

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.

Topical Outline

The topical outline is shown in the table below. The table has 2 columns. The first column lists the topics to be covered. The second column lists the number of weeks these topics will be covered.

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

Topics	Weeks
Hypothesis Testing	1
Categorical Data Analysis	1
Analysis of Variance, Experimental Design	2
Simple Linear Regression	1.5
Multiple Linear Regression	0.5

Course Learning 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

The Mapping from the Course Outcomes to ABET Student Learning Outcomes

The table below shows the relationship between course outcomes and ABET student learning outcomes. The table has 8 columns. The first column lists the course learning outcomes listed above. The next 7 columns list the abbreviated ABET Student Learning Outcomes. The entry of H in a row with specific course learning outcome and column with specific ABET Student Learning Outcomes indicate the importance of attain this outcome is high and will be assessed.

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 uncertainty in statistical decisions	M						
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						L	

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
experiments and observational studies							

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.