

Syllabus - Spring 2018

The information on this syllabus may change. For the most up-to-date syllabus, check this site on the related day of classes. This course is about the systematic approach to the management of risk as applied to engineering, operations, and management decisions. The course includes: Application of probabilistic risk analysis to business investments, engineering systems, critical infrastructure, defense and security, and health systems.

Program Information

This is a two-credit undergraduate level elective course.

Course and Instructor Information

Course name: Risk Analysis and Management
Credits: 2
Instructor: Sukran Seker, PhD
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Textbook: Instructor's lecture notes, Reliability Engineering and Risk Analysis: Assessing Uncertainties beyond Expected Values and Probabilities, 1999 (Mohammad Modarres, Mark Kaminskiy, Vasiliy Krivtsov). Risk Analysis, T. Aven, Wiley, 2008.

Course Objectives

The course aims to teach general risk management principles. Also, the course presents and interprets some of the many frameworks helpful for balancing risks and benefits in these situations that typically involve probability, subjective probability assessment, analysis, and prioritization of risks covering the principles and applications of risk assessment and management in the context of engineering management, systems engineering and human factor engineering. The goal of the course is to engage students in active discovery of risk assessment and management concepts and tools.

Course Outline

Week	Lecture/Seminar Topic	Hour
1,2	1. Risk Planning, Assessment and Management Process and the Systems Approach: What is uncertainty? The meaning of uncertainty, different types of uncertainty, basics of risk management, 2. Risk management strategies: risk avoidance, mitigation, transfer and acceptance; applications.	2+2= 4
3	Probabilistic Risk Assessment: Dealing with Uncertainty, Elements of probability, Expected NPV values of projects.	2
4,5	Risk Analysis and Project Evaluation: Scenario Analysis, Sensitivity Analysis, Calculating the Cash Break-Even Point, Degree of Operating Leverage (DOL).	2+2= 4
6	Measuring attitudes toward risk: Expected Utility. Operational risk management (ORM) components: Project Risk Management.	2
7	Cost Benefit Analysis (CBA) including uncertainty. Applications of CBA.	2
8	Risk Analysis using Simulation	2
9	Mid-Term Exam 1	
10	Human Factors, Ergonomics, and Safety: Hazard identification and risk assessment	2
11,12	Applications of Safety Analysis Methods	2+2= 4
13	Mid-Term Exam 2	
14	Group presentation	2
15	Group presentation	2

Assignments:

A team, which consist of 3 or 4 students, will discuss articles related to risk analysis and management implementations (selected from a presented list of articles (students should present) from established international journals). This project will be due to the end of the semester. An oral class presentation is required. The project should be in both electronic and hard copy format.

Grading:

Midterm: 45%

Final: 40%

Assignment: 15%