

## ISE 500: Engineering Management Decisions & Statistics

Fall 2015, Tue & Thu 11:00am – 12:20pm (OHE 100B)

**Instructor:** Dr. Kim Peters Phone: 213-740-0867 (during office hours)  
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**Office Hours:** Tue & Thu 1:00pm – 2:00pm or by appointment

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### Course Description

As the dramatic consequences of engineering and business decisions (both good and bad) demonstrate the power to generate vast wealth or drive prosperous corporations into bankruptcy, decision making under risk and uncertainty is recognized as a crucial skill. This course is designed to enable the student to formulate, collect, analyze, frame, and interpret decision making information for selecting the "best" alternative action. This course is intended to train future engineering managers in the most commonly used statistical methods in decision making with partial information in an uncertain environment. Such decisions include (i) data analyses that are appropriate for generating information useful in decision making and (ii) a framework for analyzing decisions based on partial information.

The class is designed to be practical in its approach and of value to both line and staff managers. Students who are employed are STRONGLY encouraged to bring procedures, problems or issues which the students deal with on a daily basis to the attention of the instructor.

The course objectives include enabling the student to:

- Be familiar with the basics of decision making
- Understand the importance of statistical analysis in managerial decisions.
- Understand the importance and limitations of data gathering
- Use statistical tools in decision making.
- Interpret the outcome and meaning of statistical information.
- Understand the limitations of the use of statistical methods
- Have knowledge of the use of statistical tools in contemporary management

Class sessions will generally consist of quizzes and their solution, going over homework, assigning new homework, questions and answers, lecture, and discussion.

### Course Materials

#### Required text (s):

Jay L. Devore "Probability and Statistics for Engineering and the Sciences ", 8th Edition, Brooks/Cole, 2009  
 ISBN 13:978-0-538-73352-6

Robert L. Winkler "An Introduction to Bayesian Inference and Decision", 2nd Edition, Probabilistic Publishing, 2003

#### Reference material (s):

Sheldon M. Ross "Probability and Statistics for Engineers and Scientists", 4th Editions, Academic Press, 2009  
 ISBN 13:978-0-12-370483-2

Roger B. Myerson "Probability Models for Economic Decisions", Thomson Brooks/Cole, 2005  
 ISBN 0-534-42381-7

Raiffa, Richardson and Metcalfe "Negotiation Analysis", by, Harvard University Press, 2002  
 ISBN 0 – 674 – 008890 –1

**Online access to materials**

The assignments, handouts, lecture notes, and other class information will be posted on D2L, Desire2Learn (<https://courses.uscden.net>). All students are expected to be able to access information from the website.

**Class Assignments**

Readings and Problems will be included in most weeks' assignments. It is imperative that you prepare for class -- you will find it extremely difficult to follow the discussion if you have not read the material. Usually, problems are assigned on Tuesday and are due on the following Monday at midnight.

You can work on homework together, but finish it by yourself and indicate with whom you worked in the header. Each student must turn in a separate homework, unless the assignment is specified as a team assignment. Generated data and essay questions must be unique to each student. Do not give your files to others and do not use others' files. Do not copy problems. If you used a solution from a prior semester, indicate so. If the answer is given in a book, don't just copy it, explain how you got it.

Clearly label your conclusions for each problem, followed by the supporting calculations and discussion. The problems must be in the order assigned. Late homework will not be accepted, unless prior arrangements have been made (e.g. out of town funeral). Homework is to be in digital format, a single printable document (no zip files), submitted through the drop box via D2L weekly module.

**Grading**

Homework	18%
Midterm 1	12%
Midterm 2	20%
Final exam	25%
Participation (attendance, quizzes, asking questions, making contributions, and postings on the discussion board)	25%

Participation/Behavior: Notable consideration will be given for class participation and behavior (in person or via D2L). DEN students' participation will be considered based on D2L interaction and the discussion forum.

**Quality Expectations**

All assignments and presentations should be completed with the upmost professionalism. This means that all the homework, project, papers and other materials must be prepared using a word processor, spreadsheet, PowerPoint or any other relevant computer software.

All work shall have cover page with:

1. Your full name
2. Your group member names with last names in alphabetical order (group assignments)
3. Document title
4. Document date
5. File name must conform to the following: **name (or group#) \_assignment#.ext** (doc, xls, mpp, ppt, etc.)

**Attendance**

Regular class attendance is strongly encouraged and recommended. You are responsible for all material presented in the lecture whether you are present or not. Electronic devices such as cell phones, pagers, and alarms should be turned off or set to silent mode throughout class. **Note:** Attendance will be taken for the first two weeks of class, after which an honor code for you as young adults will be adhered to.

**Outreach DEN Students**

This course is conducted in outreach format, meaning, it is available to off-campus students via video recording and streaming. Students in on-campus or off-campus receive the same instruction and perform the same tasks.

**Important Dates**

Aug 24	Classes Begin
Sept 7	Labor Day Holiday
Sept 11	Last Day to Add & Drop
Oct 1	Midterm 1 ( <i>tentative</i> )
Oct 29	Midterm 2 ( <i>tentative</i> )
Nov 13	Last Day to Drop with a "W"
Nov 25-29	Thanksgiving Holiday
Dec 4	Classes End
Dec 5-8	Study Days
Dec 15	Final Exam ( <i>tentative</i> )
Dec 16	End of Session
Dec 17-Jan 10	Winter Recess

**Language Support Systems**

USC provides support for students who need help with scholarly writing. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students.

**Emergency Services**

If an officially declared emergency makes travel to campus infeasible, USC Emergency Information <http://emergency.usc.edu> will provide safety and other updates, including ways in which instruction will be continued by means of D2L, blackboard, teleconferencing, and other technology.

**Statement for Students with Disabilities**

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the professor(s) as early in the semester as possible. DSP is located in STU 301 and is open 8:30 a.m.–5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

**Academic Integrity**

USC seeks to maintain an optimal learning environment. The Department of Industrial and Systems Engineering adheres to the University's policies and procedures governing academic integrity as described in *Scampus*, the Student Guidebook. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by others as well as to avoid using another's work as one's own. *Scampus*, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at <http://www.usc.edu/student-affairs/SJACS>. All students are expected to understand and abide by these principles, as they will be strictly enforced throughout the semester.

**Religious Observances**

On occasion a class session may conflict with a special day of religious observance. If you advise me in advance, reasonable accommodation will be made.

## Course Schedule (tentative)

Week	Date	Topics	Readings
1	8/25 – 8/27	Introduction and overview Why Statistics?	Notes
2	9/1 – 9/3	Decision Making	Notes from Raiffa
3	9/8 - 9/10	Descriptive Statistics Probability	Chapter 1 & 2, Devore Chapter 1 & 2, Winkler
4	9/15 - 9/17	Distributions	Chapter 3 & 4, Devore
5	9/22 - 9/24	Discrete Bayesian methods	Chapter 3, Winkler
6	9/29 - 10/1	Review, <b>Midterm 1</b>	
7	10/6 - 10/8	Confidence, sampling and decision making	Chapter 5, 8 & 9, Devore
8	10/13 - 10/15	Confidence, sampling and decision making	Chapter 5, 8 & 9, Devore
9	10/20 - 10/22	Bayesian Analysis Normal and Beta	Chapter 4, Winkler
10	10/27 - 10/29	Review, <b>Midterm 2</b>	
11	11/3 – 11/5	ANOVA	Chapter 10, Devore
12	11/10 – 11/12	Regression and Multiple regression	Chapter 12 & 13, Devore
13	11/17 - 11/19	Utility	Chapter 5, Winkler
14/15	11/24 - 12/3	Value of Information	Chapters 6, Winkler
17	12/15	<b>Final Exam</b>	

**Note:** This syllabus is subject to change.