NE529 – Risk Assessment
University of Idaho · Idaho Falls Center for Higher Education
Nuclear Engineering & Industrial Management

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1 Objective

Provide an understanding of risk assessment and related techniques for contemporary engineering problems.

2 Content

This course is designed to provide students with an understanding of how to perform a comprehensive risk assessment applicable to a wide variety of engineering problems in many different disciplines. The course will focus on failure mode and effect analysis, fault tree analysis, probabilistic risk analysis, and human reliability analysis. The course will also cover fundamental probability and statistics in terms of frequency analysis.

3 Learning Outcomes

In this course, students will –

- Implement various risk assessment tools to analyze risks of engineering systems.
- Generate risk mitigation strategies.
- Interpret the social, political, and technical issues surrounding risk perception and communication.

4 Delivery

Class will be in person each week. Assignments will typically be due at the next class period but will be stipulated. Submission will be through email for the time being until the course is transferred to Canvas. All materials will be stored on piazza currently until the course is transferred to Canvas. Students are expected to check the course site periodically for any updates, news, and discussions.

5 Literature

Lecture material has been compiled from the literature and research body of the field. The listed textbooks are only for reference. There are two online 'textbooks' stored on the University site – Principles of Nuclear Engineering and Risk Assessment. Each of these contain open source literature and lecture content to supplement the nuclear engineering curriculum and are free to use. Additional course literature will be available on piazza.

(1) Risk assessment: Tools, techniques, and their applications, 2nd ed. Lee T. Ostrom, Cheryl A. Wilhelmsen, 978-1119483465 (2019).

(2) Risk Assessment in the Federal Government: Managing the Process. National Research Council, 0-309-59880-X (1983).

(3) Guidelines for Hazard Evaluation Procedures, 3rd Edition. Center for Chemical Process Safety, 978-0-471-97815-2 (2008).

6 Artificial Intelligence

AI can offer some assistance in terms of literature searches, coding, or other lower level tasks. AI should not be used as a component in the research and writing process. AI should also not be used for technical work assigned in the homework projects. Unauthorized use of AI will be considered a violation of academic integrity as stipulated in the Code of Student Conduct.

7 Communications

Piazza will be used for now for regular questions and discussions related to the course. Personal issues can be discussed over email. Meetings can also be made by appointment.

8 Professionalism

Review the Code of Student Conduct pertaining to cheating and plagiarism. Realistically, professional engineering work is team-oriented. While it is ok to work in groups, students will submit their own original work for the course.

9 Civility

Conversation and dialogue about the course both online and in person is encouraged. Everyone in this course will be treated with mutual respect and civility. The instructor will moderate all discussion and make the final decision on any contentious content. Additional resources to request support include –

- Office of the Dean of Students
- Counseling & Testing Center
- Office of Equity and Diversity
- Office of Civil Rights and Investigations

10 Respect for Diversity

The diversity that students bring to this class is a resource, strength, and benefit. Course materials and related content have been curated to be respectful of gender, sexual orientation, disability, age, socioeconomic status, ethnicity, race, culture, perspective, and other background characteristics. Any suggestions to improve the value of diversity in this course are encouraged and appreciated.

11 Disability Access and Reasonable Accommodations

The University of Idaho is committed to ensuring an accessible learning environment where course or instructional content are usable by all students and faculty. If you believe that you require disability-related academic adjustments for this class (including pregnancy-related disabilities), please contact Center for Disability Access and Resources (CDAR) to discuss eligibility. A current accommodation letter from CDAR is required before any modifications, above and beyond what is otherwise available for all other students in this class will be provided. Please be advised that disability-related academic adjustments are not retroactive. For a complete listing of services and current business hours visit the Center for Disability Access and Resources.

12 Prerequisites

There are no course requirements needed to take this course. However, students should have facility in the typical skills acquired in any accredited undergraduate engineering or technology curriculum –

- Chemistry
- Physics
- Calculus
- Differential equations
- Linear algebra
- Engineering mathematics
- Technical writing
- Statistics

Additional recommended skills include –

- Command line
- Python
- Matlab or equivalent
- Scientific and engineering graphing skills
- LaTex (templates provided)

13 Assignments & grading

Homework – 0.50

Project report – 0.48

Project presentation – 0.02