FUNDAMENTALS OF ENGINEERING STATISTICAL ANALYSIS

ISE/DSA 5013

Fall 2021

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Office hours: Zoom office hours and links are posted in a discussion on the Canvas platform

Recommended textbook:

Mendenhall, W. and T. Sincich. 2016. *Statistics for Engineering and the Sciences*. 6th edition. Boca Raton, FL: CRC Press.

Other course material derived from:

Black, K. 2012. *Business Statistics for Contemporary Decision Making*. 7th Edition. Hoboken, NJ: Wiley and Sons, Inc.

De Veaux, R.D., P.F. Velleman, and D.E. Bock. 2006. *Intro Stats*. 2nd edition. Boston, MA: Pearson Education, Inc.

Devore, J.L. 2009. *Probability and Statistics for Engineering and the Sciences*. 7th edition. Belmont, CA: Brooks/Cole.

Mann, P.S. 2007. *Introductory Statistics*. 6th edition. Hoboken, NJ: Wiley and Sons, Inc.

Watkins, A.E., R.L. Scheaffer, and G.W. Cobb. 2011. *Statistics: From Data to Decision*. 2nd edition. Hoboken, NJ: Wiley and Sons, Inc.

Course description: This course provides fundamental concepts in probability and statistical inference, with application to engineering contexts. Probability topics include counting methods, discrete and continuous random variables, and their associated distributions. Statistical inference topics include sampling distributions, point estimation, confidence intervals and hypothesis testing for single- and two-sample experiments, nonparametric statistics, and goodness-of-fit testing. Excel will be used to demonstrate how to solve some class examples, and you'll be expected to use Excel to solve some homework problems. The statistical software package R will be introduced to address basic statistics problems and to prepare you for future coursework. Course prerequisites include calculus (differentiation and integration).

Announcements and consultation: The instructor and teaching assistant will attempt to answer questions posed to the “Discussion” feature of the Canvas platform (on a daily basis, or close to it). Email is not preferred, as we hope that students will assist each other and learn from questions posed by and answered by everyone in the class. The instructor and TA will hold regular office hours using Zoom. If particular questions arise.

Grading: Percentages of course grading requirements are as follows.

Homework 25%
Term exam 1 ..... 25%
Term exam 2 ..... 25%
Final exam..... 25%

There is a grade guarantee of 90% = A, 80% = B, 70% = C, 60% = D. Grades may be curved at the *end of the semester*, but grade boundaries will never be more severe than the grade guarantee.

Homework: An ability to solve statistics problems is based only partly on the final numerical answer. To receive full credit (or to receive any partial credit if the final numerical answer is incorrect), a student must demonstrate an understanding of any assumptions made, any parameters stated in the problem or otherwise assumed, any equations used to arrive at the final answer, and any insight into the problem context that is gained as a result of the final numerical answer. The topics in this course are fundamental, but the thought and effort put into the course by those enrolled is expected to be graduate level.

All assignments must be uploaded to the Canvas platform by the due date and time provided on the assignment. *All times are given in Central US time*. Late assignments will NOT be accepted. Ensure your familiarity with the Canvas platform in advance and allot a sufficient amount of time for assignment submission and any technical difficulties that may arise.

Solving problems in this course will require notation including Greek letters, subscripts, superscripts, graphical depictions, and mathematical functions. All of these can be effectively incorporated into a word processing document that has a good equation editing function (e.g., Microsoft Word, LaTeX). If you opt to type out all homework assignments, specific notation using an equation editor MUST be used. However, using such software comes at a cost, namely time. Given the brief timeline of this course, time would be more effectively spent studying course material than learning and using equation editor functions. As such, it is expected that students will opt to work out assignments by hand with pencil/pen and paper. Submitting handwritten homework assignments will require the use of a scanner or a smart phone scanning app. Scanning apps that have been vetted by the OU Center for Teaching Excellence include: Evernote Scannable (for iOS only), Tiny Scan: PDF Document Scanner (for Android and iOS), and Genius Scan - PDF Scanner (for Android, iOS, and Windows). There are tutorials available for those taking the course for OU credit (http://www.lynda.com/Android-tutorials/Using-PDF-scanner-mobile-apps/183383/367929-4.html). Only a pdf will be uploaded (i.e., an uploaded photo of a homework assignment will NOT be accepted). A specific naming convention will be required for homework submissions, where X is the assignment number: hwX_lastname_firstname.pdf.

Homework problems should have a logical order, such that grading is intuitive. Writing should be neat. Examples of effectively answered homework problems are provided in *Unit 0: Welcome to the Course*. If the instructor and/or teaching assistant cannot easily understand the logical flow, the notation used, the handwriting, or any other aspect of a homework problem, no credit will be given.

Advice: don't rest after the submission of a homework assignment. Work on assignments in advance as much as possible. There is a significant amount of material to cover in this course, and the nature of this topic requires a tremendous amount of practice (hence, several homework problems on each assignment). Try to work ahead as much as possible. Homework solutions will be posted after the due date expires.

Examinations: Two term exams and a final exam will be given in this course. The two term exams will have a two-hour time limit, while the final exam will have a three-hour time limit. Any exams taking longer than the time limit will not be graded. The planned exam dates are as follows:

Exam 1 (units 1-4)..... October 11
Exam 2 (units 5-7)..... November 11
Final exam (comprehensive).....December 15

Exams will be taken through the Canvas platform and must be monitored with Respondus Monitor and LockDown Browser. A webcam for your computer is required. An equation sheet will be provided (and in advance of the exam for study purposes). It cannot be printed out and used during exams – only the online version is allowable. No other study material will be allowed during exams. Any suspicious activity will result in a zero grade for the exam, and an academic misconduct grievance will be filed.

Exams will be open for a 24-hour window, from 12:01 AM to 11:59 PM Central US time on the examination date provided. *The exam must be taken such that the exam IS COMPLETED before 11:59 PM Central on the examination date*. Once the exam is engaged on the Canvas platform, students will have two hours to complete term exams (three hours for the final exam).

Short answers and final numerical responses are to be keyed into text boxes on the Canvas platform, and handwritten notes will be scanned and uploaded in a similar fashion as homework problem (e.g., notation, neatness, organization), noting that partial credit for incorrect final answers can only be given through the demonstration of knowledge with the upload of these notes. Notes will be submitted in a separate assignment on Canvas associated with the exam, and the scanned (with a scanner or scanning app, not a photo) handwritten notes must be uploaded within 30 minutes of the exam submission.

Note that the Canvas platform will record the time that a student retrieves the exam and when the exam is finally submitted, but the platform may not offer a timekeeping display. As such, it is incumbent upon the student to monitor their own examination time and ensure that submission is timely.

Help with course platform: The instructor and teaching assistant will not be able to help with issues with the Canvas platform or any other technology.

Academic integrity: Cheating, plagiarism, or any act of dishonesty will NOT be tolerated. This policy applies to all parties involved in the incident. Never take credit for anyone else's intellectual property, be it on an exam or a homework assignment. This includes, but is not limited to, copying from another student's paper, copying from a paper from a previous semester or other course, using forbidden information on exams, and copying from published writings. As a member of the OU community, it is your responsibility to protect your educational investment by knowing and following the rules and by reporting any violations of those rules that you witness.

Chegg and other online tutoring sources: There are a wide variety of tutoring resources available through paid websites. Many of these sites have students upload assignments and solutions and surreptitiously provide these documents to other students. What appears to be a session with a tutor may be, behind the scenes, the tutor doing a search of their company database of solutions to share. By using these sites, you risk being charged with academic misconduct, either by supplying other students with answers they did not author or by receiving someone else's answer that you did not author. Since these companies are not open with students about their practices, you cannot know whether a tutor is providing meaningful support (e.g., identifying misunderstandings of content and explaining them) or simply feeding

you someone else's solution a bit at a time. The tutor's actions can result in different students submitting answers that are identical, which may be flagged as academic misconduct during grading. There is no way to use these sites without risking being charged academic misconduct at this time. These sites cooperate with the OU Office of Academic Integrity to identify students who are using their services to commit academic misconduct.

Reasonable accommodation policy: Any student in this course who has a disability that may prevent him/her from fully demonstrating his/her abilities should contact me as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

Religious holidays: It is the policy of the University to excuse absences of students that result from religious observances and to provide without penalty for the rescheduling of examinations and required class work that may fall on religious holidays. Notification must be provided sufficiently in advance, and every effort should be made to submit required work in advance.

Title IX resources and reporting: For any concerns regarding gender-based discrimination, sexual harassment, sexual assault, dating/domestic violence, or stalking, the university offers a variety of resources. To learn more or to report an incident, please contact the Sexual Misconduct Office at smo@ou.edu. Incidents can also be reported confidentially to OU Advocates at 405.615.0013 (24 hours a day, 7 days a week). Be advised that an instructor/TA is required to report instances of sexual harassment, sexual assault, or discrimination to the Sexual Misconduct Office.

Emergency protocol: During an emergency, there are official university procedures that will maximize your safety, found here: http://www.ou.edu/emergencypreparedness/procedures.

Mental health support services: If you are experiencing any mental health issues that are impacting your academic performance, counseling is available at the University Counseling Center, located on the second floor of the Goddard Health Center. To schedule an appointment call 405.325.2911.

Students are responsible for any changes/additions to this syllabus or any other course material announced in class.