Mechanical Engineering Dept. Department

Syllabus
ME 461: Risk Mgt Tool in Sys Dsgn & Op (3-0-3)

Course Catalog Description:

The assessment and management of risk, uncertainty, and reliability are critical to the success of any engineering venture today, this course deals with understanding, theory and methodology and tools in assessment and management of risk, uncertainty, and reliability in engineering systems and enterprises. Quantification of Risk and its Impact. Applications will be explored through case studies in some of the following area; environmental, water resources and technology management, clean energy, safety-critical systems, and reliability modeling of multiple failure modes in complex systems. Risk Assessment and management in systems operation.

Course Objectives:

1. Risk Assessment
2. Risk Managment
3. Risk communication
4. Decision making

Course Learning Outcomes:

CLO1. Understand causal inferences and explanatory models in risk assessment

CLO2. Evaluate subjectivity in risk assessment applications

CLO3. Understand the basics of probability

CLO4. Apply the Bayes theorem and conditional probability in risk assessment

CLO5. Analyze the different distribution function and their applications in industrial risks

Learning Resources:

- Norman Fenton and Martin Neil, Risk Assessment and Decision Analysis with Bayesian Networks, CRC Press, 2012.
- Charles E. Ebling, An Introduction to Reliability and Maintainability Engineering, 2nd ed., Waveland Press, Inc., 2010. M. Modarres, Risk Analysis in Engineering, Taylor & Francis, 2006. Judea Pearl, The Book of Why: The New Science of Cause and Effect.

Lecture Assessment Plan:

Assessment Task	Week Due	Weight
Term Paper/Project	13	10.0%
Final Exam	15	30.0%
HWs	3,7,9,11,13	10.0%
Quizzes	3,7,9,11,13	10.0%
Mid-term exam	9	30.0%
in-class participation	Every week	5.0%
Attendance	Every week	5.0%

Lecture Weekly Schedule:

Week#	Topics
1	3
2	3 (Continue)
3	3 (Continue)
4	3 (Continue)
5	3 (Continue)
6	3 (Continue)
7	3 (Continue)
8	3 (Continue)
9	3 (Continue)
10	3 (Continue)
11	3 (Continue)
12	3 (Continue)
13	3 (Continue)
14	3 (Continue)
15	3 (Continue)