ME/NRE 4803 Probabilistic Risk Assessment
Spring 2012, M-W 4:05-5:25pm

WHY? Probabilistic risk assessment (PRA) is a systematic method to estimate risks associated with complex engineering systems to ensure their safety. The PRA technique quantifies risk and identifies the most significant components for system safety. It is critical to understand the basics of PRA to satisfy the demand of a complex engineered technological entity, i.e., nuclear power plant, airliner, etc.

THE COURSE. The main purpose of the proposed course is to provide a comprehensive introduction to PRA. As shown in Table 1, this course reviews fundamental concepts and practical aspects of core PRA techniques including basic probabilistic descriptions, sampling methods, fault/event tree analysis, risk management, and nuclear safety. In this course, students will spend much of the class time concentrating on fundamentals, but everyone should be able to develop a good grasp on the underlying ideas and methods for PRA.

Table 1. ME/NRE4803 Probabilistic Risk Assessment

Catalog Description	Introduction to fundamental methods in probabilistic risk assessments. Topics covered are probabilistic description, sampling methods, risk assessment, and nuclear power plant safety.
Prerequisites	Math 3770 or ISyE3770
Textbook	None, Lecture slides will be provided on T-square (www.t-square.gatech.edu)
Reference	Modarres, M., Risk Analysis in Engineering: Techniques, Tools, and Trends, CRC Press Ang, and Tang, Probability Concepts in Engineering Planning and Design, Wiley Choi, Grandhi, and Canfield, *Reliability-based Structural Design*, Springer, London, 2007.
Goals	To provide knowledge about risk assessment techniques and to enhance engineers and scientists' skills in the state-of-the art commercial software.
Topics Covered	1. Basic probabilistic descriptions 2. Sampling methods 3. Failure modes 4. Elements of risk assessment 5. Probabilistic risk assessment (Levels I, II, and III) 6. Fault tree / event tree analysis 7. Bayesian belief networks 8. Regulation and risk management 9. Risk-informed Decision Making 10. Fundamental concept of nuclear safety 11. Reactor safety studies and accidents
Grading	Homework 30% Tests 70%

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