Course Specifications

University: Benha University Faculty: High Institute of Technology

Course specifications
Programme(s) on which the course is given:
1. Mechanical power engineering,
2. Production Engineering

Major or minor element of programmes: Major
Department offering the programme: Mechanical Engineering
Department offering the course: Mechanical Engineering

Academic year / Level: 2008-2009/Level 3-Semester 2
Date of specification approval: Jun, 2009

A- Basic Information

Title: Measuring Instruments Code: M 352
Credit Hours: Lecture: 2
Tutorial: 1 Practical: 1 Total: 4

B- Professional Information

1 - Overall aims of course
On successful completion of the course student must be able to:

✓ Demonstrate knowledge and understanding of measuring instruments of mechanical engineering parameters.
✓ Knows the concepts and theories of operations of measuring instruments in mechanical engineering.
✓ Demonstrate knowledge and understanding of methodology of analysis of measuring data and how to find error, deviation and uncertainty in measurements.
✓ Getting familiar with the applications in which different instruments suitable to be used.
✓ Getting familiar with the techniques of calibration of measuring instruments.
✓ Know how to write the specification of instruments.
2- Intended learning outcomes of course (ILOs)

a. Knowledge and understanding:
   a.1 Define the different types of instruments that can be used for temperature, pressure, flow, load and level measurements.
   a.2 The techniques and theories of operations of measuring instruments of temperature, pressure, flow, load and level.
   a.3 The applications of the different measuring instruments.
   a.4 Methods of data analysis.
   a.5 The parameters required to specify the different measuring instruments of temperature, pressure, flow, level and force and load.
   a.6 Methods of calibration of measuring instruments.

b. Intellectual skills
   b.1 How to use of measuring instruments in engineering applications.
   b.2 The methodology of analysis of measuring data.
   b.3 How to calibrate measuring instruments.
   b.4 How to select a suitable instruments to fit a certain engineering application.

c- Professional and practical skills
   c.1 Use appropriate measuring instruments for different applications.
   c.2 Use appropriate apparatus for calibrating measuring instruments.
   c.3 Assemble and disassemble the different types of measuring instruments for adjustment and maintenance.

d- General and transferable skills
   d.1 Write work shop training reports in accordance with the scientific guidelines
   d.2 Present and analysis of data on a scientific way
   d.3 Discuss results and obtain conclusions
   d.4 Work successfully as a part of a team
3- Contents

<table>
<thead>
<tr>
<th>Topic</th>
<th>No. of Hours</th>
<th>Lecture</th>
<th>Tutorial/Practical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Sensors and Transducers: Introduction, sensitivity, error, uncertainty.</td>
<td>2</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Statistical treatment of data</td>
<td>2</td>
<td>1</td>
<td>2</td>
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<tr>
<td>Pressure transducers: Introduction, Definition of Pressure, Pressure Gauges.</td>
<td>4</td>
<td>2</td>
<td>4</td>
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<tr>
<td>Load cells and force measurement.</td>
<td>4</td>
<td>2</td>
<td>4</td>
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<tr>
<td>Level measurement: Introduction, Sight-type Instruments, Pressure-type Instruments, Electrical-type Instruments, Sonic-type Instruments, Radiation-type Instruments, Level Switches.</td>
<td>4</td>
<td>2</td>
<td>4</td>
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</tbody>
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4– Teaching and learning methods
   4.1- Lectures
   4.2- Tutorials and discussion sessions
   4.3- Lab
5- Student assessment methods

5.1 Written exams to assess the understanding of mechanics of machines and the ability of the analysis of vibrations systems and balancing of unbalanced mechanical systems.

5.2 Oral Discussions to assess the students ability on discussions on subjects related to the course contents,

5.3 Class work to assess the discussion of the technical reports assignments and measuring the ability of handling and solving mechanics of machines problems.

Assessment schedule

Assessment 1 (Written Exam) Week 5
Assessment 2 (Written Exam) week 10
Assessment 3 (Class Work) weeks 1 to Week 15 (Continuous)
Assessment 4 (Oral Exam) Week 15
Assessment 4 (Final Written Exam) week 16

Weighting of assessments

Assessment 1 (Written Exam) 10 %
Assessment 2 (Written Exam) 10 %
Assessment 3 (Class Work) 15 %
Assessment 4 (Oral Exam) 5 %
Final Written Exam 60 %
Total 100 %

6- List of references

6.1- Course notes
   Lecture notes

6.2- Essential books (text books)

6.3- Recommended books

6.4- Periodicals, Web sites, … etc

7- Facilities required for teaching and learning
Teaching facilities (whiteboard, presentation board, data show)
Measuring Instrumentations Lab

Course coordinator: Dr. Sameh Abd El-Wahed Nada

Head of Department: Dr. Sameh Nada

Date: //