INDUSTRIAL ENGINEERING DEPARTMENT

IE 256

Statistics for Industrial Engineers

Fall 2017

Type:	Required
Credits/ECTS:	3 Credits / 6 ECTS
Class/Laboratory/PS schedule:	Tuesday 09:00-10:50 (M2200) – Regular Class Friday 09:00-10:50 (M3120) – Problem Session
Instructor:	Ali R. Kaylan (kaylan@boun.edu.tr) Office Hours: Tu 15:00–17:00, W 15:00-17:00 (M4032)
Teaching assistant:	TBD
Prerequisite(s):	IE 255 (Probability for Industrial Engineers) or equivalents.

Course Description:

This course is organized to orient the students to more effective statistical thinking and modeling using methods and tools of statistical inference. The basic topics in parametric statistics such as the point estimation, confidence intervals, and hypothesis testing; statistical model building using analysis of variance, regression and correlation analysis; goodness of fit tests and nonparametric tests will be covered. Real life applications of engineering and management processes are to be investigated using design of experiments and data collection and computer implementations with available up-to-date statistical software tools.

Textbook:

Walpole, Myers, Myers, Ye: "Probability and Statistics for Engineers and Scientists", 9th ed., Prentice Hall, New Jersey, USA 2007.

Course objectives (and program outcomes):

This course aims to provide students the fundamentals of statistical tools and methods so that they can transform data into knowledge for improving their decision making processes. Students will be able to gain knowledge and skills on collection, presentation, analysis, and use of data to make intelligent judgments and informed decisions, solve problems, and design products and processes in the presence of uncertainty and variation. You will be able to draw inferences about the populations based on the sample data analysis. The course should also sharpen individual ´intuition´ and ´statistical thinking´ about how to read data, interpret data, and judge others' claims about data. By the completion of the course, the students will be able to;

- Collect, summarize, and interpret data about organizations in a sector or industry
- Designing and analyzing experiments
- Improve quality (e.g., reducing variability, sampling procedures) in production processes
- Presenting government statistical data to lay audiences
- Conducting academic research to generate new data
- Redesign processes based on historical data

Considering these objectives, this course mainly addresses the following student outcomes of

the industrial engineering undergraduate program;

(a): An ability to apply knowledge of mathematics, science, and engineering

(b): An ability to design and conduct experiments, as well as to analyze and interpret data

(e): An ability to identify, model, formulate and solve industrial engineering problems

(k): An ability to use the techniques, skills, and modern engineering tools necessary for industrial engineering practice.

Course Outline:	**Weeks**	**Chapters**
1. Statistical Thinking, Modeling and Learning	1 (Sep 19)	1
2. Descriptive Statistics, Data Visualization	2 (Sep 26)	8
3. Central Limit Theorem, Sampling Distributions	2 (Sep 26)	8
4. Parameter Estimation (Point Estimation)	3 (Oct 3)	9
5. Interval Estimation (Confidence Intervals)	4 (Oct 10)	9
6. Hypothesis Testing (Single and Two Populations)	5 (Oct 17)	10
7. Goodness-of-Fit Tests and Test for Independence	6 (Oct 24)	10
Midterm 1 (Oct 27, 2017)		1, 8-10
8. Simple Linear Regression Modeling	7-8 (Oct 31,Nov 7)	11
9. Multiple Linear Regression Modeling	9 (Nov 14)	12
10. Design of Experiments, Analysis of Variance	10-11 (Nov 21, 28)	13
Midterm 2 (Dec 1, 2017)		11-13
11. Nonparametric Tests	12 (Dec 5)	16
12. Review Session	13 (Dec 12)	8-13, 16

Grading:

Midterm I:	25%	**Friday Oct.27, 2017,**	**17:00-19:00**
Midterm II:	25%	**Friday Dec. 1, 2017,**	**17:00-19:00**
Final:	30%		
Project:	10%		
Assignments/Quizzes:	10%		

Updated by: Ali R. Kaylan
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