Course Name:

Fundamentals of Risk Management

Course Number: 20-501	**Credit:** 3
Program: Undergraduate	**Course Type:** Technical elective
Prerequisite: Engineering Probability and Statistics	**Corequisite:** -

Course Description (Objectives):
This course examines the importance of system reliability in uncertain conditions and risk management. Also, issues such as assessing risk in decision making, modeling engineering problems, simulation and cost-benefit evaluation of options are discussed.

Course Content (outline):

- Introduction and background
    - Basic Probability Concepts
    - Uncertainty Modeling
    - Probability Distributions
    - Random Sampling and Simulation
- Statistical Analysis
    - Distribution Selection and Goodness of Fit
    - Parameter Estimation
    - Sampling Uncertainty
- Simulation and Analytical Methods for Analytical Reliability Analysis
    - Reliability Index and Failure Probability
    - Limit State Functions and Solving Methods
- Survival Analysis
    - Failure and Hazard Rate
    - Mean Time to Failure
- Decision Analysis
    - Fault Tree Analysis
    - Importance Measures
    - Event Tree Analysis
- Life Cycle Management
    - Risk Analysis Methods
    - Cost-Benefit Analysis

References:

- Casella, G., and R.L Berger (2001) Statistical Inference, 2nd Edition, Duxbury Press.
- Smith, D.j. (2001) Reliability, Maintainability and Risk: Practical Methods for Engineers, 6th Edition. Butterworth-Heinemann Ltd. Oxford.
- Rausand, M., and A. Holyland (2004) System Reliability Theory: Models, Statistical Methods, and Applications, 2nd Edition. Wiley-Blackwell, New Jersey.
- Henley, E.J., and H. Kumamoto (1981) Reliability Engineering and Risk Assessment. Prentice-Hall, New Jersey.

Department of Civil Engineering