Accuracy, confusion matrix	15

Books

• Zelle, J. M. (2017). Python programming: An introduction to computer science (3rd ed.). Franklin, Beedle & Associates.

• VanderPlas, J. (2016). Python data science handbook: Essential tools for working with data. O'Reilly Media.

• Raschka, S., & Mirjalili, V. (2019). Python machine learning: Machine learning and deep learning with Python, scikit-learn, and TensorFlow 2 (3rd ed.). Packt Publishing.

• Downey, A. (2015). Think Python: How to think like a computer scientist (2nd ed.). O'Reilly Media.