

Branch Name:	Artificial Intelligence & Data Science
Program Code:	108
Course Name:	Advanced Python Programming
Course Code:	1ET1080502
Pre-requisite Course:	Basic Python Programming knowledge

Course Objectives:

1. To be able to understand the various regular expressions available in Python programming language and apply them.
2. To understand the advanced concepts of text processing, database programming, multithreading and extension
3. To be able to use extension for creating applications
4. To be able to use different libraries like Pandas, NumPy etc.

Teaching and Examination Scheme:

Teaching Scheme (Hours per week)				Evaluation Scheme (Marks)				
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory (Marks)		Practical (Marks)		Total (Marks)
				University Assessment	Continuous Assessment	University Assessment	Continuous Assessment	
03	-	02	04	70	30	30	20	150

Subject Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1	Functions & Modules: UDF: Create your own functions, Functions Parameters, Variable Arguments, Scope of a Function, Function Documentations, Lambda Functions & map Module: Create a Module, Standard Modules	05	10
2	File Handling File handling Modes, Reading Files, Writing & Appending to Files, Handling File Exceptions, The with statement	04	10
3	Python Libraries: Pandas: Introduction, Series, labels, Data Frames, Read CSV Files, Read JSON, Analyzing Data Frames NumPy: Creating Arrays, Array Indexing, Array Slicing, Datatypes, Copy Vs View, Array Shape, Array Reshape, Array Iterating, Array Join, Array Split, Array Search, Array Sort, Array Filter Introduction of Matplotlib, SciPy, Seaborn.	08	13

4	Regular Expressions: Special Symbols and Characters, Regexes and Python, A Longer Regex example (like Data Generators, matching a string etc.) Text Processing: Comma Separated values, JavaScript Object Notation (JSON), Python and XML	06	10
5	Working with Data Accessing various types of data: .csv, .xls, and unstructured file form, data pres-processing, slicing, filtering, dealing with missing Data, finding the missing data.	04	12
6	Advanced Python Programming Multithreaded Programming: Threads and Python, Thread and threading module, Single thread and Multithreaded execution, Multithreading example. Database Programming: Databases and Python, The Python DB-API, Python and ORMs, Non- Relational Databases Module Extension: Extending Python by writing extensions	04	10
7	Data Visualization Starting with a Graph, Defining the plot, Drawing multiple lines and plots, Showing parts of a whole with pie charts, Creating comparisons with bar charts, Showing distributions using histograms, Depicting groups using boxplots, Seeing data patterns using scatterplots	03	10
8	Basics of Django Framework Introduction, Installation, Framework, Working with Forms and database connectivity	07	15
9	Advance Concepts Web Scrapping, Data Wrangling (Scikit-learn), AI & Machine Learning Concepts	04	10

Text Books:

1. Wesley J Chun, Core Python Applications Programming, 3rd Edition.Pearson
2. Michael Bowles, Machine Learning in Python, Essential techniques for predictive analysis, Wiley
3. Mark Pilgrim, Dive into Python: Python Novice to pro(source: <http://diveintopython.org/>.)

Reference Books:

1. Alex Martelli, Python Cookbook, O'REILLY
2. Luke Sneeringer, Professional Python, WROX
3. Laura Cassell, Python Projects, WROX

List of Open Source Software/learning website:

1. <http://docs.python.org/library/csv>
2. <http://docs.python.org/library/json>
3. <http://docs.python.org/library/ext>
4. http://en.wikibooks.org/wiki/Python_Programming
5. <http://learnpythonthehardway.org/>
6. <http://jason.org>
7. [Nosql-database.org](http://nosql-database.org)
8. www.mongodb.org/
9. W3schools.com

LAB/Practical

1. Write a Python program to find out 1) Perimeters of Rectangle ($2 * \text{Length} * \text{Breadth}$) 2) Circumference of Circle ($2 * 3.14 * r$) using User Defined Function.
2. Write a Python program to find out 1) Sum of N natural numbers 2) factorial of given number N using User Defined Function.
3. Write a Python program to read text file and count number of characters and words.
4. Write a Python program to show the use of Pandas Library.
5. Write a Python program to show the use of NumPy Library.
6. Write a Python program to show the use of Matplotlib, SciPy, Seaborn Library.
7. Write a Python program to check whether entered email id is valid or not using regular expression.
8. Write a Python program to create a CSV file by entering user-id and password, read and search the password for given user-id.
9. Write a python program to plot multiple lines with different line styles.
10. Write a python program to draw pie chart with proper labelling.
11. Write a Python program to draw various shapes using appropriate methods in canvas.
12. Write a Python program to create registration form using tkinter.
13. Create Web Database Application “Address Book” with options to add, modify, view and delete entry option.
14. Data Preprocessing in Python: Web Scraping
15. Data Wrangling

Course Learning Outcomes (CLO): On completion of this course, the students will be able to:

CLO	Description	Bloom's Taxonomy Level
CLO1	Examine Python syntax and semantics and be fluent in the use of Python functions and file handling.	4. Analyzing
CLO2	Create, run and manipulate Python Programs using various Python built-in Libraries and Regular Expressions.	6. Creating
CLO3	Manipulate and analyze large datasets and handle missing or inconsistent values.	3. Analyzing
CLO4	Design, implement and test Python programs for data analysis and visualization, web data extraction and database interactions.	2. Understanding 3. Analyzing
CLO5	Implement exemplary applications related to Network Programming, Web Services and Databases in Python.	6. Creating

Mapping of CLOs with POs & PSOs

Course	Program Outcomes (POs)												Program Specific Outcomes(PSOs)			
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
CLO1	H	M	M	H	M							M	M	M	L	
CLO2	H	H	H	H	M							L	L	M	L	
CLO3	M	M	M	M	H							L	M	H	M	
CLO4	M	L	M	L	M							M	L	M	L	
CLO5	L	M	M	H	M							L	L	M	L	

H:High, M:Medium, L:Low