COURSE TITLE: ADVANCED PYTHON LAB

Course Objectives:

- To introduce students to use of Python programming to solve data analytics problems
- To elaborate students to statistical analysis using Python programming

Learning Outcomes:

- The students will be able to improve Problem solving and programming capability
- The students will learn data analytics through python programming

Code	Course	Teaching Period / Week		Credit			Duration of Theory Exam (in Hrs.)
		L	Pr./ Tu	Int.	Ext.	Total	
MCSL207	Advanced Python Lab	-	2	1	1	2	1

Module No.	Objective	Content	Evaluation
1	To describe various libraries required for data analytics	**Operations using Libraries for data analytics** Anaconda, Numpy, Scipy, Pandas, Matplotlib, Seaborn, Scikit-learn, Jupyter Notebook: Create Documentation, Code mode, Markdown mode	Lab manual for 05 marks
2	To elaborate statistical analysis using Python	**Practical on Statistics using python** Mean, Median, Mode, Z-scores, Bias -variance dichotomy, Sampling and t-tests, Sample vs Population statistics, Random Variables, Probability distribution function, Expected value, Binomial Distributions, Normal Distributions, Central limit Theorem, Hypothesis testing, Z-Stats vs T-stats, Type 1 type 2 error, Chi Square test ANOVA test and F-stats	Practical test of 5 marks
3	To study special libraries in Python such as Numpy and Scipy	**Practical on Numpy, Scipy** NUMPY: Creating NumPy arrays, Indexing and slicing in NumPy, Downloading and parsing data, creating multidimensional arrays, NumPy Data types, Array tributes, Indexing and Slicing, creating array, views copies, Manipulating array shapes I/O, SCIPY: Introduction to SciPy, Create function, modules of SciPy	Practical test of 10 marks

4	To study special libraries in Python such as Numpy and Scipy	**Practical on Matplotlib** MATPLOTLIB: Scatter plot, Bar charts, histogram, Stack charts, Legend title Style, Figures and subplots, plotting function in pandas, Labelling and arranging figures, Save plots	Online Class test of 5 marks

EVALUATION:

Evaluation	Details (* please give details of assessment in terms of Unit test/ Project/ quiz /or other assignments and marks allotted for it)	Marks
Internal	• **Lab Manuals** • **Practical Test** • **Online Test**	**25 Marks**
External	**Final Examination (Practical)**	**25 Marks**
Total marks		**50 Marks**

TEXT BOOKS:

1) Martin C. Brown, *Complete Reference: Python*., (2015) McGraw Hill
2) Brown, M. C. (2018). Python: The Complete Reference Paperback, USA: McGraw Hill Education.

REFERENCE BOOKS:

1) Allen Downey, Jeff Elkner and Chris Meyers, (2017), *How To Think Like A Computer Scientist: Learning With Python,*DreamTech
2) Wesley J Chun, (2018), *Core Python Programming*, Prentice Hall
3) Lutz and David Ascher, (2016), *Learning Python*, O'Reilly