Probability and Statistics
Fall 2018

Course no. 3307.010
Instructor Trey Smith
Time TR 12:30
Location MCS 215
Office MCS 219A
Office Hours MWF 9:00-10:00, 2:00-3:00: TR 11:00-12:00, 2:00-3:00
Others by Appointment
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Grading Your grade will be determined using your homework/quiz grade, three tests and a comprehensive final exam. The homework/quiz grade will count as bonus points (see homework below), and each test will count as 1/3 of your final grade. The final exam will serve to determine your final grade in the following way; if your final exam is a 90 or better, you will gain a letter grade, if the final exam is 60 or less, you will drop a letter grade.

Homework You will be assigned homework every class period. The next class, the homework will either be collected, or you will be given a quiz based on the homework material. At the end of each test period, the average of your homework/quiz grade will be scaled and used as bonus points for that particular test. You will generally receive a total of 5 to 10 points. This total will be determined by the instructor on a test-by-test basis.

Attendance Regular class attendance is expected. There will be no make-up for missed homework or quiz, so a missed day may result in a zero.

Calculators Calculators will generally not be allowed during exams.

Course Outline The following is a tentative outline of the material to be covered. I reserve the right to change the material and/or sequence.

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<th>Week</th>
<th>Topics</th>
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<tr>
<td>1</td>
<td>Sample Spaces; Axioms and basic Theorems</td>
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<td>2</td>
<td>Counting</td>
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<td>3</td>
<td>Conditional Probability and Baye’s Theorem; Independence</td>
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<td>4</td>
<td>Expectation; Variance; Discrete Random Variables</td>
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<td>5</td>
<td>Properties of Mean and Variance; Review; <strong>Test 1 (9.27)</strong></td>
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<td>6</td>
<td>Special Discrete Random Variables</td>
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<td>Continuous Random Variables</td>
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<td>Special Continuous Random Variables</td>
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<td>9</td>
<td>The Normal Distribution; Review; <strong>Test 2 (10.25)</strong></td>
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<td>10</td>
<td>Bivariate Distributions; Transformations</td>
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General University Policies

- **Student Disability Services**
  ASU is committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs or activities of the university, or be subjected to discrimination by the university, as provided by the Americans with Disabilities Act of 1990 (ADA), the Americans with Disabilities Act Amendments of 2008 (ADAAA), and subsequent legislation.

  The Office of Student Affairs is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability, and it is the student’s responsibility to initiate such a request by contacting:

  Dallas Swafford  
  Director of Student Disability Services  
  Office of Student Affairs  
  325-942-2047  
  dallas.swafford@angelo.edu

- **Title IX**
  Angelo State University is committed to the safety and security of all students. If you or someone you know experience sexual harassment, sexual assault, domestic or dating violence, stalking, or discrimination, you may contact ASU’s Title IX Coordinator:

  Michelle Boone  
  Director of Title IX Compliance  
  325-486-6357  
  michelle.boone@angelo.edu

- **Student Absence for Observance of Religious Holy Days**: A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. ([http://www.angelo.edu/opmanual/](http://www.angelo.edu/opmanual/))

- **Incomplete Grade Policy**: It is policy that incomplete grades be reserved for student illness or personal misfortune. Please contact faculty if you have serious illness or a personal misfortune that would keep you from completing course
work. Documentation may be required. See ASU Operating Policy 10.11 [Grading Procedures] for more information.

- **Student Absence for Observance of Religious Holy Days:** A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. ([http://www.angelo.edu/opmanual/ -- OP 10.19](http://www.angelo.edu/opmanual/))

- **Student Conduct Policies**

  **Academic Integrity**

  Students are expected to maintain complete honesty and integrity in all work. Any student found guilty of any form of dishonesty in academic work is subject of disciplinary action and possible expulsion from ASU.

  The College of Science and Engineering adheres to the Statement of [Academic Integrity](http://www.angelo.edu/opmanual/)

  **Plagiarism**

  Plagiarism is a serious topic covered in ASU’s [Academic Integrity policy](http://www.angelo.edu/opmanual/) in the Student Handbook. Plagiarism is the action or practice of taking someone else’s work, idea, etc., and passing it off as one’s own. Plagiarism is literary theft.

  In your discussions and/or your papers, it is unacceptable to copy word-for-word without quotation marks and the source of the quotation. It is expected that you will summarize or paraphrase ideas giving appropriate credit to the source both in the body of your paper and the reference list.

  Papers are subject to be evaluated for originality via Turnitin. Resources to help you understand this policy better are available at the [ASU Writing Center](http://www.angelo.edu/opmanual/).

  **Copyright Policy**

  Students officially enrolled in this course should make only one printed copy of the given articles and/or chapters. You are expressly prohibited from distributing or reproducing any portion of course readings in printed or electronic form without written permission from the copyright holders or publishers.

- **General Policies Related to this Course:** All students are required to follow the policies and procedures presented in these documents:
  - Angelo State University Student Handbook
Student Learning Outcomes

1. **Students will demonstrate factual knowledge of the mathematical notation and terminology used in this course.** Students will demonstrate the ability to read, interpret, and use the vocabulary, symbolism, and basic definitions of probability theory, including permutations and combinations, sample space, event, conditional probability, discrete and continuous random variables, expected value, mean, variance, probability density functions and distribution functions.

2. **Students will be able to describe the fundamental principles, laws, and theorems arising from the basic definitions of probability theory.** Students will be able to identify and use the postulates of probability, the basic properties of random variables, and laws and formulas that result from them, such as Bayes’ Theorem, Chebyshev's Theorem, independence, mean and variance of linear combinations of random variables, and the Central Limit Theorem.

3. **Students will apply course material along with techniques and procedures covered in this course to solve problems.** Students will use the facts, formulas, and techniques learned in this course to solve problems involving elementary counting processes and ones related to special probability distributions, such as the binomial, hypergeometric, Poisson, exponential, and normal distributions.

4. **Students will develop specific skills, competencies, and thought processes sufficient to support further study or work in this field or related fields.** Students will acquire a level of proficiency in the fundamental concepts and applications necessary for further study in academic areas requiring a background in probability theory. These fields might include business, the social sciences, and the physical sciences and engineering, as well as mathematics.

Textbook  There is actually no textbook required for this course. There are a series of notes available on Bb to supplement the class instruction.

Course Content

1. **Combinatorial Analysis**
   Counting, Permutations, Combinations

2. **Axioms of Probability**
   Sample Space and Events, Axioms, Properties of Probability Spaces

3. **Conditional Probability and Independence**
   Bayes Formula, Independent vents

4. **Random Variables**
   Discrete Random Variables, Expectation, Variance, Special Discrete Random Variables

5. **Continuous Random Variables**
   Expectation and Variance, Special Continuous Random Variables
6. **Jointly Distributed Random Variables**
   Independent Random Variables, Sums, Conditional Distributions

7. **Properties of Expectation**
   Covariance, Conditional Expectation, Moment Generating Functions

8. **Limit Theorems**
   Chebychev’s and Markov’s Inequalities, The Laws of Large Numbers, The Central Limit Theorem