

## Module Template for New and Revised Modules<sup>1</sup>

<b>Module Code</b>	<b>MEU33B07</b>
<b>Module Name</b>	<b>Manufacturing Technology I</b>
<b>ECTS Weighting<sup>2</sup></b>	5 ECTS
<b>Semester taught</b>	Semester 2
<b>Module Coordinator/s</b>	Assistant Professor Daniel Trimble <a href="mailto:dtrimble@tcd.ie">dtrimble@tcd.ie</a>
<b><u>Module Learning Outcomes</u> with reference to the <u>Graduate Attributes</u> and how they are developed in discipline</b>	<p>On successful completion of this module, students should be able to:</p> <ol style="list-style-type: none"><li>1. On successful completion of this module, the student should be able to:</li><li>2. Analyse the heating, pouring, solidification and shrinkage of metals during sand casting process from an engineering perspective.</li><li>3. Design riser and chaplets for different sand casting products.</li><li>4. Identify and describe the different casting processes in terms of machinery, tooling, set-up, materials, defects, advantages and disadvantages.</li><li>5. Analyse both bulk metal deformation (Rolling, Forging, extrusion and drawing) and sheet metalworking (cutting, bending and deep drawing) processes to solve engineering problems.</li><li>6. Identify and describe the different bulk metal deformation and sheet metalworking processes in terms of machinery, tooling, set-up, materials, defects, advantages and disadvantages.</li><li>7. Use the theory of metal machining (orthogonal cutting model and Merchant's theory) to solve engineering problems in turning, drilling and milling operations.</li><li>8. Identify and describe a range of different machining processes in terms of machinery, tooling, set-up, materials, defects, advantages and disadvantages.</li><li>9. Understand the mechanisms of tool wear and its influence on the selection of cutting tool materials, geometry and cutting fluids.</li><li>10. Solve tool life problems by utilising the Taylor Tool Life Equation.</li></ol>

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<sup>1</sup> [An Introduction to Module Design](#) from AISHE provides a great deal of information on designing and re-designing modules.

<sup>2</sup> [TEP Glossary](#)

**Graduate Attributes: levels of attainment**

To act responsibly - Choose an item.

To think independently - Choose an item.

To develop continuously - Choose an item.

To communicate effectively - Choose an item.

**Module Content**

- Introduction and overview of manufacturing
- Fundamentals of metal casting
- Metal casting processes
- Fundamentals of metal forming
- Bulk deformational processes in metal working
- Sheet metalworking
- Theory of metal machining
- Machining operations and machine tools
- Cutting tool technology

**Module description:**

The objective of this module to provide students with an introduction to manufacturing in general, and cover traditional manufacturing processes such as casting, metal forming, sheet metal working and material removal processes. In particular, the focus is to provide a treatment of manufacturing that is quantitative rather than just descriptive. The module will enable students to solve quantitative manufacturing problems through the use of material science and mathematical theory.

**Teaching and Learning Methods**

This module is taught using a combination of lecturers, tutorial problem solving sessions, multiple choice review quizzes and a group based laboratory assignment. All lecture notes, tutorial questions and solutions, multiple choice quizzes, videos and laboratory handouts will be available through Blackboard.

<b>Assessment Details<sup>3</sup></b> Please include the following: <ul style="list-style-type: none"> <li>• <b>Assessment Component</b></li> <li>• <b>Assessment description</b></li> <li>• <b>Learning Outcome(s) addressed</b></li> <li>• <b>% of total</b></li> <li>• <b>Assessment due date</b></li> </ul>	<b>Assessment Component</b>	<b>Assessment Description</b>	<b>LO Addressed</b>	<b>% of total</b>	<b>Week due</b>			
	In-class exams	3x in-class exams	1-10	60%	continuous			
	Laboratory	CNC Lab	7-10	10%	2 weeks after taking lab			
	Continuous Assessment	Multiple Choice Quizzes	1-10	30%	continuous			
<b>Reassessment Requirements</b>								
<b>Contact Hours and Indicative Student Workload<sup>3</sup></b>	<table border="1"> <tr> <td><b>Contact hours: 44 Hours (33 lectures, 8 tutorials, 1 Lab)</b></td> </tr> <tr> <td><b>Independent Study (preparation for course and review of materials): 37</b></td> </tr> <tr> <td><b>Independent Study (preparation for assessment, incl. completion of assessment): 37</b></td> </tr> </table>					<b>Contact hours: 44 Hours (33 lectures, 8 tutorials, 1 Lab)</b>	<b>Independent Study (preparation for course and review of materials): 37</b>	<b>Independent Study (preparation for assessment, incl. completion of assessment): 37</b>
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<b>Recommended Reading List</b>	<ul style="list-style-type: none"> <li>• Groover's Principles of Modern Manufacturing, materials, processes, and systems. SI Version. Mikell P. Groover. ISBN: 978-1-119-24912-2.</li> <li>• Manufacturing Engineering and Technology. Kalpakjian and Schmid</li> </ul>							
<b>Module Pre-requisite</b>								
<b>Module Co-requisite</b>								
<b>Module Website</b>								
<b>Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.</b>								
<b>Module Approval Date</b>	16/07/2019							
<b>Approved by</b>	Nicole Byrne							

<sup>3</sup> [TEP Guidelines on Workload and Assessment](#)

<b>Academic Start Year</b>	2019
<b>Academic Year of Date</b>	2019 - 2020