ISyE 4803
Reliability Engineering

Course Time: T/Th @ 4:30 to 5:45 pm
Location: Boggs B5
Instructor: Nagi Gebraeel
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Prerequisite: Basic understanding of Probability and Statistics (ISyE 2027/2028, ISyE 3770, or equivalent). Basic understanding of Stochastic Processes (ISyE 3232 or equivalent).

Description: This course covers major topics in Reliability Engineering and is designed for qualified senior undergraduates, and graduate students who are interested in learning about Reliability. Reliability is important because it helps us assess whether or not a product will function properly. It also helps us understand the uncertainties associated with product failures.

This course will focus on several key topics. Students will start by understanding what we mean by reliability and the metrics that are used to quantify the reliability of a single component. Next, students will learn how to evaluate the reliability of a system of components. Specifically, students will learn about how components are configured within a system and how this configuration affects the overall reliability of the system. Building reliability models requires data and this data can be acquired during reliability tests. In this part of the course, students will focus on analysis of failure data and how to estimate reliability models. This will be followed by exposing students to different types of reliability testing strategies. Students will also learn about the topic of Maintainability and its relationship to reliability. Finally, students will be exposed to basics of sensor monitoring, diagnostics, and prognostics

Class Textbook: "An Introduction to Reliability and Maintainability Engineering", Charles E. Ebeling, Second Edition.

References: "Reliability Engineering", Elsayed Elsayed,
"Statistical Methods for Reliability Data", William Q. Meeker and Luis A. Escobar

Topics:

1- Review of Probability Concepts
2- Basic Reliability Concepts
3- Failure Models.
4- System Reliability
5- State-Dependent Systems
6- Physical Reliability Models
7- Analysis of Failure Data
8- Reliability Testing
9- Maintenance Management
10- System Availability

Grading:

Assignments	25%
Midterm I	35%
Final Exam	35%
Class Participation	5%

Course Outcomes and their relationships to ISyE Program Outcomes
Once completed, students will be able to perform the following tasks:

- Assess and evaluate component reliability and hazard functions

- Assess and evaluate system reliability

- Design and calculate the reliability of state-dependent systems

- Use physical models to calculate reliability

- Define preventive and predictive maintenance models

- Calculate component/system availability

- Analyze failure data and estimate reliability models.

- Conduct statistical data analysis on complete as well as censored failure data.

- Design suitable reliability testing plans for different products and failure scenarios

Honor Code: Students are reminded of the Georgia Tech Honor Code. Please see http://www.honor.gatech.edu. Any act of dishonesty will result in a Fail Grade.

Students with Disabilities: Georgia Tech offers accommodations to students with disabilities. If you need a classroom accommodation, please make an appointment with the *ADAPTS* office (see http://www.adapts.gatech.edu).