

ANALYTICS / COMPUTING WITH PYTHON

CREDIT DISTRIBUTION, ELIGIBILITY AND PRE-REQUISITES OF THE COURSE

| Course title & Code | Credits | Credit distribution of the course | | | Eligibility criteria | Pre-requisite of the course (if any) |
|--|----------|-----------------------------------|----------|---------------------|-----------------------------|--------------------------------------|
| | | Lecture | Tutorial | Practical/ Practice | | |
| Analytics/computing with Python | 2 | 0 | 0 | 2 | 12th Pass | NIL |

Learning Objectives

The Learning Objectives of this course are as follows:

- To introduce machine learning techniques to students using Python programming
- To enable students to use various tools and packages for advanced data analysis

Learning outcomes

The Learning Outcomes of this course are as follows:

- After studying this course, students will be able to learn about Python's main features and how they make Python a great tool for financial analysts.
- After studying this course, students will be able to get familiarized with Anaconda and Jupyter Notebook.
- After studying this course, students will be able to learn basics of Machine learning.
- After studying this course, students will be able to apply these techniques on data.

SYLLABUS

Unit I

(5 weeks)

Python: General overview, Python vs. Excel , Anaconda and Jupyter notebook: Interface overview, Data types in Python, Python basic syntax: Assignment statements, creating variables, indentation, conditionals, and loops, writing user defined functions. Working with libraries: Pandas, NumPy, Matplotlib, and Seaborn. Python SQL Database Access: Introduction, Installation, DB Connection, Creating DB Table.

Unit II

(5 weeks)

Pandas: Working with Data Frame, Importing from Excel or .csv files, Powerful filters and indexes. Numpy: Selecting data with loc and iloc, Using NumPy for speed, Trade-offs between arrays and lists, Array functions. Data cleansing and normalization: Libraries for data visualization, Types of charts/graphs and how to build them.

Unit III

(5 weeks)

Machine learning: Introduction, Definitions, Supervised, unsupervised, python libraries for machine learning: Sci-kit learn, Regression: Linear regression, logistic regression, over-fitting and regularization.

Essential/recommended readings

- Pilgrim, M. (2004). Dive Into Python. Apress. Ch. 1,2,4
- S Raschka, Python Machine Learning, V Mirjalili (2020), Ch 3
- Mitchell, T. M. (1997). Machine Learning. New York: McGraw-Hill.

Suggested Readings

- Liu, Y. (2019). Python machine learning by example: Implement machine learning algorithms and techniques to build intelligent systems (Second edition.). Packt Publishing.
- Boschetti, A. (2016). Regression Analysis with Python (1st ed.). Packt Publishing. Retrieved from <https://www.perlego.com/book/4457/regression-analysis-with-python-pdf> (Original work published 2016)
- Sivanandam, S.N., & Deepa, S.N. (2011). Principles of soft computing.

Examination scheme and mode:

Total Marks: 100

Internal Assessment: 25 marks

Practical Exam (Internal): 25 marks

End Semester University Exam: 50 marks

The Internal Assessment for the course may include Class participation, Assignments, Class tests, Projects, Field Work, Presentations, amongst others as decided by the faculty.

Note: Examination scheme and mode shall be as prescribed by the Examination Branch, University of Delhi, from time to time.

