SIE 305- Introduction to Engineering Probability and Statistics
Fall 2018, University of Arizona

Instructor:

Dr. Donald Bruyère
Office: ENGR 154, Phone #: 520-621-2298
Email: dbruyere@email.arizona.edu (best way)
Office Hours: Monday - Wednesday 10:30 am to 12:00 am

Teaching Assistants:

Xi Chen
Office: ENGR 122
Email: xic@email.arizona.edu (best way)
Office hours: Tuesday 3:30 to 5:00 pm

Md Habibor Rahman
Office: ENGR 258a
Email: habiborrahman@email.arizona.edu (best way)
Office hours: Thursday 2:00 to 3:30 pm

Class meetings:

Monday, Wednesday, Friday, 1:00 – 1:50 pm, M. Pacheco ILC, Rm 141

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. (Available on-line through WebAssign)

Software packages:

MS Excel, "R" and/or Minitab will be helpful.

Other:

Clicker or Turning Technologies Response Ware (Turning Technologies Response devices, 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 etext via WebAssign.

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

c. Timeliness: Unless announced differently, homework will be posted on a Friday, and completed 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 completing your previous assignment. You may always complete it early. Late homework will not be accepted. Emergencies will be considered on a case-by-case basis..

d. 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.

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 an 8 x 11" 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.

Reading Checks	5%
Homework Assignments	15%
Quizzes	15%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final	20%
Total	100%

Clickers –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". Clickers are interactive student response systems that allow you to participate in demonstrations, find out whether you understand a particular concept or idea, and examine your preferences and opinions. Clickers also allow me to get a snapshot of whether most students in the class understand particular concepts, and which areas I need to spend more time on or go back over. The clickers are useful in helping you to learn and in helping me to teach more effectively. Thus, it is important that you remember to bring your clicker with you to class each day, and you participate using your clicker throughout the class. Device models that will be supported include: NXT, QT, QT2, and Mobile Responseware Application.

You can obtain a clicker any of the following ways:

1. Buy clicker bundle (device, 5-year subscription and use of mobile app) at the bookstore (allows the use of financial aid). Cost around $75.
2. Buy clicker bundle (device, 5-year subscription and use of mobile app) at Turning Technologies online store (less expensive, requires credit card and is mailed to you). Cost is $59.
3. Buy/Borrow a clicker from a friend or purchase on Amazon/eBay, but you still need to buy a Subscription License from Turning Technologies Online Store. Subscription license for one semester costs $17.99, one year costs $24.99, and on up for more years.
4. ResponseWare (Mobile App). For this, you still need to purchase a Subscription License from Turning Technologies Online Store. Subscription license for one semester costs $17.99, one year costs $24.99, and on up for more years.

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. Instructions for registering your clicker are at http://help.d2l.arizona.edu/student/turning-techclickers-overview. You will need to log in to D2L, access your course and click on UA Tools and choose Clickers. Then follow steps for creating a Turning Technologies account and entering appropriate codes/IDs.
If you are using the physical clicker device there are 3 steps that you have to complete. Enter in your subscription license code, enter in your clicker device ID, and connect to the Brightspace LMS.
If you are only using the mobile app there are only 2 steps you have to complete. Enter in your subscription license code and connect to the Brightspace LMS.

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.

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

Course Schedule as of 7/30/18

Monday	Wednesday	Friday
RC Chapt 1 **8/20**	**8/22**	**8/24** Hw 1Assigned
Chapter 1 Overview	Descriptive Statistics: Histograms, Stem Leaf, & Box Plots	Histogram shapes, measures of location, measures of variation
RC Chapt 2 **8/27**	**8/29**	**8/31** Hw 2Assigned
Chapter 2 - Events, Probability & Sample Spaces	Axioms of Probability	Conditional Probability/ Independence
9/3 Hw1 Due	**9/5**	**9/7**
Labor Day	Bayes Rule/Total Probability	Counting Problems: Combinations Quiz 1
RC Chapt 3 **9/10** Hw 2 Due	**9/12**	**9/14** Hw 3Assigned
Counting Problems: Permutations	***Chapter 3*** Random Variables, Expected Value, Mean, Variance	Review
9/17	**9/19**	**9/21**
Exam 1	Probability Distribution Functions (PDF's)	Discrete Distributions: Geometric, Bernoulli, and Binomial
RC Chapt 4 **9/24** Hw 3 Due	**9/26**	**9/28** Hw 4Assigned
Discrete Distributions: Hypergeometric	Discrete Distributions: Negative Binomial	Discrete Distributions: Poisson Quiz 2
10/1	**10/3**	**10/5**
Chapter 4 Continuous Distributions	Continuous Distributions: Normal/Gaussian	Continuous Distributions: Exponential, Gamma
RC Chapt 5 **10/8** Hw 4 Due	**10/10**	**10/12** Hw 5Assigned
Continuous Distributions: Weibull, Beta	Probability Plots	Quiz 3 Review
10/15	**10/17**	**10/19**
Clicker Review	Exam 2	***Chapter 5*** Joint Distributions (JDs)
RC Chapt 6 **10/22** Hw 5 Due	**10/24**	**10/26** Hw 6Assigned
Calculating Marginal Probabilities from JDs	Properties of JDs: Expected Value, Covariance	Sample Statistics Quiz 4
RC Chapt 7 **10/29**	**10/31**	**11/2** Hw 7Assigned
Chapter 6 Point Estimation	Method of Moments & Maximum Likelihood Estimation	***Chapter 7*** Confidence Intervals
RC Chapt 8 **11/5** Hw 6 Due	**11/7**	**11/9** Hw 8Assigned
t-Distributions	Prediction Intervals & Tolerance Intervals	One sided vs. Two Sided Intervals
11/12 Hw 7 Due	**11/14**	**11/16** Hw 9Assigned
Veterans Day	Intervals for Sample Variance	Review
RC Chapt 9 **11/19** Hw 8 Due	**11/21**	**11/23** Hw 10Assigned
Exam 3	***Chapter 8*** Hypothesis Testing	Thanksgiving Day
11/26 Hw 9 Due	**11/28**	**11/30**
Measuring α error and Understanding β error	Proportion Hypothesis Testing	P-Values Quiz 5
12/3 Hw 10 Due	**12/5**	**12/7**
Inferences Based on 2 Samples	Class Review	No Class
Final Exam Monday December 10th, 1:00 pm to 3:00 pm		