Module Code	**MEU11EM1**
Module Name	**Introduction to Manufacturing**
ECTS Weighting[1]	5 ECTS
Semester taught	Semester 2
Module Coordinator/s	Associate Professor Rocco Lupoi (lupoir@tcd.ie)
Module Learning Outcomes with reference to the Graduate Attributes and how they are developed in discipline	On successful completion of this module, students should be able to: 1. Analyse various machining processes and calculate relevant quantities such as velocities, forces and powers. 2. Identify and explain the function of the basic components of a machine tool. 3. Have a basic knowledge of safe workshop practice and the environmental implications of machining process decisions. 4. Understand the limitations of various machining processes with regard to shape formation and surface quality and the impact this has on design. 5. Explain the relationship between manufacturing technology and systems, the impact of manufacturing on the economy and the relationship between materials selection, design and manufacture. 6. Understand the procedures and techniques involved for the manufacturing of components, and keep up to date with innovation through literature search. 7. Describe and explain applications of the most common bulk and sheet forming. Understand the potential of more advanced manufacturing processes such as Rapid Prototyping, EDM, Cold Spray and LASER based methods. 8. Give short presentations in front of the class about manufacturing topics, write summaries and reports.

[1] TEP Glossary

Graduate Attributes: levels of attainment
To act responsibly - Introduced
To think independently - Introduced
To develop continuously - Introduced
To communicate effectively - Introduced

Module Content

- Introduction to manufacturing processes and systems. The relationship between material selection, product design, manufacturing decisions, product uses and safety and environmental considerations.
- Introduction to engineering materials: ferrous and non-ferrous metals and polymers, basic manufacturing processes and material properties – elasticity, plasticity, ductility, toughness.
- Introduction to stress, strain, yielding and plastic flow.
- Crystal structure of metals, dendrite formation, recrystallisation, hot and cold working.
- Introduction to Turning, Milling and Drilling.
- Introduction to the technology associated with forging, rolling, extrusion, wiredrawing, piercing and blanking, bending, casting, joining processes and polymer forming. Advanced technologies, such as for the production of coatings and LASER material processing are also introduced.
- Calculations of forming forces and tool/workpiece stresses for the most conventional processes.
- Basic machine tool structure and terminology.

ASSOCIATED LABORATORY/PROJECT PROGRAMME

- Visits to Laboratories and Workshop.
- Group and single research summaries/reports.

	• Presentation in front of the class.
Teaching and Learning Methods	The module is taught using a combination of lectures, group projects, and tutorials. Regular visits are made to the workshop to demonstrate the actual machines and processes being discussed. External speakers (from other departments or companies) are typically invited to give lectures about their specific manufacturing experience and research.

Assessment Details[2]
Please include the following:

- **Assessment Component**
- **Assessment description**
- **Learning Outcome(s) addressed**
- **% of total**
- **Assessment due date**

Assessment Component	Assessment Description	LO Addressed	% of total	Week due
Exam	Written Exam	all	70%	EOS
Assignments	Continuous Assessment	all	30%	BB
	EOS-end of semester, BB- Blackboard			

Reassessment Requirements

Exam

Contact Hours and Indicative Student Workload[2]

Contact hours: 33 Hours
Independent Study (preparation for course and review of materials): 33
Independent Study (preparation for assessment, incl. completion of assessment): 33

Recommended Reading List

- Kalpakjian & Schmid, 2006, Manufacturing Engineering and Technology, Pearson.
- M.P. Groover, 2012, Introduction to Manufacturing, John Wiley.

Module Pre-requisite

na

Module Co-requisite

na

Module Website

TCD Blackboard

Are other Schools/Departments involved in the delivery of this module? If yes, please provide details.

na

Module Approval Date

25/03/2025

Approved by

Nicole Byrne

Academic Start Year

2025

Academic Year of Date

2025-2026

[2] TEP Guidelines on Workload and Assessment