

Course Specification

Vibration analysis & Predictive Maintenance

Course Specifications

Program(s) in which the course is given: Industrial Engineering
Major or minor element of programs: N/A
Department offering the program: Industrial Engineering
Department offering the course: Mechanical Engineering
Academic year / Level: 2009/2010 / Leve2

Date of specification approval:

A- Basic Information

Title: Vibration analysis & Predictive Maintenance Code: MDP 208

Credit Hours:

Lecture: 2
Exercises: 2
Total: 4 contacts 3 Credits

B- Professional Information

1- Overall aims of the course

This course aims to deepen the concepts of vibration analysis. It presents a comprehensive treatment of the analysis and design of predictive maintenance based on the vibration of the machine.

2- Intended learning outcomes of the course (ILOs)

a. Knowledge and understanding

By the end of this course the student should be able to

- Understand the requirements of vibration system
- Design a strategy of predictive maintenance based on vibration analysis.
- diagnose the failure based on vibration analysis.

b. Intellectual skills

Analysis Creative thinking Problem solving

c. Professional and practical skills

Managing Engineering design
 Computer program Ability to diagnose
 Ability to identify the problem
 Ability to estimate cost Other

d. General and transferable skills

Computing Communication
 Management Working in group
 Use of technological tools

3- Contents

Topic	No. of hours	Lecture	Tutorial/ Practical
Types of vibration – Source of vibration	8	4	4
Single degree of freedom system	8	4	4
Two degree of freedom system	8	4	4
Dynamic unbalance – Multi degree of freedom system	8	4	4
Introduction to continuous structure vibration	8	4	4
Predictive maintenance based on vibration spectrum analysis	8	4	4
Case studies	16	8	8
Total	60	30	30

4- Teaching and learning methods

- | | |
|---|--|
| <input type="checkbox"/> Information collection | <input checked="" type="checkbox"/> Discussions |
| <input checked="" type="checkbox"/> Research assignment | <input type="checkbox"/> Field visit |
| <input checked="" type="checkbox"/> Lecture | <input checked="" type="checkbox"/> Practical training / lab |
| <input checked="" type="checkbox"/> Class activities | <input type="checkbox"/> Case study |

5- Student assessment methods

Class attendance and participation
 Homework assignments
 First midterm exam
 Final exam

Assessment schedule

Homework assignments	weeks 3, 5, 7, 9, 11
First midterm exam	week 8
2 th midterm exam	week 12
Final exam	week 15

Weighting of assessments

Final	40 %
7 th week Exam	30 %
12 th week Exam	20 %
Class attendance and participation	5 %
Homework assignments	5 %

6- List of references

6.1 Course notes

6.2 Essential books

- S. Graham Kelly (Introduction to Vibration Analysis) Mc Graw Hill , 2nd edition , 2000
- Beards, C.F., " Engineering Vibration Analysis with Application to Control Systems", 1995
- Paresh Girdhar, "Practical Machinery Vibration Analysis and Predictive Maintenance", Newnes, 2004.

6.3 Recommended books

- Rao, S. S., "Mechanical Vibrations", Addison-Wesley, 2nd edn, 1990.

7- Facilities required for teaching and learning

- Vibration monitoring system and software
- Computer Lab (students have their own laptop)
- Data Show
- Overhead Projector

Course Coordinator: Prof. Dr. Attia Gomaa

Program Coordinator: Prof. Dr. Attia Gomaa

General Supervisor & Vice Dean: Prof. Dr. Abdalh Saad

Date: 01 / 06 / 2010