Course Specifications

University: Benha University          Faculty: High Institute of Technology

Course specifications
Programme(s) on which the course is given: Mechanical Production Engineering
Major or minor element of programmes
Department offering the programme: Mechanical Engineering
Department offering the course: Production Engineering
Academic year / Level: year 4 Mechanical Production Engineering
Date of specification approval

A- Basic Information
Title: Manufacturing Technology          Code: M484
Credit Hours: 4                        Lecture: 3
Tutorial: 2                            Practical: 1
Total: 6

B- Professional Information
1 - Overall aims of course
By the end of the course the students will be able to:

- Demonstrate the theoretical and practical foundations of the different manufacturing technologies in both the machining and forming sectors,
- understand the theory of metal forming, design of dies and materials, forming forces, and lubrication,
- understand the theory of metal cutting forces, temperatures heat generation and tool wear,
- define the concept of tribology in metal cutting and surface finish.

Student shall attain the above mentioned objectives through lectures, tutorial for problem solving and laboratory for experiments and microscopic examinations

2- Intended learning outcomes of course (ILOs)
a. Knowledge and understanding:
   a.1 Define the current technology in both the machining and forming processes,
a.2 Describe machining tools, cutting machines and cutting technologies
a.3 Understand deep facts, concepts, principles and detailed theories relevant to forming and cutting technology, forces, sources and effects of heat generation,
a.4 Explain the lubrication machining accuracy and surface finish.

b. Intellectual skills

b.1 Analyze engineering problems relevant to machining and forming,
b.2 Solve mechanical and product design in hot and cold working,
b.3 Creatively solve problems of tool life extension and surface finish improving methods.

c. Professional and practical skills

c.1 Employ computational facilities, measuring instruments, workshops and laboratories equipment to design experiments and collect, analyze and interpret results.
c.2 Operate and maintain different production machines

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>Theory of metal forming (Die design and materials, Forming resistance and forces, friction and Lubrication)</td>
<td>30</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Theory of metal cutting (Mechanics, Forces, Temperatures and heat generation)</td>
<td>36</td>
<td>18</td>
<td>18</td>
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<tr>
<td>Tool wear and tool life</td>
<td>12</td>
<td>6</td>
<td>6</td>
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<tr>
<td>Tribology in metal cutting</td>
<td>6</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Surface finish</td>
<td>6</td>
<td>3</td>
<td>3</td>
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4– Teaching and learning methods

4.1 - Lectures
4.2 - Problem solving sessions
4.3 - Laboratories

5- Student assessment methods
5.1 Written exam to assess ILO a1, a2, a3, a4, b1, b2, b3, c1
5.2 Problem solving to assess ILO a3, b1
5.3 Labs to assess ILO c2
5.4 Report writing to assess ILO a3, b2, c1
5.5 Oral exam to assess ILO b2, b3

Assessment schedule

| Assessment 1 | Written exam | Week 5 |
| Assessment 2 | Written exam | Week 10 |
| Assessment 3 | Oral exam    | Week 15 |

Weighting of assessments

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Final-term examination</td>
<td>60 %</td>
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<tr>
<td>Semester work</td>
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</tr>
<tr>
<td>Practical work</td>
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</tr>
<tr>
<td>Oral exam</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
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6- List of references

6.1- Course notes

Course notes of Material technology
Metal Forming: Mechanics and Metallurgy by William F. Hosford and Robert M. Caddell

6.2- Essential books (text books)

Machining Fundamentals: From Basic to Advanced Techniques by John R. Walker
Fundamentals of Metal Machining and Machine Tools, Third Edition (Mechanical Engineering (Marcell Dekker)) by Geoffrey Boothroyd and Winston A. Knight

6.3- Recommended books

6.4- Periodicals, Web sites, … etc

http://en.wikipedia.org/wiki/Machining
http://en.wikipedia.org/wiki/Forming
http://en.wikipedia.org/wiki/Tool_wear
7- Facilities required for teaching and learning

- Lecture rooms
- Classrooms for problem solving sessions
- Materials laboratory

Course coordinator: Prof. Adel Omar
Head of Department: Prof. Sameh Nada
Date: / /