

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				
1. Ability to collect, organize, summarize and present data graphically		2. produce solutions consider public health, safety, welfare, global, cultural, social, environ & economic				
2. Demonstrate ability to use formal mathematical argument with basic probability concepts, including conditional probability distributions		3 communicate with a range of audience				
3. Understand how to characterize and assess probability in its role in experiments		4 recognize ethical & professional responsibilities, make informed judgement consider resolutions in global, economic, environ and societal context.				
4. Use statistical tests and confidence intervals to assess mathematical		5. effective on a team provide leadership, collaborative and inclusive envirn, 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				

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.