Course Specifications

University: Benha University

Faculty: Benha Faculty of Engineering

Course specifications
Programme(s) on which the course is given: Electrical Engineering technology Dep.
Major or minor element of programmes: Major
Department offering the programme: Electrical Engineering technology Dep.
Department offering the course: Electrical Engineering technology Dep.
Academic year / Level: Second year (first & second semester)
Date of specification approval: 2008

A- Basic Information

Title: Instrumentation
Code: E220
Credit Hours: N.A.
Lecture: 2
Tutorial: -
Practical: 1
Total: 3

B- Professional Information

1 - Overall aims of course

Upon successful completion of this course, the student should be gain the following:

- Knowledge of methods of measurements: direct and indirect measurements,
- Classification of instruments: indicating, permanent magnet, moving coil, moving iron, electrodynamometer and induction instrument. Transient in indicating instruments.
- Measurements of DC, AC power energy, power factor, and r. DC and AC bridges: theory, operation and applications. DC and AC electronic voltmeters. Error in measurements. Introduction to digital instruments.

2- Intended learning outcomes of course (ILOs)

a. Knowledge and understanding:
   a. Mention the different statistics techniques for errors calculation.
   b. Illustrate measurements techniques (analog/digital)
c. List methods for measuring electrical quantities (power, voltage, current, energy, frequency,)
d. Explain the basics of digital instruments

b. Intellectual skills
   a. Assess the theory of operation of different measuring systems.
   b. Suggest alternative methods for measuring electrical quantities.
   c. Suggest alternative methods for measuring non-electrical quantities.

c- Professional and practical skills
   a. Select an appropriate measuring system
   b. Calculate the errors in measured results.

d- General and transferable skills
By the end of this course, the student should be able to:
   d.1 Work cooperatively and effectively in a group
   d.2 Find information independently

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>Error analysis</td>
<td>6</td>
<td>4</td>
<td>-/2</td>
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<tr>
<td>Moving coil instruments</td>
<td>6</td>
<td>4</td>
<td>-/2</td>
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<tr>
<td>Moving iron instruments</td>
<td>6</td>
<td>4</td>
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<tr>
<td>Electrodynamometer</td>
<td>6</td>
<td>4</td>
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<tr>
<td>DC bridges</td>
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<td>4</td>
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<tr>
<td>AC bridges</td>
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<td>4</td>
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<tr>
<td>Measurements of non-electrical quantities,</td>
<td>6</td>
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<td>-/2</td>
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<tr>
<td>and Digital devices</td>
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<tr>
<td>Total</td>
<td>42</td>
<td>28</td>
<td>14</td>
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</table>
4– Teaching and learning methods
   4.1- Lectures
   4.2- Tutorials
   4.3- Practice in Laboratories
   4.4- Internet collected information and Self-study projects

5- Student assessment methods
   5-1 Written exams (Final and Midterm), assignments and quizzes to assess knowledge and understanding, solving problems skills and interpretation capabilities of physical phenomena.
   5-2 Oral exams to assess the abilities of discussing physical concepts
   5-3 Practical exam to assess measuring and professional skills

Assessment schedule
   Quiz 1  .....................Week No.  8
   Midterm .....................Week No.  14
   Quiz 2  .....................Week No.  22
   Oral and Practical exam......Week No.  29
   Final written exam ............Week No.  30

Weighting of assessments
   Mid-term examination  12%
   Final-term examination 40%
   Oral and Practical examination 30%
   Semester work 18%
   Total 100%

6- List of references
   6.1- Corse notes
   6.2- Essential books (text books)
       - Ernest Frank, “Electrical measurement analysis”, TATA McGraw-Hill publishing company LTD
   6.3- Recommended books
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7- Facilities required for teaching and learning
   Lecture rooms – Tutorial section rooms – Experimental Labs - computers – Virtual simulation programs

Course coordinator:

Head of Department: Prof Ghada Amer

Date: