

ENGR 531: Engineering Risk Analysis

Syllabus

Summer Semester, 2023

Professor:	Dr. James Cale	Email:	James.Cale@colostate.edu
TA:	Irvin A. Diaz Sandoval	Email:	Irvin.Diaz@colostate.edu
Phone:	(970) 412-0494	Office:	Spruce Hall, Room 16
Office Hours:	By appointment at Spruce Hall, Room 16 (or Zoom, by request)		

Course Description: This course targets understanding engineering or technical risks. Risk analysis seeks to identify and mitigate potential hazards that threaten the safety, health, and success of individuals, organizations, and the environment. This class will prepare you to make better risk decisions based on quantitative risk analyses and modeling, hazard analysis, fault tree analysis, decision diagramming, and risk management and planning. 3 credit hours. Upon the completion of this course, you should be able to:

- Identify, analyze, quantify, and mitigate risks;
- Apply tools, techniques, and methodologies to implement risk management processes;
- Assess discrete and continuous probability events, commonly used probability distributions, and apply these probabilities to risk assessment;
- Understand the use of Bayes' rule, Fault Tree Analysis, and other decision analysis techniques.

Meeting Location and Time

This course is online only, delivered via Zoom on Tuesday evenings 5:15–8:55 PM (MST). A Zoom link will be provided in Canvas. All lectures will also be recorded and posted by the following day.

Policy on Lecture Completion Time

Lectures will be completed when the learning objectives for that day are met; this may occur before the official ending time (8:55 PM). In some cases, individual reading assignments may be given for the remaining lecture time.

Prerequisites[†]

Working knowledge of undergraduate probability and statistics. Can be fulfilled by: ECE 303/STAT 303 (Introduction to Communications Principles), STAT 315 (Statistics for Engineers and Scientists) or equivalent.

Textbooks

Ostrom, L. T., and Wilhelmsen, C. A. (2019). *Risk Assessment: Tools, Techniques, and Their Applications, Second Edition*. Hoboken, NJ: Wiley & Sons. ISBN-13: 978-1119483465. Available free online through the CSU Library: <https://ebookcentral.proquest.com/lib/csu/search.action?query=978-1119483465>

[†]Contact the instructor (jcale@colostate.edu) with questions and/or requests for waivers for the prerequisites.

Communication Policy

Questions on the course material can usually be answered most quickly via Canvas messaging or email; this is the preferred method when possible. The TA or instructor will respond to your inquiry within 24 hours (typically sooner). For more in-depth questions, you may choose to bring them to the office hours with the TA or instructor, by request. Important: this is *graduate-level course*; questions/office hours will not be used to “walk you through” any assignments. Office hours are for clarifying course content or logistical questions, if needed.

Course Structure

Assignments: There will be several assignments based on content discussed in class and from the readings. Many of the assignments will be based on a project idea that you will come up with and use as the topic for answering several of the homework questions throughout the semester.

Exams: There will be one midterm exam and one final exam. The exams will not be proctored, but you are expected to work on them individually. You may use your textbook and class notes. The exams will be posted on Canvas and turned in through Canvas.

Readings: Weekly readings will be from the textbook for the class. You are expected to read the assigned readings within the week they are assigned, as the lecture and assignment content will coincide with the assigned reading.

Course Grading Weights

Assignments	50%
Mid-term Exam	25%
Final Exam	25%

**Your grade will be calculated according to the weights above and your earned points on the assignments, *not* what may or may not be shown within Canvas.

Late Assignments and Makeup Policy

The assignments and exams are due by 11:59 PM (MST) on the day they are due. No late assignments will be accepted. Special circumstances may be accommodated with approval BEFORE assignment due date.

Regrades

Regrading can only be accommodated under two circumstances: (1) incorrect calculation of scores or (2) incorrect assignment of scores. **All requests for regrading must be turned in within 5 days of the return of the graded project/exam.** When requesting a regrade, contact the TA or course instructor. Note that your solution to the entire problem as well as the regrade request form will be scrutinized and the allocation of partial credit is at the discretion of the grader. In some cases, regrade requests may result in a reduced score.

Working Together

Studying together in this class is encouraged. However, any individual assignments (homework, exams) *must be solely your own work*. Solutions will be checked to ensure academic honesty. Academic misconduct has serious consequences (see below).

Final Grade Assignments

Grade	Score
A+	96.67–100.00
A	93.33–96.66
A–	90.00–93.32
B+	86.67–89.99
B	83.33–86.66
B–	80.00–83.32
C+	76.67–79.99
C	70.00–76.66
D	60.00–69.99
F	0.00–59.99

Academic Integrity

The faculty expects every member of the CSU community to practice honorable and ethical behavior both inside and outside the classroom. Any actions that might unfairly improve a student's score on homework or examinations will be considered academic misconduct and will not be tolerated. Examples of academic misconduct include (but are not limited to):

- Sharing results or other information during quizzes, projects or examination.
- Working on an assignment before or after the official time allowed.
- Requesting a regrade of answers or work that has been altered.
- Submitting work that is not your own.
- Representing as your own work anything that is the result of the work of someone or some thing else (e.g., AI). This includes solutions obtained via solution manuals, the Internet, AI applications and/or other services.

At the professor's discretion, academic misconduct on an assignment or examination/report will result in a reduced score, a zero score, or a failing grade for the course. All occurrences of academic misconduct will be reported to the Vice President for Student Affairs and copied to the SE Department Head. If there is any question as to whether a given action might be construed as academic misconduct, please see the professor before you engage in any such action. For more information, please see CSU's page on Practicing Academic Integrity.* For information on the Honor Pledge, see the Honor Pledge.†

*<http://learning.colostate.edu/integrity/>

†<http://tilt.colostate.edu/integrity/honorpledge/>

Sexual Harassment-Free Environment

Colorado State University strives to create and maintain a work and study environment that is fair, humane, and responsible so that each member of the University community is treated with dignity and rewarded for such relevant considerations as ability and performance. Abusive treatment of individuals on a personal or stereotyped basis is contrary to the concepts of academic freedom and equal opportunity. Sexual harassment is one form of such abuse and cannot be tolerated.

For more information, please see the CSU Office of Equal Opportunity's Sexual Harassment Policy[‡] and Principles of Community[§].

COVID-19 University Policy

We will follow all guidance by the University regarding implementation of COVID-19 policies and safeguards, which may change from time to time. For the latest information about the University's COVID resources and information, visit the CSU COVID-19 site: <https://covid.colostate.edu/>.

Additional Resources and Policies

For additional information on university resources and policies, see the "Resources and Policies" document posted under Canvas > Modules > Organizational.

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[‡]<http://oeo.colostate.edu/sexual-harassment-policy>

[§]<http://oeo.colostate.edu/colorado-state-university-principles-of-community/>