ISYE 3770 - Statistics and Applications

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

Hours 3-0-3 (Lecture-Lab-Total Credit Hours)

Prerequisite(s): MATH 2401 or MATH 2411 or MATH 24x1; for CS majors: MATH 2605

Texts: one of
1. Probability and Statistics for Engineers and Scientists (with CD-ROM) by Anthony J. Hayter, Duxbury Press; 3 edition,
2. W. W. Hines, D. C. Montgomery, D. Goldsman, and C. Borror, Probability and Statistics in Engineering, 4th Edition, 2003, John Wiley and Sons.

Objective: Provide an introduction to probability and statistics, emphasizing applications in science and engineering.

Topical Outline:
1. Probability Introduction
2. Random Variables
3. Discrete Distributions
4. Continuous Distributions
5. Normal Distribution
6. Descriptive Statistics
7. Point Estimation
8. Confidence Intervals
9. Hypothesis Testing
10. Discrete Data Analysis
11. Analysis of Variance
12. Simple Linear Regression
13. Multiple Linear Regression
14. Experimental Design & Analysis of Variance

Outcomes and their relationships to ISyE Program Outcomes

- Estimate parameters of distributions
- Assess risks in decisions, concerning long term performance, based on sample data
- Select proper statistical techniques for statistical decision making based on the type of data available
- Use statistical software to conduct analyses and interpret output
- Draw sound statistical conclusions from experiments and observational studies

Course outcome \ Program Outcomes	a. apply math	b. data	c. IE method	d. team	e. problem solving	f. prof/ and ethical responsibilities	g. communication	h. global, eco, envi and soc context	i. continue to improve	j. current issues	k. participate in an organization
Analyze and display sampling data…	H	H									
Draw conclusions…	H	H									
Use proper statistical techniques…		M					M				
Use computer to…		H									

- H, M and L denote high, moderate and low relationships.
- Team project are sometimes conducted

Evaluation of the important outcomes:
Three or more important outcomes will be evaluated from direct questions in the Final exam:

1. Students should be able to analyze and display sampling data, evaluate statistics, and estimate distribution parameters;
2. Students should be able to draw conclusions about population parameters from experimental data by using proper statistical techniques.
3. Students should be able to use proper statistical techniques (namely hypothesis testing) to draw sound statistical conclusions.