IE 1071 Statistical Testing and Regression Sec I
Spring 2020 (SCUPI)

Time/Place: Wednesday 8:15-11:00, Zone4-212.

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Prerequisite: IE 1070 Probability and Statistics for Engineers 1 (Probability)

Textbook: Walpole, Myers, Myers and Ye, *Probability and Statistics for Engineering and the Sciences*, 9th Edition, Pearson. (ISBN-13: 978-0134115856)

Course Description: Statistical testing provides a mechanism for making quantitative decisions about a process or processes. The intent is to determine if there is evidence to reject a conjecture or hypothesis about the process. The purpose of statistical or regression modeling is to estimate the relationships between independent and dependent variables. This course is designed for students majoring in engineering. Topics include hypothesis testing, analysis of variance (ANOVA), linear regression, categorical data analysis (e.g, contingency tables, loglinear models, logistic regressions and goodness of fit), and nonparametric statistics.

Course Objectives:

- To provide the student with a basic understanding of statistical test and regression and practice over a diverse range of potential applications
- Apply software for problems solving.
- Familiarize the student with information resources and techniques used by regression
- To apply these concepts and principles in a team-based project.

Engineering Criteria Outcomes:

- An ability to apply knowledge of mathematics, science, and engineering
- An ability to define a regression model for a system or process to meet desired needs
- An ability to function on multi-disciplinary teams
- An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice issues

Exams: There will be **two** exams. Please see schedule attached. **If you have to miss and exam**, please see me prior to the scheduled date to make the proper arrangements. If it is an emergency, please see me as soon after the emergency as is possible. To be fair to everyone, I will have to see some sort of proof that it was a true emergency.

Projects: There will be two projects that will be completed in small groups and will involve the contents that we will discuss in the beginning of the class. It will be a group assignment and you will be assigned to a group. The project will be monitored throughout the three weeks with memos required at certain times (see schedule). More information will be given at a later time, but the format will be different than in prior years… First, there will be no final report… rather; you will be making a YouTube Video instead...

Note: Group members who do not participate adequately in their groups in the project could receive a **much lower** grade for the project. You will rate yourself and your teammates on each project. If you do not carry your own weight, I will grade some individuals separately where necessary!

In-class Exercises: These activities will be conducted in teams of two or three of your choice. **Statgraphics** and **SPSS** software are required for the pair exercises.
Note some of the initial work will start in the in-class exercises – so attendance will be required.

Participation: Industry has indicated to engineering schools that graduates must possess **teamwork** abilities and **interpersonal** skills, as well as be technically **proficient**. In addition to learning the principles of statistical regression and test concepts and techniques, and how to apply them, you will also develop your teamwork abilities through various group activities, as well as **project management** skills. Be an active participant; a significant part of your grade revolves around working in a group and project participation.

Student Conduct:

1. Engineers are educated professionals, and every engineer is expected to subscribe to a professional canon of ethics.
2. Please upload the assignments, quizzes, and exam papers in a timely manner.
3. Academic integrity is taken very seriously. I have no objections if you wish to study with friends or work together on homework – in fact, you should feel free to do so! However, all work that you turn in must represent your own effort (i.e. you do the first problem, your friend does the second problem is not considered working together!). Cheating of any form on labs or exams and plagiarism on projects or reports will result in a grade of 0!

Course Grade:

	Normal
Homework	20
Quiz	10
Mid-term Exam	20
Final Exam	30
Projects	20
Total	100

A 90-100% A- 85-90% B+ 80-84% B 76-80% B- 73-76% C+ 70-73% C 66-70% C- 63-66% D+ 61-62% D 60% F below 60%

Wk	Date		Chapter
Wk Date		**Topic**	
1	2/26	Overview	
2	3/4	Sample Estimation Problems	9
3	3/11	Hypothesis Tests	10
4	3/18	Simple Linear Regression and Correlation	11
5	3/25	Multiple Linear Regression	12
6	4/1	Nonlinear Regression	12
7	4/8	**Group Presentation**	
8	4/15	**Midterm Exam**	
9	4/22	One-Factor Experiments	13
10	4/29	One-Factor Experiments	13
11	5/6	Factorial Expeirments	14
12	5/13	Factorial Expeirments	14
13	5/20	2^K Factorial Experiments and Fractions	15
14	5/27	2K Factorial Experiments and Fractions	15
15	6/3	Nonparametric Statistics	16
16	6/10	Review	
17	6/17	**Group Presentation**	
18	6/24	**Final Exam Week**	
19	7/1	**Final Exam Week**	