SIE 305- Introduction to Engineering Probability and Statistics
Fall 2016, University of Arizona

Instructor:

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Office Hours: M, W 3:15pm to 4:30 pm, or by appointments

Teaching Assistants:

Wanlu (Lynn) Gu
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Office Hours: Tuesday 11:00am – 1:00pm

Roya Karimi
Office: ENGR 306
Email: royakarimi1993@email.arizona.edu
Office Hours: Thursday 9:30 to 10:45

Class meetings:

MWF 1:00 pm -1:50 pm, Music 146

Catalog description:

Axioms of probability, discrete and continuous distributions, sampling distributions. Engineering applications of statistical estimation, hypothesis testing, confidence intervals.

Prerequisite(s):

MATH 129
Each student must be able to do:
1. Differentiate (derivatives of exp., log, and polynomial, etc.)
2. Integrate (single integrals, simple double integrals)

Textbook (required):

Devore, Jay L. *Introduction to Engineering Probability and Statistic*, CENGAGE Learning. (SIE 305 University of Arizona Edition. Pic pg 2)

Software packages:

MS Excel (Minitab will be optional).

Other:

Clicker or Response Ware (Turning Technologies Response Card, picture page 3.)

Course learning outcomes:

Use basic probability correctly. Understand when and how to use discrete and continuous probability models in univariate and multivariate contexts. Apply to reliability. Derive functions of random variables. Use point estimation techniques. Develop confidence intervals, tolerance intervals, and prediction intervals. Develop tests of hypotheses in single and two-sample scenarios. Collect and describe data.

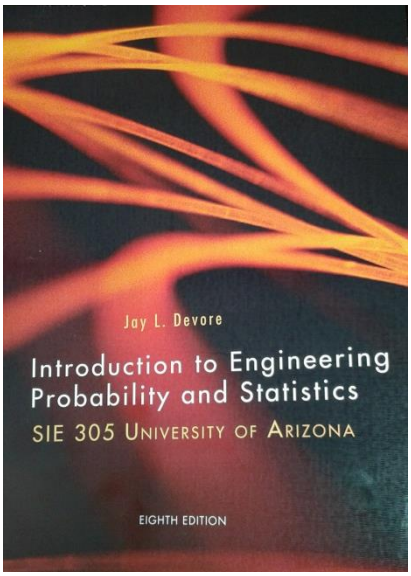
Topics covered:

- Combinatorics
- Basic Probability
- Discrete R.V.
- Continuous R.V.
- Descriptive Stats.
- Function of R.V.
- Joint R.V.
- Point Estimation
- Sampling Dist.
- Stat. Intervals
- Hypothesis Tests

D2L Website – You will access this site by going to http://d2l.arizona.edu and logging in with your UA Net ID. If you need assistance with D2L you should contact D2L Help (http://help.d2l.arizona.edu); you may also try the 24/7 IT Support center on campus (http://the247.arizona.edu), which is available 24 hours a day, 7 days a week. When you log on to D2L, this course will be listed on the welcome page under "My Courses". Announcements, class notes, PowerPoint files, spreadsheets used in class, homework assignments and solutions, exams from previous semesters, discussion questions, and links to news items of interest will posted to this website. You must be registered for the class to be permitted entry to the site.

Weekly Assignments

a. All assignments will be taken from the text book.



b. Quantity: The course will include 10+homework assignments.

c. Teams: **You may work in teams of 3 or less students on the weekly assignments, but each student should turn in his/her own assignment,** or you may complete your homework individually.

d. Timeliness: Unless announced differently, homework will be posted on a Friday, and must be submitted by D2L Drop Box by 9:00 pm on the second Monday of the week after the homework is assigned. This means that you might have a new homework assignment prior to handing in your previous assignment. You may always submit it early via D2L. Homework submitted late will be subject to a 10% penalty. No homework will be accepted after the solutions have been posted. If you have a valid reason for handing in late homework, you must let me know in advance. Emergencies will be considered on a case-by-case basis. Homework assignments must be submitted on D2L. Homework cannot be emailed, faxed, given to the department secretary, stuffed into my or T.A.'s mailbox, or slipped under our office doors. Keep your returned homework.

e. Academic integrity: Students are expected to uphold the University of Arizona academic integrity policy. Copied homework is not difficult to detect. Penalties for turning in copied homework are as follows: first offense – warning and 0% credit for copied problems for all parties; second offense – all parties involved will score a non-droppable 0% for the assignment; third offense – failing grade in the course. Group work is a great way to learn, and study groups are encourage, but you should try the problems on your own first, for your own benefit and also to be fair to the group.

f. Quality: Always indicate your answers clearly. Please print your name on each sheet. Anything that cannot be read will be considered wrong. Please remember that it's easier to claim more partial credit if your homework is clearly done.

Exams

a. There will be 3 exams during the semester and a final exam at the end of the semester. Final exam will be cumulative.

b. Exams are closed-book, but you may bring ONE sheet of paper with useful information handwritten on both sides and with your name printed on it. You can also bring the previous exam's note sheet to subsequent exams. Therefore, on exam 3, you will have three note sheets; one from the first exam, one from the second, and a newly created one for exam three. You will be allowed the same three note sheets on the final exam.

c. Calculators may not connect wirelessly to internet or to each other.

d. All cellphones must be OFF and put away during exams. This applies to class time, too.

e. Anyone caught acting against UA Code of Academic Integrity, will receive a non-droppable grade of zero on an exam.

f. Re-grade requests may be submitted ONLY in the class following the return of the exam, and they MUST be in writing. Attach a note describing clearly why you think you deserve more points. Any detected post-exam manipulation of your paper will result in a non-droppable grade of zero on the exam. Requests for regarding may open the possibility of the entire test being re-graded, which may or may not be in your favor.

g. If you are stuck on a problem and write a verbal explanation of how you might approach it and what concepts apply, you will get partial credit. Partial credit is better than no credit!

h. Exam scope. Tests and exams will never cover probability/statistics topics far beyond the realm of topics covered in class, or addressed on related textbook pages. Some questions that are similar, yet not identical, to homework exercises may appear on examinations.

Grading – The final grades will be given based on weekly assignments, 3 exams, quizzes, and a final exam.

Quizzes and Activities	10%
Exam 1	20%
Exam 2	20%
Exam 3	20%
Weekly Assignments	10%
Final Exam	20%
Total	100%

Attendance policy –We will be introducing questions in class that require real time responses from attending students using a Turning Technologies Response Card, also referred to as a "Clicker". Clicker response has the potential for raising final grades for threshold cases for good clicker response during class. Also, don't forget to register your "Clicker" once purchased if you haven't done so already.

Also, material that is not in the text is presented in class. In class examples are performed, demonstrations will be done with the computer, and discussions will be conducted on the material. All material from the class is fair game on the exams. It is critical that you do not miss class, since material will not be repeated or private tutoring will not be given. If you are continuously absent, you are taking on a huge risk of failing the course and you will miss the social structure of the class. The Web page can be used as a backup for a missed class and for additional help, but it is not a substitute for class activities, discussions, demonstrations, and performed examples. Missed announcements that may pertain to exam schedules, modifications in syllabus, handouts, and homework assignments are your responsibility to obtain if you miss a class.

Students with Special Needs - Students with disabilities or special needs who require accommodations to fully participate in course activities or meet course requirements must register with the S.A.L.T. Center or Disability Resource Center. Students needing special accommodations should contact SALT, 1010 N Highland Ave., or the Center for Disability Related Resources, 1224 E. Lowell Street, for documentation of special needs. If you qualify for special accommodations, bring your letter of request to the instructor as soon as possible. An exam taken in the DRC testing center is to be taken at exactly the same time the exam is given in class.

Academic behavior - If any form of academic dishonesty occurs in this course, procedures as given by the Dean of Students will be followed. The reduction in credit in the following bulleted list is the minimum action to be taken – other actions (e.g., notes on transcripts, reduction in final grade in course) may be taken as deemed appropriate.

- You are encouraged to work together on homework assignments, but do not copy someone else's work and do not let other people copy yours. If an individual assignment has been copied, then ALL copies (including the original) will receive a grade of zero.

- Plagiarism is a serious offense! Students are advised to review the library site (http://www.library.arizona.edu/help/tutorials/plagiarism/index.html) on plagiarism. Plagiarized material will receive a zero score and the incident will be reported to the dean.

- Anyone found cheating on an exam is in violation of the Student Code of Academic Integrity and will receive a zero on that exam and will be reported to the Dean of Students or appropriate designee.

- The Arizona Board of Regents' Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one's self. See: http://policy.web.arizona.edu/~policy/threaten.shtml.

Academic integrity policy – Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work, exercises, homework, and exams must be the product of independent effort unless otherwise instructed. Students are expected to know and to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:

http://catalog.arizona.edu/2011-12/policies/aaindex.html
http://deanofstudents.arizona.edu/codeofacademicintegrity

Any violation of the academic integrity code will be dealt with using the procedures detailed in the code.

Confidentiality of Student Records – the UA policy on confidentiality is on the web at:

http://www.registrar.arizona.edu/ferpa/default.htm

Classroom Behavior Policy – The Arizona Board of Regents' Student Code of Conduct, ABOR Policy 5-308, prohibits threats of physical harm to any member of the University community, including to one's self. See: http://policy.web.arizona.edu/~policy/threaten.shtml.

Restricted communication devices - Cell phones and other communication devices are to be turned off during class and during examinations. Lap top computers are prohibited during exams.

University absence policies - 1) All holidays of special events observed by organized religions will be honored for those students who have affiliation with that particular religion. 2) Absences pre-approved by the UA Dean of Students (or Dean's designee) will be honored.

Revisions - Modifications may occur in this syllabus. The grading policy, regarding tests, exams, and homework is rigidly fixed. Students will receive timely updates on any modifications.

Inclusive Excellence - Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As a part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course.

Student feedback - Students may be asked to provide written feedback on the course and its contents.

Monday	Wednesday	Friday
8/22	**8/24**	**8/26 Hw 1Assigned**
Course outline	***Chapter 1*** Overview	Descriptive Statistics: Histograms, Stem Leaf, and Box Plots
8/29	**8/31**	**9/2 Hw 2Assigned**
Descriptive Statistics: Histogram shapes	***Chapter 2*** - Events, Probability & Sample Spaces	Quiz 1 Axioms of Probability
9/5	**9/7 Hw1 Due**	**9/9**
NO CLASS – Labor Day	Conditional Probability	Independence/Bayes Rule/Total Probability
9/12 Hw 2 Due	**9/14**	**9/16**
Counting Problems: Combinations/Permutations	***Chapter 3*** Random Variables, Expected Value, Mean, Variance	Review
9/19	**9/21 Hw 3Assigned**	**9/23**
Exam 1	Cumulative Distribution Functions (CDF's)	Discrete Distributions: Geometric, Bernoulli, and Binomial
9/26	**9/28**	**9/30 Hw 4Assigned**
Discrete Distributions: Hypergeometric	Discrete Distributions: Negative Binomial	Discrete Distributions: Poisson Quiz 2
10/3 Hw 3 Due	**10/5**	**10/7 Hw 5Assigned**
Chapter 4 Continuous Distributions	Continuous Distributions: Normal/Gaussian	Continuous Distributions: Exponential, Gamma, X^2
10/10 Hw 4 Due	**10/12**	**10/14**
Continuous Distributions: Weibull, Beta	Probability Plots	Quiz 3 Review
10/17 Hw 5 Due	**10/19**	**10/21 Hw 6Assigned**
Clicker Exercise	Exam 2	***Chapter 5*** Joint Distributions (JDs)
10/24	**10/26**	**10/28 Hw 7Assigned**
Calculating Marginal Probabilities from JDs	Properties of JDs: Expected Value, Covariance	Sample Statistics Quiz 4
10/31 Hw 6 Due	**11/2**	**11/4 Hw 8Assigned**
Chapter 6 Point Estimation	Method of Moments & Maximum Likelihood Estimation	***Chapter 7*** Confidence Intervals:
11/7 Hw 7 Due	**11/9**	**11/11**
t-Distributions	Prediction Intervals & Tolerance Intervals	Veterans Day
11/14 Hw 8 Due	**11/16**	**11/18 Hw 9Assigned**
One vs. Two Sided Intervals & Intervals for Sample Variance	Review	Exam 3
11/21 Hw 10Assigned	**11/23**	**11/25**
Chapter 8 Hypothesis Testing	Measuring α error Understanding β error	Thanksgiving Holiday
11/28 Hw 9 Due	**11/30**	**12/2**
Proportion Hypothesis Testing	P-Values Quiz 5	Inferences Based on 2 Samples
12/5 Hw 10 Due	**12/7**	**12/9**
Review	Clicker Review	No Class
12/12	**12/14**	**12/16**
Final	No Class	Happy Holiday
Final Exam Monday Dec 12th, 1:00 to 3:00 pm		