SoTeRiA
Socio-Technical Risk Analysis

NPRE 498:
PROBABILISTIC RISK ASSESSMENT

CREDIT
3 undergraduate hours / 4 graduate hours

PREREQUISITES
Junior, senior, or graduate standing in any engineering discipline, or consent of instructor
(This course is a prerequisite for a 500-level advanced risk analysis course that is offered every Fall)

INTRODUCTION
This course surveys multidisciplinary issues of risk, safety, and reliability of complex systems. It encompasses state-of-the-art methodologies in Probabilistic Risk Assessment. Topics include:

- Probability and Statistics for Risk Analysis
- Safety and Reliability Modeling
- Systematic Risk Scenario Modeling
- Availability Modeling for Repairable Systems
- Bayesian Updating
- Uncertainty propagation

- Human Error Modeling in Risk Analysis
- Failure Causal Modeling
- Risk Importance Ranking
- Data Analytics
- Probabilistic Physics of Failure
- Risk-Informed Decision Making & Regulation

*Software codes for risk analysis, uncertainty treatment, and Bayesian analysis will be utilized.

MEETING SCHEDULE & LOCATION
Tu. and Th. 12:30 - 1:50pm; Spring 2016
106B6 Engineering Hall

GRADING
- Undergraduate: Homework (45%), Midterm exam (15%,), Final exam (40%), Term Project (optional; for extra credit).
- Graduate: Homework (35%), Midterm exam (15%), Final exam (35%), Term project (15%).

READING MATERIALS
- Mohammad Modarres, Mark Kaminskiy, and Vasiliy Krivtsov, "Reliability Engineering and Risk Analysis-A Practical Guide (2nd edition)", CRC Press Taylor & Francis Group, 2010.
- A set of notes, slides, reports, and articles

INSTRUCTOR BIO: Zahra Mohaghegh is currently an Assistant Professor in the Department of Nuclear, Plasma, and Radiological Engineering (NPRE) and an affiliate to the Department of Industrial and Enterprise Systems Engineering, Beckman Institute for Advanced Science and Technology, Graduate School of Library and Information Science, and Illinois Informatics Institute at the University of Illinois at Urbana-Champaign. She is a recipient of the five-year NSF Grant for Big Data Analytics in risk assessment, the 2015 Dean's Award for Excellence in Research from the College of Engineering, the George Apostolakis early-career award in risk assessment, and the Zonta International Award for her contribution to modeling large-scale complex systems. Professor Mohaghegh is the director of the Socio-Technical Risk Analysis (SoTeRiA) laboratory (http://soteria.npre.illinois.edu) at UIUC.

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