

Introduction



Reliability and Maintenance Engineering, IE - 438

Introduction

Instructor

Dr. Emad Abouel Nasr- Assocaite Professor KSU – IE

Course Description

Lecturing Style

Three-section lecture

Dynamic Interaction

Computer Examples

What is Maintenance Engineering?

Course Description



Introduction

Course Description

What is Maintenance Engineering?

The course provides..

Introduction to maintenance function and types of maintenance, introduction to the concept of reliability, failure distributions, reliability characteristics, estimation of system reliability both for the independent and dependent cases, maintenance workload analysis and calculations; capacity planning of maintenance resources; maintenance work scheduling; maintenance audit and the measurement of maintenance work performance; and finally the computerized maintenance management systems (CMMS).

Objective

The objective of the course is to provide the students with the fundamental concepts, the necessary knowledge and the basic skills related to system reliability and systems maintenance functions. The course intends to expose the students to the concept of reliability and to help them learn the techniques of estimating reliability and related characteristics of components/ systems. Moreover, it exposes them to the necessary engineering techniques used for analyzing, planning and controlling maintenance systems

Course Description



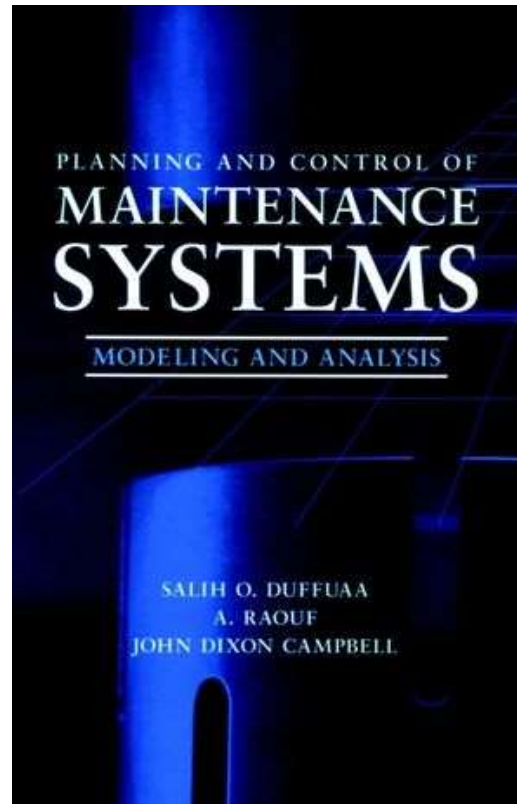
Introduction

Course
Description

What is
Maintenance
Engineering?

Textbook

“Planning and Control of Maintenance Systems: Modeling and Analysis”, Duffuaa, S.; Raouf, A; and Campbell, J. 1999. Publisher: John Wiley & Sons.



Course Topics

1. Maintenance Function and Objectives
2. Types of Maintenance
3. Introduction to the Concept of Reliability
4. Failure Distributions
5. Constant Failure Rate Model
6. Time-Dependent Failure Models
7. Systems Reliability
8. Systems Maintainability
9. Maintenance Workload Analysis
10. Maintenance Resources Planning
11. Maintenance Work Scheduling
12. Maintenance Performance Measures
13. Computerized Maintenance Management System (CMMS)

Introduction

**Course
Description**

What is
Maintenance
Engineering?

Course Description



ABET Outcomes Explained

Introduction

Course Description

What is Maintenance Engineering?

- a Ability to apply knowledge of mathematics, statistics, basic sciences, and engineering to work professionally in industrial systems.
- c Ability to identify design problems, to design a system, component or process to meet desired needs that may include issues related to manufacturability, reliability, quality, environment, health and safety, ethics and society.
- g Ability to effectively communicate orally and in writing.
- k Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.



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Course Description

What is Maintenance Engineering?

Learning outcomes

1. Understand the maintenance function and its objectives and know how to prepare report about the maintenance function **[a]** (First Subject)
2. Gain the necessary knowledge about the types of maintenance and know how to use them when design maintenance systems **[a]** (First Subject)
3. Gain the necessary knowledge about failure distributions and apply failure analysis techniques **[a, k]** (Second Subject)
4. Estimate components reliability both for the independent & dependent cases as well as related characteristics **[k]** (Second Subject)
5. Estimate systems reliability both for the independent & dependent cases as well as related characteristics and design systems for better reliability **[c, k]** (Third Subject)



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Course Description

What is Maintenance Engineering?

Learning outcomes

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6. Estimate systems maintainability as well as related characteristics and design systems for better maintainability **[c, k]** (Fourth Subject)
 7. Understand and apply different methods of maintenance workload analysis **[k]** (Fifth Subject)
 8. Gain the necessary knowledge about the maintenance resources planning and apply various planning techniques **[a, k]** (Fifth Subject)
 9. Know different ways for scheduling maintenance works and know how to use them **[k]** (Sixth Subject)
 10. Gain the necessary knowledge about maintenance performance measures and apply various maintenance performance techniques **[k]** (Seventh Subject)
 11. Understand the computerized maintenance management systems and learn how to use MAXIMO Software by conducting term project **[g, k]** (MAXIMO)



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What is
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Grades

- 15% First Term Exam
- 15% Second Term Exam
- 20% Maintenance Lab +Project
- 50% Final Exam

Lab & Term project

Experiments in the maintenance lab and group projects on real life maintenance system - Students are asked to use the MAXIMO software in their projects.



Introduction

Computer Packages

MS Excel



**Course
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Minitab

<http://www.minitab.com>



What is
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Maximo

<http://www-01.ibm.com/software/tivoli/products/maximo-asset-mgmt/>

What is Maintenance Engineering?



Introduction

Maintenance Engineering

Maintenance Engineering is the discipline and profession of applying engineering concepts to the optimization of equipment, procedures, and departmental budgets to achieve better maintainability, reliability, and availability of equipment

Course Description

A Maintenance Engineer should possess significant knowledge of:

- Statistics
- Probability
- Logistics
- Skill to operate the equipment and machinery

What is Maintenance Engineering?

What is Maintenance Engineering?



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What is
Maintenance
Engineering?

Maintenance

Maintenance is a set of organised activities that are carried out in order to keep an item in its best operational condition with minimum cost acquired. It can also be defined as the combination of all technical and administrative actions, including supervision actions, intended to retain an item in, or restore it to, a state in which it can perform a required function

Maintenance Management

All the activities of the management that determine the maintenance objectives or priorities (defined as targets assigned and accepted by the management and maintenance department), strategies (defined as a management method in order to achieve maintenance objectives), and responsibilities and implement them by means such as maintenance planning, maintenance control and supervision, and several improving methods including economical aspects in the organization.

What is Maintenance Engineering?



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