Mechanical Engineering Dept. Department

Syllabus
ME 462: Products & Systems Reliability (3-0-3)

Course Catalog Description:

Fundamentals of probability theory. Reliability in Design- Probabilistic models of load (stress) and resistance (strength) variables. Stress-strength interference models in probabilistic design. Monte Carlo simulation. Hazard functions and reliability models for random and wear-out failures. Hazard plotting and reliability estimation. System reliability – series, parallel, and n out of k and series-parallel systems, Failure rate endurance testing, and failure data analysis. Accelerated life testing. Reliability in systems operation: availability, spare parts computation, and maintenance strategies. Use of Excel and other reliability software in reliability analysis and predictions.

Course Pre-requisites:

- ME 307: Machine Design I

Course Objectives:

1. To give the students basic ideas about theory and practice of reliability engineering
2. To introduce reliability data analysis using spreadsheets, such as Excel.
3. To cover various applications of reliability in design, systems analysis, and manitenance

Course Learning Outcomes:

CLO1. Understand the terminology of reliability and will gain the knowledge of probability and statistics in theory and practice of reliability engineering.

CLO2. Apply the knowledge of probability and statistics by recognizing, formulating and solving reliability problems.

CLO3. Perform data analysis using spreadsheets, such as Excel, and interpret the data and results by the used of statistics.

CLO4. Learn about systems and sub-systems reliability and their interrelations, estimate system reliability, and design a system to meet a reliability target.

CLO5. Work and write reports and term papers together as team members and communicate more efficiently, through oral/poster presentations.

CLO6. Understand professional responsibility through data collection procedures, review of reliability issues, and public relations and contemporary issues associated with them.

Learning Resources:

- Singiresu S. Rao, Reliability Engineering, , 1st edition, Pearson, 2016
- Elmer E. Lewis, Introduction to Reliability Engineering, 2nd Edition, John Wiley & Sons, Inc., 1996
- Patrick D. T. O'Connor and Andre Kleyner, Practical Reliability Engineering, John Wiley & Sons, Ltd., 5th Edition, 2013

Lecture Assessment Plan:

Assessment Task	Week Due	Weight
Major Exam - 2	11	20.0%
Term Project	14	10.0%
Final Exam	15	30.0%
Quizzes	3,7,9,11,13	10.0%
HW	3,7,9,11,13	10.0%
Major Exam - 1	6	20.0%

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)