

**Statistics for Engineering Managers (ISE500) Fall 2020**  
**(rev. 08/14/2020)**

Instructor:	Geza Bottlik, E-mail: bottlik@usc.edu	
Office Hours:	Monday 9:00 A.M. – 11:00 A.M. or by appointment (all on line)	
TA	Hemakshi Pant, hpant@usc.edu	
TA Office Hours:	TBD	
Class time/place:	Tuesdays/Thursdays 2:00 P.M. – 3:20 P.M., on- line, invitation by Zoom	

**Test Schedule:**

Midterm 1:	Tuesday, September 15, 2020	2:00 P.M. – 3:20 P.M
Midterm 2:	Thursday, October 22, 2020	2:00 P.M. – 3:20 P.M
Final:	Thursday, December 3, 2020	2:00 P.M. – 4:00 P.M.

Web Page: [www.gezabottlik.com](http://www.gezabottlik.com)

At the site you will find:

- The syllabus, grades, résumés, Lecture Notes
- Assignments and due dates, solutions

Your responsibility:

- Register on the site and learn how to use it
- Download the lecture notes and assignments for each class
- Review and verify your grades to track your progress and standing in the class.

The DEN website (D2L, courses.uscden.net) is only used for e-mail, the discussion board and assignment upload and return. Check your email on a regular basis. Session recordings will be emailed as soon as they are provided by Zoom

Required Texts:

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

Schmuller, Joseph “Statistical Analysis with R for Dummies”, John Wiley and Sons, 2017, ISBN-978-1-119-33706-5

References:

Andrie de Vries and Joris Meys, “R for Dummies”, 2nd Edition, John Wiley and Sons, 2015, ISBN 978-1-119-05580-8

Sheldon M. Ross “Probability and Statistics for Engineers and Scientists”, 4<sup>th</sup> 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

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

John K Kruschke “Doing Bayesian Data Analysis”, Academic Press, 2011

**Assignments:** Readings and Problems will be included in all 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. We will return the

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assignments one week later on the assignment manager if points have been deducted. Late homework **cannot** be accepted, unless **prior** arrangements have been made (e.g. out of town funeral). Homework is to be in Excel, a **single** printable document (no zip files), submitted through the assignment manager on D2L.

Your name, assignment number, the date and with whom you worked must be in the **header**. Use a consistent template and format the output for a professional appearance. The assignments should be as professional in appearance as if you were preparing reports at work or for publication. Clearly label your conclusions for each problem, followed by the supporting calculations and discussion. The problems must be in the order assigned. Out of sequence problems will receive no credit. One problem per sheet. Most homework templates will be uploaded as the homework and must be used to submit the homework. It is essential that you follow directions as they are graded by software.

It's OK to 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. Homework files will be named by the assignment manager, so keep your names very short – LastNameFirstNameHW#, otherwise we have to truncate them in order to open them. The same rules apply among teams for team assignments. 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.**

**Attendance Requirements during on line courses**

You should attend synchronously if the class time falls between 7 A.M. and 10 P.M. in your time zone. You may be excused from watching synchronously for a valid reason, obtained before class. If you do attend asynchronously, you need to send me an email after having watched, so that I know that you have attended and can be given credit.

When attending synchronously, have your camera on, so we can all see each other. If this is a problem, please email me to discuss it.

**Objectives of the course**

The major objective of this course is to have you understand, interpret and verify the results obtained from statistical analyses and make appropriate decisions based on them. Secondly, given a situation or problem, you will learn which statistical tools are the appropriate ones to assess the problem or situation.

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 specific course objectives include enabling the student to:

- Use Excel and R
- 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

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**Grading:**

Homework, 1.5 points each	~18%
Midterm 1	~12%
Midterm 2	~21%
Final exam	~29%
Participation (attendance – must be verified by email to the professor after viewing, quizzes, asking questions, making contributions, postings on the discussion board) 1.5 pts. Each for quizzes, 0.2 for others	~20%

The grade for the course will only be based on the required work listed above and **cannot** be improved with additional work. Note that 20% of the grade is for participation – so participate!

Grades are based upon your personal comprehension of the material and your performance on the exams and assignments relative to the other students. The quality of your fellow classmates as students is expected to be quite high and the expectations of the instructor are established accordingly.

**Quizzes:**

There will be a quiz every week at the start of class on Tuesday or Thursday. The format is mostly True/False. The purpose of these quizzes is to encourage you to keep up with the class material. I anticipate that you will have little difficulty in answering the questions if you are up to date on the class materials, including those for the next class. There is normally no make-up of a missed quiz. However, if a student expects to be away from class for a valid reason (e.g. employment travel) then special arrangements can be made to allow the quiz to be taken. The quiz each week will be based primarily upon two subjects: the material from the previous week and the reading assignment for that week. You are expected to have read the weekly assignment prior to the start of class. The quizzes are open notes, book and laptop and on line.

**Examinations:**

The midterms and final exams are open book and open notes and on line. Calculators are OK but laptops are required. Exam problems will be both numerical and essay, with occasional true/false, fill in the blank, or multiple choice and are to be done in Excel.

**Course Outline:**

25-Aug	(Week 1) Introduction and overview, Why Statistics?
01-Sept	(2) Decision Making (Material provided from Raiffa)
08-Sept	(3) Decision Making, Descriptive Statistics Chapter 1
15-Sept	(4) Probability Chapter 2, Review
22-Sept	(5) Midterm 1, go over midterm, Distributions
29_Sept	(6) Distributions Chapters 3 and 4
06-Oct	(7) Confidence, Sampling and decision-making Chapters 5,8 and 9

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13-Oct	(8) Confidence, Sampling and decision-making Chapters 5,8 and 9
20_Oct	(9) Review, Midterm 2
27-Oct	(10) Regression Chapter 12, 13
03-Nov	(11) ANOVA Chapter 10, 11
10-Nov	(12) Bayesian Analysis Material from Winkler and Krischke
17-Nov	(13) Bayesian Analysis Material from Winkler and Krischke
24-Nov	(14) Bayesian Analysis Material from Winkler and Krischke, Review
8-Dec	Tuesday, December 8, 2020, 8 A.M. - 10 A.M.

**Expectations:**

Students are expected to attend every session, be on time, to have read the preparation material and participate actively in the discussions in the class. Students are also expected to post comments and questions on the discussion board (or send emails or contributions to be used in class). You should be prepared to devote the time necessary to take the course. The course material is cumulative and you need to keep up as we go along.

**Method of Instruction:**

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

**ALWAYS BE SURE TO GIVE THE SOURCE OF ALL YOUR INFORMATION. ANYTHING TAKEN VERBATIM FROM SOMEONE ELSE MUST BE IN QUOTATION MARKS AND REFERENCED. THIS INCLUDES PARTIAL SENTENCES.**

This is intended to be an interactive class and your participation should increase as the semester progresses. Attendance at all classes is expected of everyone. Frequent absences will result in a reduction in grade. Punctuality is expected. If you are late, be sure not to disturb the class as you log in.

The midterms and final will be based on problems similar to the ones assigned in the homework and the discussions in class. They are generally shorter but do require some thinking. **All tests are open book and open notes. Laptops or desktops are required.** Students are expected to **apply** what they should have learned up to that point to analyzing situations, identifying the problems and applying the appropriate techniques to solve them.

**NEATNESS, SPELLING, AND GRAMMAR COUNT. THEY ARE AN EXPRESSION OF YOUR COMMITMENT TO DO A GOOD JOB.**

**Last, but most important:**

**Academic Conduct:**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

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**Support Systems:**

Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. [engemannshc.usc.edu/counseling](http://engemannshc.usc.edu/counseling)

National Suicide Prevention Lifeline – 1 (800) 273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. [www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org)

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. [engemannshc.usc.edu/rsvp](http://engemannshc.usc.edu/rsvp)

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: [sarc.usc.edu](http://sarc.usc.edu)

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086 Works with faculty, staff, visitors, applicants, and students around issues of protected class. [equity.usc.edu](http://equity.usc.edu)

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. [studentaffairs.usc.edu/bias-assessment-response-support](http://studentaffairs.usc.edu/bias-assessment-response-support)

The Office of Disability Services and Programs Provides certification for students with disabilities and helps arrange relevant accommodations. [dsp.usc.edu](http://dsp.usc.edu)

Student Support and Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. [studentaffairs.usc.edu/ssa](http://studentaffairs.usc.edu/ssa)

Diversity at USC

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. [diversity.usc.edu](http://diversity.usc.edu)

USC Emergency Information

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. [emergency.usc.edu](http://emergency.usc.edu)

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime. Provides overall safety to USC community. [dps.usc.edu](http://dps.usc.edu)