

1: Course Number and Name

- a. **ENGR 3305:** Probability and Risk in Engineering, Summer 2022
- b. Section DM1, Online

2: Credits and Contact Hours

- a. **Credits:** 3
- b. **Contact Hours:** Online Class

3: Instructor Information

- a. **Course Coordinator:** Manuel Garcia
- b. **Instructors:**
 - i. Manuel García, 325-486-5515, manuel.garcia@angelo.edu. Office: VIN 274. For office hours see [faculty homepage](#).

4: Required Course Materials

Navidi, W. Statistics for Engineers and Scientists, 5th Ed. (2020). McGraw-Hill. Connect required.

5: Technology Requirements

To successfully complete this course, you need to
McGraw Hill Connect access.

Python and Jupiter Notebooks. Computer exercises are solved using Python in a Jupyter Notebook.
You can access two ways:

Via the VDI Server <http://view.angelo.edu>

Local installation in your personal computer (<https://www.anaconda.com/products/individual>)

6: Specific Course Information

- a. **Catalog Description:** Modeling of random processes in engineering design and decision making. Fundamentals of probability spaces; random variables; dependence and independence; mean values and moments. Development of mathematical and simulation models, and their relevance to engineering design and decision making
- c. **Prerequisites:** MATH 3415
- d. **Required or elective:** Required (Engineering Principles)

7: Specific Goals for the Course

- a. Course Learning Outcomes:
 1. Describe uncertainty, randomness, and imperfect knowledge; and describe applications of decision making in various disciplines within civil engineering;
 2. Identify probabilistic events, and calculate the probability of those events using various mathematical tools;
 3. Analyze, construct, and communicate the probability of outcomes using various mathematical tools;
 4. Describe and construct probabilities based on multiple, dependent variables;
 5. Utilize numerical and simulation methods in software programs (e.g. Python) to solve complicated probability scenarios;

6. Analyze probabilistic distributions and formulate engineering recommendations with known levels of confidence and risk;
7. Analyze sociotechnical probabilistic situations (including impacts of engineering solutions in global, economic, environmental, and societal contexts) and justify recommendations with known levels of confidence and risk.

b. Course Learning Outcome Mapping to ABET Criterion 3 Student Outcomes:

Table 1: Course Learning Outcomes mapped to ABET Student Outcomes

ABET Student Outcomes	1	2	3	4	5	6	7
1. Solve Problems	X	X	X	X	X	X	X
2. Design							X
3. Communication							X
4. Ethics & Professionalism							X
5. Teamwork							X
6. Experimentation							
7. Acquire New Knowledge					X		X

8: Topics Covered

1. Sampling and Descriptive Statistics
2. Probability, Conditional Probability, and Events Space
3. Probability Distribution Functions
4. Propagation of Error
5. Hypothesis Testing and Confidence Intervals
6. Correlation and Regression Analysis
7. Special Topics: Programming and Statistical Projects

9: Course Delivery and Communications

9.1: Delivery Method(s)

This is an online course with learning resources and supplemental materials posted in Blackboard Communications.

Table 3 contains the course outline but in blackboard you will find a suggested study plan. It includes daily activities during the four weeks. A daily activity covers one topic and consists of :

- **Reading:** Read the book section and answer the comprehension questions.
- **Video Lecture:** Watch videos related to the lecture
- **Homework Assignments:** Do the homework assignments for the section
- **Computer exercises:** Use python to solve problems using the Jupyter notebook

Depending on the person, those activities could take minimum of two hours, but my estimate is 3+. Notice that summer version of the course covers the same material that is usually cover in 15 weeks in just 8 weeks. This is very intensive and you need to work daily on the course.

Exam dates have a fixed time. However, they are released on a date, and you have about 24 hours to start. Once started, you will have 4 hours to complete it.

Faculty will respond to email and/or telephone messages within 24 hours during working hours Monday through Friday. Weekend messages may not be returned until Monday.

Written communication via email: All private communication will be done exclusively through your ASU email address. Check frequently for announcements and policy changes. In your emails to faculty, include the course name and section number in your subject line.

Virtual communication: Office hours and/or advising may be done in person or with Google Meet using the ASU account.

10: Professionalism

Professional engineering standards apply in this class. You are expected to demonstrate a behavior consistent with the conduct of an individual practicing in the engineering profession. You are expected to: (1) come prepared for class; (2) respect faculty and peers; (3) demonstrate responsibility and accountability for your own actions; (4) demonstrate sensitivity and appreciation for diverse cultures, backgrounds, and life experiences; (5) offer and accept constructive criticism in a productive manner; (6) demonstrate an attitude that fosters professional behavior among peers and faculty; (7) be punctual to class meetings; (8) maintain a good work ethic and integrity; and (9) recognize the classroom as a professional workplace.

11: Graded Material

11.1: Class Attendance, Participation, Timeliness and Teamwork

The number one complaint of engineering clients is the timeliness of deliverables (reports, drawings, specifications, etc.). As a professional engineer you will be expected to arrive at scheduled meetings on time and prepared. Late proposals are not generally accepted. Late specifications or drawings may cost the engineer a monetary penalty. Professional engineering standards apply in this course.

Your online assignments will be due at the time specified on McGraw Hill Connect. Jupyter notebooks have to be submitted using Gradescope and the due date is in gradescope.

11.2: Reading Assignments and Homework

You will be given reading and homework assignments nearly every lesson. Reading assignments will come from the assigned textbooks or other materials provided or available via the web. The homework assignments will consist of questions to be answered during your reading and preparation for the video-class. Reading and homework assignments will be distributed via the Blackboard and McGraw Hill Connect. Your instructor may assess penalties for late work.

11.3: Participation

The instructor's purpose is to help you understand the course material. Making questions to the instructor via forums or contacting him for office hours will increase your understanding. Participation will be graded according to:

Does Not Meet Expectations

- *1 – The student do not ask or answer questions*
- *2 – The student do not contact the instructor*

Meets Minimum Expectations

- *3 – The student ask a questions that are not relevant to her/his understanding of the course*
- *4- contributes at least once to class discussion; or participates through*

Exceeds Expectations

- *4 – participates multiple times in class discussion; is responsive to participation and engaged in contributions and comments made by others; contributions are thoughtful and provoke additional comments from others; does not dominate conversation; listens carefully and responds thoughtfully to comments made by others.*

Every week I will be assessing your class participation and the final grade will be the average of the four weeks

11.4: Exams

Make-up exams will only be given for extenuating circumstances, unless prior arrangements with the instructor are agreed upon. Proof, such as a doctor's note or other official document, may be required for unexcused absences during an exam. Approval from the Disability Services office is needed if you are under quarantine due to a close contact or sickness.

11.5: Computer exercises

There will be Computer exercises for each topic in this class. They can be completed by group e (2 people maximum). The reports will be prepared using a Jupyter Notebook.

In general, your reports must be organized according to the format provided, sections must be clearly labeled and contain the correct content, grammar and sentence structure must be correct, the overall appearance must be neat and professionally assembled, and the technical content must be correct.

11.6: Grades: Weighting and Letter Grades

The weighting system shown in Table 2 will be used in determining final grade for the course

Table 2: Grade Weighting

<u>Item</u>	<u>Percent</u>
Homework	14
Participation	5
Readings	6
Computer Exercises	25
Exams	30
Final Exam	20
Total	100

The instructor will determine letter grades for the course using his professional judgment, and the following standards as described in the University Catalog:

A = excellent work B = good work C = average work D = poor work F = failing work

12: Classroom and University Policies and Student Support

12.1: General Policies

All students are required to follow the policies and procedures presented in the [Angelo State University Student Handbook](#)¹ and [Angelo State University Catalog](#)².

12.2: 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.

Student Disability Services is located in the Office of Student Affairs, and is the designated campus department charged with the responsibility of reviewing and authorizing requests for reasonable accommodations based on a disability. It is the student's responsibility to initiate such a request by contacting an employee of the Office of Student Affairs, in the Houston Harte University Center, Room 112, or contacting the department via email at ADA@angelo.edu. For more information about the application process and requirements, visit the [Student Disability Services website](#)³. The employee charged with the responsibility of reviewing and authorizing accommodation requests is:

Dallas Swafford
Director of Student Disability Services
Office of Student Affairs
325-942-2047
dallas.swafford@angelo.edu
Houston Harte University Center, Room 112

12.3: Title IX at Angelo State University

The University prohibits discrimination based on sex, which includes pregnancy, sexual orientation, gender identity, and other types of Sexual Misconduct. Sexual Misconduct is a broad term encompassing all forms of gender-based harassment or discrimination including: sexual assault, sex-based discrimination, sexual exploitation, sexual harassment, public indecency, interpersonal violence (domestic violence and/or dating violence), and stalking. As a faculty member, I am a Responsible Employee meaning that I am obligated by law and ASU policy to report any allegations I am notified of to the Office of Title IX Compliance.

Students are encouraged to report any incidents of sexual misconduct directly to ASU's Office of Title IX Compliance and the Director of Title IX Compliance/Title IX Coordinator at:

Michelle Boone, J.D.

Director of Title IX Compliance/Title IX Coordinator

Mayer Administration Building, Room 210

325-486-6357, michelle.boone@angelo.edu

You may also file a report online 24/7 at www.angelo.edu/incident-form⁴

If you are wishing to speak to someone about an incident in confidence you may contact the *University Health Clinic and Counseling Center at 325-942-2173* or the *ASU Crisis Helpline at 325-486-6345*.

For more information about resources related to sexual misconduct, Title IX, or Angelo State's policy please visit: www.angelo.edu/title-ix⁵.

12.4: Observance of Religious Holy Day

A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. See ASU Operating Policy 10.19 Student Absence for [Observance of Religious Holy Day](#)⁶ for more information.

12.5: 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](#)⁷ for more information.

12.6: Student Conduct Policies

12.6.1: 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.

12.6.2: Plagiarism

Plagiarism is a serious topic covered in ASU's [Academic Integrity policy](#)⁸ 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 or SafeAssign. Resources to help you understand this policy better are available at the [ASU Writing Center](#)⁹.

12.6.3: 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.

13: Course Outline

The course outline is presented in the table next page. Detailed reading and homework assignments along with updates to this schedule will be provided via Bb. The following schedule may be modified as the semester progresses.

Table 3: Course Lesson Outline

W	Date	Topic	Book Sections
1	Jun 6 – 10	Ch1. Sampling and Descriptive statistics	1.1,1.2,1.3, 2.1 A
2	Jun 13 – 17	Ch2. Probability	2.1 B, 2.2 2.3
3	Jun 20 - 24	Ch2. Probability	2.4, 2.5, 2.6
	June 24	EXAM 1	
4	Jun 27 - July 1	Ch2. Probability Ch3. Propagation of Errors Ch4. Probability Distributions	2.6, 3.1, 3.2 4.1,4.2
5	July 4 – 8	Ch4. Probability Distributions	4.3, 4.5, 4.6,
	July 8	EXAM 2	
6	July 11 - 15	Ch4. Probability Distributions Ch5. Confidence intervals Ch6. Hypothesis Testing	4.10, 4.11 5.1,5.2,5.3 6.1,6.2
7	July 18-22	Ch7. Correlation & Simple Linear Regression Ch10. Statistical Quality Control	7.1, 7.2 10.1, 10.2
8	July 25-29	Ch10. Statistical Quality Control	
	July 29	FINAL EXAM	

14: End Notes

¹ <http://www.angelo.edu/student-handbook/>

² <http://www.angelo.edu/catalogs/>

³ <http://www.angelo.edu/services/disability-services/>

⁴ <http://www.angelo.edu/incident-form>

⁵ <http://www.angelo.edu/title-ix>

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- ⁶ <http://www.angelo.edu/content/files/14206-op-1019-student-absence-for-observance-of>
- ⁷ <https://www.angelo.edu/content/files/14197-op-1011-grading-procedures>
- ⁸ <http://www.angelo.edu/student-handbook/community-policies/academic-integrity.php>
- ⁹ http://www.angelo.edu/dept/writing_center/academic_honesty.php