

MODULE DESCRIPTOR

Module Title

Introduction to Design, Materials and Manufacture

Reference	EN1701	Version	10
Created	December 2022	SCQF Level	SCQF 7
Approved	March 2004	SCQF Points	15
Amended	August 2023	ECTS Points	7.5

Aims of Module

The aim of this module is to provide an introduction to design, materials and manufacture in an engineering context.

Learning Outcomes for Module

On completion of this module, students are expected to be able to:

- 1 Recognise the principles of engineering design, product life cycle and design for the environment.
- 2 Identify the properties of the principal classes of engineering materials and their selection in manufacturing for various products.
- 3 Select manufacturing processes based on materials, design, customer needs, constraints, and quality.
- 4 Apply metrology in manufacturing for quality control.

Indicative Module Content

This module will be activity centred and will introduce the student to the principles of design materials, manufacture and test and how these relate to other non-technical factors. The module will introduce the principles of design as a process of meeting both customer and organisational needs while taking account of constraints. It will demonstrate the interrelationship of design, materials, manufacturing, testing, and how these relate to other non-technical factors. Students will learn the principles of materials technology including the structure and properties of principal classes of engineering materials with a focus on metals, polymers, composites and ceramics. Similarly, students will understand the basic working principles of at least 5 manufacturing processes in each family namely (i) casting, (ii) forming (including sheet metals) (iii) material removal (traditional and non-traditional) and (iv) joining ? with their process capabilities and their suitability with different materials. Discussions on case studies and relevant examples. Understand the impact of engineering solutions to meet customer demands and demonstrate knowledge and the need for sustainable development while considering materials, production capacity, quality, and environmental and economic constraints. These principles will be applied in practical activities including (i) charpy, materials heat treatment and performance (ii) manufacturing processes - composite manufacturing technology milling, turning, and welding. (iii) measurement using fundamental equipment?s such as vernier calliper, screw gauges and associated fundamental instruments suitable with metrology

Module Delivery

The module will be essentially student-centred but will be supported by lectures, demonstrations, industrial visits and videos where these are felt to be appropriate. It will involve the student working to tackle problems relating to real mechanical engineering products. The student will be given set objectives and will, in general, be expected to follow prescribed procedures.

Indicative Student Workload

	Full Time	Part Time
Contact Hours	35	35
Non-Contact Hours	115	115
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	150	150
<i>Actual Placement hours for professional, statutory or regulatory body</i>		

ASSESSMENT PLAN

If a major/minor model is used and box is ticked, % weightings below are indicative only.

Component 1

Type:	Coursework	Weighting:	100%	Outcomes Assessed:	1, 2, 3, 4
Description:	A portfolio of evidence.				

MODULE PERFORMANCE DESCRIPTOR**Explanatory Text**

Component 1 comprises 100% of the module grade. To pass the module, a D grade is required.

Module Grade	Minimum Requirements to achieve Module Grade:
A	A
B	B
C	C
D	D
E	E
F	F
NS	Non-submission of work by published deadline or non-attendance for examination

Module Requirements

Prerequisites for Module	None.
Corequisites for module	None.
Precluded Modules	None.

ADDITIONAL NOTES

The student will be provided suitable clothing for laboratory and workshop activities as designated by University staff.

INDICATIVE BIBLIOGRAPHY

- 1 ULRICH, K.T. and EPPINGER, S.D., 2016. Product Design and Development. 6th ed. New York: McGraw-Hill.
- 2 TIMINGS, R.L., 2000. Manufacturing Technology: volume 1. 2nd ed. Harlow: Longman.
- 3 CALLISTER W.D. and RETHWISCH, D.G., 2015. Materials Science and Engineering. 9th ed. New York: Wiley.
- 4 Jack, Hugh, Engineering design, planning, and management. 2022. London, United Kingdom : Academic Press