

IEDA 2540 Syllabus

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Learning outcomes:

After the course, the students are expected to understand the basic ideas and elements of modern statistics. Those who pursue academic goals will be able to conduct empirical analysis of research data and have a solid background to take more advanced statistical courses, such as machine learning, data mining and Bayesian statistics. Those who want to work in industry should be able to conduct data analysis in related projects.

Course description:

The course introduces basic concepts of statistics to undergraduate engineering students. It will cover estimation theory, hypothesis testing, regression models and their implementation in Python. This course assumes the knowledge of multivariate calculus and basic probability.

Teaching approach:

- There are two lectures per week. The lectures are mainly based on slides and some Python experiments.
- The TA will give a tutorial on Python in the second week and there are lab sessions in the subsequent weeks. In the lab session, the TA will go over the Jupiter Notebook related to the course materials.
- Students are encouraged to raise questions, start and join discussions under Discussion in Canvas. This is the best way to get answers outside the office hours from the instructor and the TAs.

Textbook:

No textbooks required. The lecture slides are self-contained.

- Reference book: Douglas C. Montgomery and George C. Runger, Applied Statistics and Probability for Engineers, 6th Edition.

Materials covered:

- Topic 1: Descriptive statistics
- Topic 2: Useful distributions in statistics
- Topic 3: Population and random sample
- Topic 4: Estimation of a parameter
- Topic 5: Interval estimation
- Topic 6: Hypothesis testing
- Topic 7: Analysis of Variance (ANOVA)
- Topic 8: Linear regression

Assessment: Homework (30%), Midterm (30%), Final exam (40%).