Course Specifications of
Testing and Strength of Materials - C 231

University: Benha  Faculty: Benha Faculty of Engineering

Course specifications
Programme(s) on which the course is given: Structural Engineering & Utilities Engineering
Major or minor element of programmes: N.A.
Department offering the programme: Civil Engineering
Department offering the course: Civil Engineering
Academic year / Level: 2nd year – 1st term
Date of specification approval: / /2009

A- Basic Information
Title: Testing and Strength of Materials  Code: C 231
Credit Hours: N.A.  Lecture: 3
Tutorial: 1  Practical: 1  Total: 5

B- Professional Information

1 - Overall aims of course:
By the end of the course the students will be able to:
- Acquire knowledge and understanding on behavior and mechanical properties of engineering materials under static and impact loads.
- Measure the mechanical properties of engineering materials under static and impact loads.
- Acquire practical skills in the area of engineering materials testing.

2- Intended learning outcomes of course (ILOs)
a. Knowledge and understanding:
   a.1 Define engineering materials, and its types.
   a.2 Explain different types of testing machines and strain gauge devices.
   a.3 List different types of engineering materials properties.
   a.4 Explain mechanical properties and behavior of engineering materials under static and impact loads.
a.5 Draw stress – strain curve of engineering materials under static and impact loads.

a.6 Describe procedures of testing engineering materials.

a.7 Explain different processes of engineering materials failure under static and impact loads.

a.8 List mathematical procedures for properties of engineering materials.

a.9 List quality control procedures and evaluation of engineering materials.

b. Intellectual skills

b.1 Conclude the mechanical properties of engineering materials and factors affecting them.

b.2 Conclude acceptance criteria of engineering materials.

b.3 Apply testing methods to determine mechanical properties of engineering materials.

b.4 Apply quality control procedures.

c- Professional and practical skills

c.1 Perform necessary tests to check the validity of engineering materials.

c.2 Observe, record and analyze data in laboratory.

c.3 Prepare testing reports.

c.4 Decide the acceptance or refusal of engineering materials according to required specification.

d- General and transferable skills

d.1 Present, share and discuss ideas, and communicate with others.

d.2 work in 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 engineering materials.</td>
<td>3</td>
<td>3</td>
<td>-</td>
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<tr>
<td>Testing machines – strain gauge devices.</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Behavior of engineering materials under static tension load.</td>
<td>13</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Behavior of engineering materials under static compression load.</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Behavior of engineering materials under static bending</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Behavior of engineering materials under static shear.</td>
<td>8</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>Behavior of engineering materials under static torsion.</td>
<td>7</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Behavior of engineering materials under impact loads.</td>
<td>10</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Hardness and fatigue of engineering materials.</td>
<td>10</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Creep of metals.</td>
<td>5</td>
<td>3</td>
<td>2</td>
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<tr>
<td><strong>Total</strong></td>
<td><strong>75</strong></td>
<td><strong>45</strong></td>
<td><strong>30</strong></td>
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</tbody>
</table>

4– Teaching and learning methods

4.1- Class Lectures
4.2- Lab
4.3- Tutorials
4.4- Assignments

5- Student assessment methods

5.1 Written examinations at the mid and end of the term to assess understanding and scientific knowledge.
5.2 Assignments to assess ability to solve problems and analyze results.
5.3 Lab reports to assess ability to observe, record and analyze data in laboratory and, also, ability to prepare testing reports.

Assessment schedule

<table>
<thead>
<tr>
<th>Assignment</th>
<th>Week</th>
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</thead>
<tbody>
<tr>
<td>Assignment 1</td>
<td>4</td>
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<tr>
<td>Lab report</td>
<td>5</td>
</tr>
<tr>
<td>Assignment 2</td>
<td>6</td>
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<tr>
<td>Lab report</td>
<td>7</td>
</tr>
<tr>
<td>Assignment 3</td>
<td>8</td>
</tr>
<tr>
<td>Lab report</td>
<td>8</td>
</tr>
<tr>
<td>Mid-term exam</td>
<td>8</td>
</tr>
</tbody>
</table>
Assignment 4  Week 10
Lab report  Week 11
Assignment 5  Week 11
Assignment 6  Week 13
Assignment 7  Week 15
Assignment 8  Week 16
Final exam  Week 16

**Weighting of assessments**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mid-term examination</td>
<td>20 %</td>
</tr>
<tr>
<td>Final-term examination</td>
<td>60 %</td>
</tr>
<tr>
<td>Lab report</td>
<td>5 %</td>
</tr>
<tr>
<td>Assignment</td>
<td>10 %</td>
</tr>
<tr>
<td>Participation</td>
<td>5 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>

6- List of references

6.1- Course notes
- Staff lectures notes

6.2- Essential books (text books)

- "المواد الهندسية مقاومتها واختبارها " (الجزء الأول والثاني) ا.د. عبد الكريم عطا - ا.د. أحمد العريان
- "مقاومة واختبار المواد" د. عبد الوهاب محمد عوض - د. إبراهيم ع. دووش
- المواصلات القياسية المصرية.
- الملحق الثالث للكود المصري لتصميم وتنفيذ المنتشات الخرسانية (دليل الاختبارات العملية لمواد الخرسانة).

6.3- Recommended books
- N.A.

6.4- Periodicals, Web sites, … etc
- N.A.

7- Facilities required for teaching and learning
- Appropriate teaching class including presentation board and data show.
- Laboratory.

**Course coordinator:** Dr. Ehab Mohammed Hosny Ragab

**Head of Department:** Assoc. Prof. Dr. Ashraf Abou-Rayyan

**Date:** / / 2009