

ISYE/CEE 3770 - Statistics and Applications

Service Class for other STEM majors. No credit for BSIE students

Credit: 3-0-3

Coordinators Prof. Jing Li, Ethan Lee 2025

Prerequisite(s): MATH 2551 or MATH 2550 AND MATH 1554 or MATH 1553

Texts

1. Main Text: Applied Statistics and Probability for Engineers by Douglas C. Montgomery, George C. Runger, 5th Edition, 2010, John Wiley and Sons.
2. Sometimes used: W. W. Hines, D. C. Montgomery, D. Goldsman, and C. Borror, Probability and Statistics in Engineering, 4th Edition, 2003, John Wiley and Sons.

Reference

Probability and Statistics for Engineers and Scientists (with CD-ROM) by Anthony J. Hayter, Duxbury Press; 3 edition,

Catalog Description: Introduction to probability, probability distributions, point estimation, confidence intervals, hypothesis testing, linear regression, and analysis of variance. Cross-listed with CEE 3770.

Course description

Topical Outline:

Topics	Weeks
Probability Introduction	1
Random Variables	1
Discrete Distributions	1
Continuous Distributions (including Normal)	2
Descriptive Statistics	1
Sampling Distributions	1
Point Estimation	1
Confidence Intervals	1
Hypothesis Testing	1
Categorical Data Analysis	1
Analysis of Variance, Experimental Design	2
Simple Linear Regression	1.5
Multiple Linear Regression	0.5

Outcomes and their relationships to ISyE Program Outcomes

At the end of this course, the students will be able to

- Ability to collect, organize, summarize and present data graphically

- Demonstrate ability to use formal mathematical argument with basic probability concepts, including conditional probability distributions
- Understand how to characterize and assess probability in its role in experiments
- Use statistical tests and confidence intervals to assess mathematical uncertainty in statistical decisions
- Select proper statistical techniques for statistical decision making based on the type of data available
- Use statistical software to conduct data analyses and interpret output
- Draw sound statistical conclusions from experiments and observational studies

Student Outcome Assessment Plan

Course outcome \ Program Outcomes	1. identify, formulate solve engg prob by engg, sci & Math	2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic	3 communicate with a range of audience	4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context.	5. effective on a team provide leadership, collaborative and inclusive envirm, plan tasks & meet objectives	6. develop and conduct experiment, analyze and interpret data & use engineering judgement to draw conclusions.	7. acquire and apply new knowledge using appropriate learning strategies
1. Ability to collect, organize, summarize and present data graphically						M	
2. Demonstrate ability to use formal mathematical argument with basic probability concepts, including conditional probability distributions	M						
3. Understand how to characterize and assess probability in its role in experiments	M						
4. Use statistical tests and confidence intervals to assess mathematical	M						

uncertainty in statistical decisions							
5. Select proper statistical techniques for statistical decision making based on the type of data available						L	
6. Use statistical software to conduct data analyses and interpret output						L	
7. Draw sound statistical conclusions from experiments and observational studies						L	

Assessment of the important course outcomes

The course outcomes. This is a service course, not relevant to BSIE. If the other units want to assess the outcomes, those Ls can be assessed.