CE541 STRUCTURAL RELIABILITY

2025-2026 Spring Semester

Course description: This course aims to present theoretical and design developments in the growing field of structural reliability. Fundamental concepts related to structural reliability, safety measures, load model, resistance models, system reliability, optimum safety levels, and optimization of design codes.

Grading:

Homework	: 10%
Term Project	: 20%
Paper Review	: 5%
Midterm	: 25%
Final	: 40%

Recommended References:

Nowak, A.S., Collins, K.R., *Reliability of Structures*, McGraw Hill, 2000.

Melchers, R.E., *Structural Reliability Analysis and Prediction*, 2nd ed. J. Wiley & Sons, 1999.

Ditlevsen, O., Madsen, H.O. Structural Reliability Methods, J. Wiley & Sons, 1996

Tentative Schedule

1. INTRODUCTION TO STRUCTURAL RELIABILTY CONCEPT
2. PROBABILITY THEORY
3. APPLICATIONS OF BAYES THEORY
4. RELIABILITY FORMULATIONS
5. SECOND MOMENT CONCEPTS
6. EXACT RELIABILITY FORMULATIONS
7. MONTE CARLO SIMULATION
8. MIDTERM
9. SYSTEM RELIABILITY
10. SPECIFICATION DEVELOPMENT
    a. LRFD PHILOSOPHY
    b. LOAD MODELS
    c. RESISTANCE MODELS
11. SPECIFICATION DEVEOLOPMENT (cnt'd)
    d. CODE CALIBRATION
12. RELIABILITY OF EXISTING STRUCTURES
13. RELIABILITY BASED DECISION ANALYSIS
14. RELIABILITY BASED OPTIMIZATION (RBO)
15. FINAL