

**DEPARTMENT OF INDUSTRIAL ENGINEERING
IE 506 STATISTICAL DATA ANALYSIS**

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OFFICE-HOURS : T 10:00-11:00, Th 15:00-17:00 M4040

LECTURE HOURS : T 14:00-16:00 M2180, Th 14:00-15:00 M2231

COURSE OBJECTIVE : The need for efficient methods of data collection and analysis in various fields of application is well recognized. This course aims to expose experimental design concepts and statistical modelling tools of data analysis readily usable to solve real life problems.

COURSE TEXTBOOK : Douglas C. Montgomery, **Design and Analysis of Experiments**, Sixth Edition, John Wiley and Sons, 2005.

Software Tool: Design-Expert (Web Site: www.statease.com)

COURSE OUTLINE :

	Chapter
1. Role of experimental design in engineering studies	1
2. Simple Comparative Experiments	2
a) Descriptive statistics	
b) Random sampling and related distributions	
c) Statistical Inference : Estimation and Hypothesis Testing	
d) Comparison of two treatments, t-test	
3. Comparison of more than two treatments	3-4
a) Analysis of variance	
b) Randomized block design	
c) Latin squares and other block designs	
d) Multiple comparisons	
4. Measuring the effects of variables	5-8
a) Factorial designs	
b) Fractional factorial designs	
MIDTERM EXAM	
5. Regression and correlation analysis	10
a) Linear regression	
b) Detection and correction of model violations	
c) Weighted least squares	
d) Biased estimation of regression coefficients Principal components and ridge regression	
e) Stepwise regression	
6. Process Optimization Approaches	11-13
a) Response surface methodology	
b) Robust Design and Taguchi Methods	
c) Nested Plot and Split Plot Designs	

FINAL EXAM

GRADING:

%30 (Midterm) + %20 (Project) + %10 (Assignments/Quizzes) + %40 (Final) = %100

PREREQUISITE : A basic course in statistics (IE 256 or equivalent) or permission of instructor