Name of the Department/Centre: Computer Science
Course Type (Please tick appropriate box):

Major	☐	Discipline Specific Core	☐	Ability Enhancement	☐
Minor	☐	Multidisciplinary	☐	Skill Enhancement	√
Value Added	☐	Any other	☐		

Course Title: Programming with Python
Course code: 24-DCS-S-151
Semester: II
Total Credits: 3   Lecture-Tutorial-Practical (LTP) breakup: (2-0-2)
Maximum Marks: 100   No of seats: 50
Course Advisor Name: NA
Course Advisor's Email: computerscience@jmi.ac.in
Prerequisites: Nil
Special Requirements (if any): Nil
Expected Learning Outcomes:

- Gain proficiency in writing and understanding Python code.
- Learn the use of basic data types (integers, floats, strings, booleans) and operators.
- Understand the structure of Python scripts, including indentation and code blocks.
- Use Python's standard library and install external packages using pip.
- Work with popular Python libraries such as math, random, datetime, etc.
- Understand how to explore and integrate third-party libraries (e.g., NumPy, pandas).
- Learn the basics of classes and objects in Python.
- Understand and implement concepts such as inheritance, encapsulation, and methods.
- Create small projects such as calculators, games, and data analysis scripts.

Course Syllabus (Unit wise):

1. Python fundamentals: data types, mutable & immutable types, operators & expressions, standard library modules, the flow of control, Python data structures: lists, tuples, dictionaries, and sets; string manipulation: string operators, slices, methods; List manipulation: creating & accessing the list, list operations, true copy of lists, nested lists; Tuples: creation, accessing, modifying tuples, nested tuples, methods & functions, tuple slicing; Dictionaries, creating, accessing, modifying dictionaries, Stack, Queue, data frame, etc., Exception handling and debugging techniques.
2. User-defined functions: modules in Python, importing python modules, name resolution, module aliasing, package/library, locating modules, using Python's standard library, user-defined functions: parameters in functions, passing arrays/tuples/dictionary, and lists to functions, function call, the scope of variables, dynamic typing and dynamic binding,
3. Classes & Objects: Creating and instantiating classes with attributes and methods, public v/s non-public members, Inheritance, Polymorphism, etc.
4.Data Handling: data file operations: opening & closing a file, reading/writing/appending a file, relative and absolute paths, standard file streams, binary file operations, Pandas library for data manipulation, Loading data from various sources (CSV, Excel, databases), data visualization, etc.
Text Book:
Cay S. Horstmann and Rance D. Necaise: "Python for Everyone", 2nd Edition, Wiley
References Books:
Eric Matthes: "Python Crash Course: A Hands-On, Project-Based Introduction to Programming", 2nd Ed, No Starch Press, Eric_Matthes_Python_Crash_Course_A_Hands.pdf (khwarizmi.org)
John V. Guttag: "Introduction to Computation and Programming Using Python", 3rd Ed, MIT Press, 2021
LAB component: Python

1. Write a Python program that takes two numbers as input from the user and performs basic arithmetic operations (addition, subtraction, multiplication, division). Display the results in a formatted output.
2. Create a program that converts temperatures between Celsius and Fahrenheit based on user input. Use functions to separate conversion logic and input/output.
3. Write a program that takes a list of numbers from the user and performs operations such as finding the maximum and minimum values, sorting the list, and calculating the sum and average.
4. Develop a program that checks if a given number is a prime number. If not, it should display all its factors.

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5. Write a Python program that checks if a given string is a palindrome (reads the same forwards and backward). Also, implement string manipulation features like reversing a string, converting to uppercase/lowercase, and counting vowels.
6. Create a phonebook application that stores names and phone numbers using a dictionary. The program should allow the user to add, remove, and search for contacts.
7. Write a program that reads a text file and counts the number of words, characters, and lines. Additionally, create a new file that stores the reversed content of the original file.
8. Implement a simple banking system using classes. The system should allow for account creation, deposits, withdrawals, and checking the account balance.
9. Given a CSV file with student scores, write a Python program using pandas to calculate the average, median, and highest score. Also, visualize the score distribution using matplotlib.
10. Create a console-based to-do list application that allows users to add, remove, and view tasks. Save the tasks to a file so they persist even after the program is closed, and load them when the program starts.

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Course Type (Please tick appropriate box):

Major	☐	Discipline Specific Core	☐	Ability Enhancement	☐
Minor	☐	Multidisciplinary	√	Skill Enhancement	☐
Value Added	☐	Any other	☐		

Course Title: Business Informatics
Course code: 24-DCS-T-151
Semester: I
Total Credits: 3   Lecture-Tutorial-Practical (LTP) breakup: (3-0-0)
Maximum Marks: 100   No of seats: 50
Course Advisor Name: NA
Course Advisor's Email: computerscience@jmi.ac.in
Prerequisites: Nil
Special Requirements (if any): Nil
Expected Learning Outcomes:

- Explain the concepts related to business analytics and its utility in decision-making.
- Comprehend database analytics to enrich business analytics processes.
- Perform descriptive analytics on business data in the context of practices.
- Comprehend and use ways of business forecasting.
- Apply data mining techniques to solve pertinent business problems and decisions.

Course Syllabus (Unit wise):

1. Business Analytics: Informatics and Business Analytics, Using Business Analytics, Impacts and Challenges, Evolution of Business Analytics, Analytic Foundations, Modern Business Analytics, Software Support and Spreadsheet Technology, Descriptive, Predictive, and Prescriptive Analytics, Data for Business Analytics; Big Data, Data Reliability and Validity; Models in Business Analytics: Descriptive, Predictive and Prescriptive; Model Assumptions, Uncertainty and Risk, Problem Solving with Analytics: Interpreting Results and Making a Decision, Implementing the Solution.

2. Database Analytics: Data Sets and Databases, Using Range Names in Databases; Data Queries: Tables, Sorting, and Filtering; Database Functions: Logical Functions, Lookup Functions for Database Queries, Template Design, Data Validation Tools, Form Controls, PivotTables, PivotTable Customization and Slicers.

3. Descriptive Analytics: Data Visualization, Value of Data Visualization, Tools and Software for Data Visualization, Creating Charts , Charts from PivotTables, Geographic Data, Data Visualization Tools; Descriptive Statistics: Metrics and Data Classification, Frequency Distributions; Percentiles and Quartiles, Cross-Tabulations, Descriptive Statistical Measures, in Business Decisions; Measures of Dispersion; Chebyshev's Theorem and the Empirical Rules; Measures of Association; Using Descriptive Statistics to Analyze Survey Data; Statistical Thinking in Business Decisions and Variability in Samples.

4. Business Forecasting: Qualitative and Judgmental Forecasting, Historical Analogy, The Delphi Method, Indicators and Indexes, Statistical Forecasting Models, Forecasting Models for Stationary Time Series, Moving Average Models, Error Metrics and Forecast Accuracy, Exponential Smoothing Models, Forecasting Models for Time Series with a Linear Trend, Double Exponential Smoothing, Regression-Based Forecasting for Time Series with a Linear Trend, Forecasting Time Series with Seasonality and Regression-Based Seasonal Forecasting Models.

Text Book:
J. R. Evans: Business Analytics. Pearson
References Books:
D. Delen & E. Turban: Business Intelligence, Analytics, and Data Science: A Managerial Perspective. Pearson
Alter: Information Systems – The Foundations of E-Business, Pearson
Combe: Introduction to E-business Management and Strategy, Elsevier
Colin Combe Haag and Cummings: Information Systems Essentials, TMH