

STAT 3320: Probability and Statistics

Fall 2020, Credit Hrs: 3.0, CRN: 18790

Department of Mathematical Sciences
University of Texas at El Paso

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Course Meetings: Tuesday 5PM–6PM on Blackboard Zoom.

This is an online (asynchronous) course, but some synchronized lectures will be arranged for those interested.

Office Hours: Thursday 5PM–6PM on Blackboard Zoom or by appointment by email.

Prerequisites

MATH 1312 (Calculus II) with a grade of “C” or higher or Department/Instructor approval.

Course Description and Learning Outcomes

Introduces students to probability and statistics applicable to research in computer science and other sciences. By the end of this course, students should be able to read a word problem, realize the uncertainty that is involved in a situation described, select a suitable probability model, estimate and test its parameters on the basis of real data, compute probabilities of interesting events, and make appropriate conclusions. This course covers theory and applications of probability models, random variables, discrete and continuous probability distributions, joint and conditional distributions, sampling distributions, central limit theorem, hypothesis testing, confidence intervals, chi-square tests for categorical variables and exposure to simple linear regression. Time to failure probability models are considered.

Note: Students may not receive credit for both STAT 3320 and STAT 3330.

Learning Modules

This course is designed using a modular format – that is, each week is “packaged” as a single module so that all the materials, lecture videos, slides, homework and quiz submission areas are in one area for a given week. You may submit your homework and quiz anytime before the due date. However, two midterms and the final exam will have a fixed schedule. We will mainly use a statistical software called SPSS, but in most of the cases, the statistical analysis using R and Excel will also be discussed. Some pre-recorded video lectures will be posted, but at the same time, synchronized class lectures will also be arranged.

Textbook (Recommended)

Jay L. Devore, **Probability and Statistics for Engineering and the Sciences**, 9th Edition (ISBN-13: 978-1305251809). Any format (e-book or hard copy) of the 8th or 9th edition is acceptable. The entire question will be written on Blackboard, so the book is not required for the homework assignments. Access code or WebAssign is not required. Make sure to understand all video lectures/slides and the corresponding sections from the textbook.

Reference: Roxy Peck, Tom Short and Chris Olsen, Introduction to Statistics and Data Analysis, 6th edition (ISBN-13: 978-1337793612).

If you cannot buy the textbook, you may use the following books freely available online. However, the level of these books is very elementary, whereas the current course is more advanced.

1. OpenIntro Statistics, 3rd Edition:
https://www.openintro.org/stat/textbook.php?stat_book=os
2. Introductory Statistics, Openstax:
<https://openstax.org/details/introductory-statistics>

You may check the online class notes of STAT 100 and STAT 200 from Penn State University:

<https://newonlinecourses.science.psu.edu/stat100/>
<https://onlinecourses.science.psu.edu/stat200/>.

Khan Academy – Statistics and Probability:

<https://khanacademy.org/math/statistics-probability>

A reference book for SPSS:

Andy Field, **Discovering Statistics Using IBM SPSS Statistics**, 4th Edition, (ISBN-13: 978-9351500827).

A reference book R:

R Tutorial: An R Introduction to Statistics.

Available online at <http://www.r-tutor.com/r-introduction>

Technology Requirements

Course content is delivered via the Internet through the Blackboard learning management system. Ensure your UTEP e-mail account is working and that you have access to the Web and a stable web browser. Google Chrome and Mozilla Firefox are the best browsers for Blackboard; other browsers may cause complications. When having technical difficulties, update your browser, clear your cache, or try switching to another browser.

You will need to have access to a computer/laptop (Windows or Mac), a webcam and a microphone. You will need to download or update the following software: Microsoft Office, Adobe Acrobat Reader, Zoom, Respondus Lock Down Browser, SPSS, R and RStudio. Check that your computer hardware and software are up-to-date and able to access all parts of the course.

Important: If you encounter technical difficulties beyond your scope of troubleshooting, please contact the UTEP [Help Desk](#) as they are trained specifically in assisting with technological

needs of students. Please do not contact me for this type of assistance. The Help Desk is much better equipped than I am to assist you!

Microsoft Office 365: If you do not have a word-processing software, you can download Word and other Microsoft Office programs (including Excel, PowerPoint and more) for free via UTEP's Microsoft Office Portal. Click the following link for more information about [Microsoft Office 365](#) and follow the instructions.

Zoom: All office hours and class meeting will be held on Zoom. Check the following link: https://www.utep.edu/technologysupport/ServiceCatalog/COMM_Zoom.html

SPSS: IBM SPSS is available to all UTEP students, faculty, and staff at no cost, see this [link](#). Contact Technology Support if you have any problem. VPN connection is required when accessing SPSS from off campus. For convenience, you may also use My.Apps to run SPSS, see the following link:

https://www.utep.edu/technologysupport/ServiceCatalog/INST_MyAppsInfo.html.

R (optional): The R software is the most commonly used statistical software among statisticians. It is free and available at <http://lib.stat.cmu.edu/R/CRAN>. It is very easy to handle R using another software called RStudio. Install RStudio from <https://www.rstudio.com>.

Respondus Lock Down Browser and Respondus Monitor: Most quizzes and exams will make use of Respondus Lock Down Browser and Respondus Monitor inside of Blackboard to promote academic integrity. You are encouraged to learn more about how to use these programs prior to the first test.

- Install LockDown browser, see this [website](#) for detailed information.
- A reliable Internet connection is essential to completing the exam. If you must go to a location to take the exam (such as the library), be sure to follow their health and safety requirements.
- Respondus Lockdown Browser will require that all internet tabs are closed prior to the start of the test.
- Respondus Monitor requires a webcam and microphone.
- You will be required to show the webcam your student ID prior to the start of the test.
- Your face should be completely visible during the test. Blocking the camera will disable the test.
- Respondus Monitor requires you to take a video of your surrounding area (desk, chair, walls, etc.)
- You should not have conversations with other people and/or leave and return to the area during the test.

Course Communication

Because this is an online class, we won't see each other in the ways you may be accustomed to: during class time, small group meetings, and office hours. However, there are a number of ways we can keep the communication channels open:

- **Office Hours:** We will not be able to meet on campus, but I will still have office hours for your questions and comments about the course. My office hours will be held on Zoom. Schedule will be announced on Blackboard.
- **Email:** UTEP e-mail is the best way to contact me. I will make every attempt to respond to your e-mail within 24-48 hours of receipt. When e-mailing me, be sure to email from your UTEP student account and please put the course number in the subject line. In the body of your e-mail, clearly state your question. At the end of your e-mail, be sure to put your first and last name, and your university identification number.
- **Discussion Board:** If you have a question that you believe other students may also have, please post it in the Help Board of the discussion boards inside of Blackboard. Please respond to other students' questions if you have a helpful response.
- **Announcements:** Check the Blackboard announcements frequently for any updates, deadlines, or other important messages.

Netiquette

As we know, sometimes communication online can be challenging. It's possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep these netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider audience. This is a college-level course; therefore, all communication should reflect polite consideration of other's ideas.
- Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else's message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on in these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.

Deadlines, Late Work and Absence Policy

Homework assignments and quizzes will be due on Sundays at midnight (11:59 PM). No late work will be accepted if the reason is not considered excusable. In a rare case, 10% marks will be deducted each day after the due date.

Make-up Work

Make-up work will be given only in the case of a documented emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me – in advance if at all possible – and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

Incomplete Grade Policy

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

Course Schedule

- Duration: 8/24/2020 to 12/3/2020
- Midterm I: Sunday, September 27, 2020 from 5:00 PM to 7:00 PM.
- Midterm II: Sunday, November 1, 2020 from 5:00 PM to 7:00 PM.
- Final: Monday, December 7, 2020 from 5:00 PM to 7:00 PM.
- Course drop deadline: Fri, 10/30/2020 (No “W” will be assigned for dropping the course after the deadline!)

The dates of the exams listed here are tentative. The exact dates will be announced on Blackboard.

Grades

Course grades will be determined by the following components, with the weights shown:

Homework	25%
Quizzes	15%
Midterm I	15%
Midterm II	15%
Final Exam	25%
Group Project	1.5%
Individual Project	3.5%

A bonus of 2% will be given to all students if at least 80% of students fill out the evaluation.

The usual grading scale will be used for this course:

90–100%	A
80–89%	B
70–79%	C
60–69%	D
0–59%	F

Any cheating or plagiarism may make your grade F.

Homework

- Homework assignments will be due approximately every week on Sunday midnight (11:59 PM). You must submit your homework online on Blackboard. The official course policy is that **no late homework will be accepted**. In a rare case, 10% marks will be deducted each day after the due date.
- There is no time limit to solve the homework problems, but make sure you submit it before the due date. Your answers will be auto-saved; you may quit and resume at any time before the due date.
- Only one submission is allowed. You will see the correct answers and keys once you submit your homework.
- Collaboration in small groups is permitted and encouraged for homework assignments. But **you must write up your solutions independently**; otherwise, points will be deducted.
- Most homework assignments will be automatically graded by Blackboard. In some cases, you don't have to submit the detailed answers for some descriptive questions. But, make sure that you know how to solve those questions. Generally, you will expect a similar question (possibly, with a different data set) in the quiz, where you must submit the full answer.
- The lowest grade will be dropped from the final grade.

Quiz

- A quiz is held every week and it will be due on Sundays at midnight (11:59 PM). You may submit your quiz anytime before the due date.
- Most quizzes will make use of Respondus Lock Down Browser and Respondus Monitor inside of Blackboard to promote academic integrity.
- The quizzes will generally cover current material being covered during the week. In most cases, a quiz will have one or two similar problems from the list of homework questions and some problems discussed in lecture videos or online classes with possibly modified data.

- Check the solutions of all homework problems from Blackboard even if you get full marks in that homework. Make sure you understand all the assigned homework problems before a quiz.
- No notes or textbook materials are permitted during the quiz.
- In some quizzes, you will use SPSS (or R/Excel).
- **A simple calculator may be required during the quiz.**
- Quizzes will be assigned on Blackboard. Other than the quiz url, **use of internet is strictly prohibited.**
- Questions may be randomized, so students will receive possibly different questions.
- The time limit is generally 30 minutes. Once you start, you must submit it within the time limit. You cannot restart later.
- There will be no make-up quizzes for any personal reasons.
- Only one submission is allowed.
- The lowest grade will be dropped.

Final Projects

Each student must submit two projects – one individual project and another group project. Students may form their own group, otherwise it will be assigned by the instructor. For the final projects, you must set a research question by yourself. You may get help from the homework problems and the real data analyses discussed in this course. You will collect your data via an observational study or by creating your own survey questionnaires. You will analyze your data using some statistical tools discussed in the class. The project must have a test of hypothesis, confidence interval or regression analysis that is covered in this course. **Any cheating or plagiarism may make your grade F.** The project report must contain the aim of the research, detailed analysis and your conclusion. Each student must submit two different projects – one in group and another individual project. The detailed information will be provided after the second midterm.

Class Recordings

The use of recordings will enable you to have access to class lectures, group discussions, and so on in the event you miss a synchronous or in-person class meeting due to illness or other extenuating circumstance. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP's acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. Your instructor will not share the recordings of your class activities outside of course participants, which include your fellow students, teaching assistants, or graduate assistants, and any guest faculty or community-based learning partners with whom we may engage during a class session. You may not share recordings outside of this course. Doing so may result in disciplinary action.

Copyright Statement for Course Materials

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

Math Tutoring Center

If you need additional help for your homework or class lecture, you are encouraged to visit Math Tutoring Center. For details, check the following link:

<https://www.utep.edu/science/math/marcs/>.

Academic Integrity Policy

The University policy is that all suspected cases or acts of alleged scholastic dishonesty must be referred to the OSCCR for investigation and appropriate disposition. Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes, but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts. Each student is responsible for notice of and compliance with the provisions of the Regents' Rules and Regulations, which are available for inspection electronically at <http://www.utsystem.edu/bor/rules/homepage.htm>. All students are expected and required to obey the law, to comply with the Regents' Rules and Regulations, with System and University rules, with directives issued by an administrative official in the course of his or her authorized duties, and to observe standards of conduct appropriate for the University. A student who enrolls at the University is charged with the obligation to conduct himself/herself in a manner compatible with the University's function as an educational institution.

Any student who engages in conduct that is prohibited by Regents' Rules and Regulations, U. T. System or University rules, specific instructions issued by an administrative official or by federal, state, or local laws is subject to discipline, whether such conduct takes place on or off campus or whether civil or criminal penalties are also imposed for such conduct.

Accommodations Policy

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the [UTEP Center for Accommodations and Support Services](#)

(CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the [CASS portal](#).

COVID-19 Accommodations

Students are not permitted on campus when they have a positive COVID-19 test, exposure or symptoms. If you are not permitted on campus, you should contact me as soon as possible so we can arrange necessary and appropriate accommodations.

Military Statement

If you are a military student with the potential of being called to military service and/or training during the semester, please contact me by the end of the first week of class.

College of Science Policies

All grades of Incomplete must be accompanied by an Incomplete Contract that has been signed by the instructor of record, student, Department Chair, and the Dean. Although UTEP will allow a maximum of one year to complete this contract, the College of Science requests it be limited to month based upon completion data. A grade of Incomplete is only used in extraordinary circumstances confined to a limited event such as a missed exam, project, or lab. If the student has missed a significant amount of work (e.g., multiple assignments or tasks), a grade of Incomplete is not appropriate or warranted.

Tentative Calendar

This calendar provides an overview of the course. More details and a weekly checklist are available in the weekly modules in Blackboard.

Week	Date	Chapter/topic
Week 1	Aug. 24 to Aug. 30	Overview and Descriptive Statistics
Week 2	Aug. 31 to Sept. 6	Descriptive Statistics
Week 3	Sept. 7 to Sept. 13	Probability
Week 4	Sept. 14 to Sept. 20	Conditional Probability
Week 5	Sept. 21 to Sept. 27	Random Variables and Probability Distributions
Week 6	Sept. 28 to Oct. 4	Continuous Random Variables and Probability Distributions
Week 7	Oct. 5 to Oct. 11	Point Estimation and Sampling Distributions
Week 8	Oct. 12 to Oct. 18	Statistical Intervals Based on a Single Sample
Week 9	Oct. 19 to Oct. 25	Tests of Hypotheses Based on a Single Sample
Week 10	Oct. 26 to Nov. 1	Inferences Based on Two Samples
Week 11	Nov. 2 to Nov. 8	The Analysis of Variance
Week 12	Nov. 9 to Nov. 15	Simple Linear Regression and Correlation
Week 13	Nov. 16 to Nov. 22	Goodness-of-Fit Tests and Categorical Data Analysis
Week 14	Nov. 23 to Dec. 3	Quality Control Methods and Miscellaneous