<table>
<thead>
<tr>
<th>Instructor</th>
<th>Dr. Francisco Oswaldo Aguirre</th>
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</thead>
<tbody>
<tr>
<td>Course Title:</td>
<td>Reliability &amp; Maintainability (3 Credits)</td>
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<tr>
<td>Course Location:</td>
<td>Education Building 318</td>
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<td>Tuesday 6:00 pm – 8:50 pm</td>
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<tr>
<td>Office Location</td>
<td>E-226C</td>
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<td>Tuesday 5:00 pm – 6:00 pm</td>
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<td>Course Description</td>
<td>This course will introduce the basic reliability &amp; maintainability definitions, applications and benefits. This course will include reliability, redundancy, maintainability, availability analysis and modeling, life testing, acceleration, parametric and non-parametric models</td>
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| Class Objectives   | • To become familiar with the major concepts of reliability, maintainability  
|                    | • To develop skills for identifying; formulating, solving, and interpreting appropriate reliability models  
|                    | • To understand how the mathematical concepts are applied in the real-world and to learn to effectively use computing software to solve more complicated reliability problems such as they arise in the real world.  
|                    | • To become a more independent learner and logical thinker. |
| Text Book          | An Introduction to Reliability and Maintainability Engineering By Charles E. Ebeling Second Edition |
| Other references   | • Introduction to reliability engineering 2d Edition by E.E Lewis, Wiley  
|                    | • Reliability: probabilistic Models and statistical Methods, 2d edition by Lawrence M. Leemis  
|                    | • Reliability Engineering by Elsayed A., Wesley |
| Late Work Policy   | Late homework or reports will not be accepted, unless certified medical proof is given. If you are unable to attend the class at which the homework is due, it is your responsibility to submit it earlier. |
| Course Assignments: | **Homework:** There will be approximately 8 homework assignments during the course. Assignments will be posted on the course website. No late homework will be accepted. Your homework should show all necessary work you used to solve problems.  
**Paper presentation:** Groups of 2-3 persons will perform a 10 minutes presentation. The Presentation will be about a journal paper related to the course. The paper can be selected for the student or be assigned by the instructor.  
**Final Project:** Groups of 3-4 persons. There are different type of project to choose from:  
- Apply the topics explained in class into real problem.  
- Explain at least three papers related to the class  
- Model and programs a software that solve some of the problems presented in class |
| --- | --- |
| Evaluation | There will be two midterm exams and one final exam. No books, notes, will be allowed. No make-up/alternate exam will be given.  
**Midterm 1**  
**Midterm 2**  
**Midterm 3** |
| Evaluation Criteria | **Homework:** 10%  
**Paper Presentation:** 10%  
**Midterms:** 60% (20% per exam)  
**Final Project:** 20% |
Course Schedule:

Chapter 1:
Introduction
Brief History
Applications

Chapter 2
The reliability Function
Mean Time to failure
Hazard Rate Function
Bathtub Curve
Conditional Reliability

Chapter 3
The Exponential Reliability Function
Failure Modes
Applications
The Two-Parameter Exponential Distribution
Redundancy and CFR Model

Chapter 4
The Weibull Distribution
The Normal Distribution
The Gama Distribution

Chapter 5
Serial Configuration
Parallel Configuration
Combined Series-Parallel Systems
Minimal Cuts and Minimal Paths

Chapter 6
Markov Analysis
Load-Sharing System
Standby Systems
Degraded Systems

Chapter 9
Repair time distribution
System repair time
State-dependent systems with repair

Chapter 11
Exponential Availability
System Availability
Repair and availability Model

Chapter 13
Reliability Testing
Burn-In testing
Accelerating Life Testing