Reliability in Mechanical Design

Fall 2007

Course Instructor :

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Office Hour : 10:00 am - noon, Wednesdays, or by appointments

Course Information :

Days and Hours : 10:10am-11:00 am, Tuesdays ; 8:10-10:00 am, Wednesdays

Classroom : Room #804, ME building

Textbook : course slides and handouts

Webpage : http://iteach.ncku.edu.tw (需登入，確認已將此課程加入，並設定常用Email帳號)

Reference :

"*Probability, Reliability, and Statistical Methods in Engineering Design*"

by A. Haldar and S. Mahadevan, John Wiley & Sons, 2000, ISBM:0-471-33119-8

Credit : 3

Grades (100%) :

Homework[1]	30%
Project Report	25%
Attendance and Participation	15%
Midterm Exam #1	15%
Midterm Exam #2	15%

Course Mission :

Develop fundamental reliability backgrounds for mechanical engineers. Students are expected to have basic knowledge about probability and statistics including set theory prior to this class.

Course Objectives :

- Provide examples to show the significance of reliability in engineering applications
- Review fundamental probability theory and statistics
- Compare various uncertainty models
- Understand some commonly used probability distributions and their physical meanings
- Determine distributions and parameters from observed data
- Determine reliability of serial and parallel systems
- Introduce various reliability analysis techniques
- Advanced topics : system reliability, variance reduction techniques, design for six sigma

Projects :

A project will be assigned early in the semester that will investigate a specific topic related to this course. The project is intended for public utilization and be made public in an appropriate form. Projects will be graded regarding their potential for impacting research and education in reliability. Some possible topics will be suggested early in the semester.

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[1] Homework Policy : Due on Wednesdays. Past-due homework is discounted 20% per day

Class Schedules : (updated 8/28/2007)

* Holiday

Wk.	Dates Tue.	Wed.	Lecture	Homework	Project
1	9/18	9/19	Syllabus, Introductory Examples		
2	9/25*	9/26	Design Examples		Select Topic
3	10/2	**10/3**	Fundamental Probability and Statistics	**HW #1 Due**	Project Meeting
4	10/9	10/10*	Models of Uncertainty : Interval and Fuzzy		
5	10/16	**10/17**	Models of Uncertainty : Fuzzy and Probability	**HW #2 Due**	**Project Proposal**
6	10/23	**10/24**	Review: Stat., Prob., and Uncertainty Models **Midterm #1 (10/24)**		
7	10/30	10/31	Probability Distributions		Project meeting
8	11/6	11/7	Determine Distributions from Data		
9	11/13	**11/14**	Determine Distributions from Data	**HW #3 Due**	
10	11/20	11/21	System Reliability		
11	11/27	**11/28**	Reliability Allocation		**Progress Report**
12	12/4	**12/5**	Strength and Stress	**HW #4 Due**	
13	12/11	**12/12**	Review Distributions and System Reliability **Midterm #2 (12/12)**		
14	12/18	12/19	Reliability Analysis : Sampling Techniques		Project meeting
15	12/25	12/26	Reliability Analysis : FOSM, FORM		
16	1/1*	**1/2**	Advanced Reliability Analysis	**HW #5 Due**	
17	1/8	**1/9**	Advanced Reliability Analysis	**HW #6 Due**	
18	1/15	**1/16**	Project Presentation		**Final Report**