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 3 Mechanical Production Engineering
Date of specification approval

A- Basic Information

Title: Manufacturing Technology  Code: M36
Credit Hours:  Total: 5
Lecture: 3  Tutorial: 1  Practical: 1

B- Professional Information

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

• Demonstrate about the different casting processes, mould and core-making, sand properties and testing,
• get a basic idea of solidification and, melting and melt treatment, behaviour of liquid metals, melting and melt treatment,
• deal with casting quality control methods,
• recognize and demonstrate the different machining processes (conventional and non conventional) and metal forming processes,
• demonstrate knowledge and understanding of theoretical analysis of metal forming,
• recognize different types of metal forming processes,
• get to know the correlation between materials behaviour and joining technology and how to improve quality in industrial manufacturing,
• get a basic idea of powder metallurgy, and processing of plastics.
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 casting processes and its concern
   a.2 Describe current casting and forming technologies
   a.3 Understand essential facts, fundamentals, concepts, principles and theories relevant to manufacturing technology
   a.4 Explain hot and cold working and metal forming.

b. Intellectual skills

   b.1 Analyze engineering problems relevant to casting processes,
   b.2 Solve mechanical and product design in hot and cold working,
   b.3 Creatively solve problems of forming methods, other non-metals forming.

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>Casting Metal technology</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Sand casting (moulding, melting, pouring, solidification, cleaning, defects and inspection)</td>
<td>20</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Contemporary casting processes (metallic mould, Electro-slag, precision and centrifugal casting)</td>
<td>10</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>Hot and cold working of metals</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>Metal forming processes (rolling, forging, drawing, extrusion and spinning)</td>
<td>20</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Pipe and tube manufacturing</td>
<td>5</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
Joining technology (fastening, riveting, soldering and brazing, welding and adhesive bonding) | 10 | 6 | 4 
---|---|---|---
Powder metallurgy | 5 | 3 | 2 
Forming technology | 5 | 3 | 2 
Processing of plastics | 5 | 3 | 2 

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

<table>
<thead>
<tr>
<th>Assessment</th>
<th>Type</th>
<th>Week</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1</td>
<td>Written exam</td>
<td>5</td>
</tr>
<tr>
<td>Assessment 2</td>
<td>Written exam</td>
<td>10</td>
</tr>
<tr>
<td>Assessment 3</td>
<td>Oral exam</td>
<td>15</td>
</tr>
</tbody>
</table>

Weighting of assessments

<table>
<thead>
<tr>
<th>Component</th>
<th>Weighting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final-term examination</td>
<td>60%</td>
</tr>
<tr>
<td>Semester work</td>
<td>20%</td>
</tr>
<tr>
<td>Practical work</td>
<td>10%</td>
</tr>
<tr>
<td>Oral exam</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

6- List of references

6.1- Course notes
Course notes of Material technology

6.2- Essential books (text books)
M. Lal, O. P. Khanna, 1979, Text Book of Foundry Technology,
6.3- Recommended books


6.4- Periodicals, Web sites, … etc

http://en.wikipedia.org/wiki/Casting
http://en.wikipedia.org/wiki/Metal_forming,

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: / /