ECE 23000 – Engineering Data Analysis in Python

Type of Course
Required for EE and CmpE Program

Catalog Description
This course introduces data analysis to engineering students through Python programming. Students learn Python programming and introductory data science topics. The topics include data sampling and estimation, classification, clustering and advanced data analysis approaches. Students will be able to use Python as the programming language to solve data science problems in their course and research work.

Credits
3

Contact Hours
3

Prerequisite Courses
ENGR 12800 or equivalent course of computer programming

Corequisite Courses
None

Prerequisites by Topics
None

Recommended Textbooks
Avinash Navlani et. al. Python Data Analysis. 3rd, edition

John V. Guttag. Introduction to Computation and Programming Using Python, 3rd Edition

Course Objectives
Students should be able to program in Python, understand basic data analysis methods and apply the knowledge in data processing problems.

Course Outcomes
A student who successfully fulfills the course requirements will have demonstrated:
1. An ability to program in Python [1]
2. An ability to understand and implement data analysis algorithms [2]
3. An ability to explain the results of data analyses [2]
4. An ability to incorporate basic data structure and numerical packages in their computer programs [6]

Lecture Topics

1. Python Data Types, Flow Controls
2. Data Structures, Functions
3. Input/Output and Files
4. Error and Exception Handling, Assertion
5. Object Oriented Programming
6. Python Standard Libraries
7. Essential Python packages for Data Science
8. Python Data Visualization
9. Python Data Analysis Topics:
10. Histograms, probability distributions
11. Data retrieving, cleaning, and sampling
12. Regression, Classification and Clustering

Computer Usage

High

Laboratory Experience

None

Design Experience

Medium

Coordinator

Bin Chen, Ph.D.

Date

3/14/2022