

Branch Name:	Information and Communication Technology
Semester/Year:	Semester I / First Year
Subject Title:	Python for Data Science
Subject Code:	2ET2080101T
Pre-requisite:	Basic programming fundamentals, Statistical and numerical concepts

Course Objective:

The data collected by organization needs insights to take the decisions, for predictions as well as for finding hidden patterns inside the data. Python is an appropriate language supporting all the features and libraries to perform data science activates. This subject covers the overview of the python with emphasis on various python data structures and various libraries like Pandas, NumPy, Matplotlib for performing various data science function including data preparation, cleaning, exploratory analysis and visualization.

Credit	Teaching Scheme Hours per week				Evaluation Scheme (Marks)								Total (Marks)
					Theory (Marks)				Practical (Marks)				
	L	T	P	Total	SEE		CCE		SEE		CCE		
					Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	
3	3	-	-	3	24	60	16	40	-	-	-	-	100

Subject Contents			
Sr. No	Topic	Total Hours	Weight (%)
1	Overview of Python and Data Structures Basics of Python including data types, variables, expressions, objects and functions. Python data structures including String, Array, List, Tuple, Set, Dictionary and operations them	7	18%

2	Python Tools & Libraries Using Jupyter Notebook, Anaconda, Google Colab, and Python Libraries: Pandas, NumPy, SciPy, Matplotlib, Seaborn.	7	18%
3	Working with Data Accessing various types of data: .csv, .xls, and unstructured file form, data pre-processing, slicing, filtering, dealing with missing Data, finding the missing data.	5	12%
4	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	8	20%
5	Basics of Django Framework Introduction, Installation, Framework, Working with Forms and database connectivity	8	20%
6	Advance Concepts Web Scrapping, Data Wrangling (Scikit-learn), AI & Machine Learning Concepts	5	12%

Review Presentation: The student is expected to spend minimum 2 hours per week (as mentioned in the teaching and evaluation scheme) to refer at least two peer reviewed journal papers related to this domain/subject. The student is expected to identify issues/challenges and emerging trends in the domain/subject. Student is supposed to explore various video lectures (E.g. NPTEL) available in the domain/subject. Student is required to make a review-presentation on the work carried out for the same. Recommended sites for journal papers are (1) dl.acm.org (2) springer.com (3) sciencedirect.com (4) elsevier.com (5) ieeexplore.ieee.org (6) scholar.google.co.in (7) scopus.com or similar of similar repute.

Course Outcome: Upon successful completion of this course the student would be able to: Develop proficiency in creating based applications using the Python Programming Language.

- Do testing and debugging of code written in Python
- Apply various Python data structures to effectively manage various types of data.
- Design applications applying various operations for data cleansing and transformation.
- Use various data visualization tools for effective interpretations and insights of data.

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

CLO	Description	Bloom's Taxonomy Level
CLO1	Develop proficiency in creating based applications using the Python Programming Language.	6 Creating

CLO2	Do testing and debugging of code written in Python	5 Evaluate, 3 Applying 4 Analyze
CLO3	Apply various Python data structures to effectively manage various types of data.	3 Applying, 2 Understanding
CLO4	Design applications applying various operations for data cleansing and transformation.	3 Applying, 2 Understanding
CLO5	Use various data visualization tools for effective interpretations and insights of data.	5 Evaluate , 4 Analyze

Mapping of CLOs with Pos& PSOs

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

H:High, M:Medium, L:Low

List of Reference Books:

1. John V Guttag. "Introduction to Computation and Programming Using Python", Prentice Hall of India
2. R. Nageswara Rao, "Core Python Programming", dreamtech
3. Wesley J. Chun. "Core Python Programming - Second Edition", Prentice Hall
4. Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser, "Data Structures and Algorithms in Pyhon", Wiley
5. Kenneth A. Lambert, "Fundamentals of Python – First Programs", CENGAGE Publication

6. Luke Sneeringer, “Professional Python”, Wrox

E-Resources:

1. www.w3schools.com
2. <https://nptel.ac.in/courses/117106113/34>
3. <https://learnpython.org/>