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## MODULE DESCRIPTOR

### Module Title

Advanced Manufacturing

Reference	EN3108	Version	4
Created	April 2023	SCQF Level	SCQF 9
Approved	March 2021	SCQF Points	30
Amended	August 2023	ECTS Points	15

### Aims of Module

To provide the student with the fundamental understanding of joining processes and equipment, surface technology and engineering metallurgy, manufacturing systems and different support systems for manufacturing including quality control and inspection.

### Learning Outcomes for Module

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

- 1 Explain the principles of welding processes, brazing, soldering and adhesive bonding as well as mechanical assembly processes.
- 2 Discuss surface processing operations including treatment, coating and cleaning.
- 3 Review the principles of rapid prototyping and additive manufacturing processes.
- 4 Asses the fundamentals of automation technologies for manufacturing systems including CAM and CIMS.
- 5 Discuss a manufacturing system including material selection for a given product.

### Indicative Module Content

Joining processes and equipment: fusion welding process, solid-state welding process, Brazing, Soldering, Adhesive-bonding, and Mechanical Fastening Processes. Surface processing operations: Surface Roughness and Measurement; Friction, Wear, and Lubrication. Surface Treatments, Coatings, and Cleaning. Fundamentals of rapid prototyping and additive manufacturing processes. Automation of Manufacturing Processes and Operations Computer-aided Manufacturing Computer-integrated Manufacturing Systems Manufacturing in a Competitive Environment Manufacturing support systems: process planning and production control, quality control and inspection

### Module Delivery

The module will be essentially student centred but will be supported by lecture, demonstration, industrial visits and video 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	80	N/A
Non-Contact Hours	220	N/A
Placement/Work-Based Learning Experience [Notional] Hours	N/A	N/A
TOTAL	300	N/A
<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, 5

Description: Case study evaluating processing and assembly operations, rapid prototyping as well as automation for manufacturing processes and systems (CAM/CIMS).

**MODULE PERFORMANCE DESCRIPTOR****Explanatory Text**

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

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

**Module Requirements**

Prerequisites for Module	Completion of EN1703 and EN2704 or equivalent.
Corequisites for module	None.
Precluded Modules	None.

**INDICATIVE BIBLIOGRAPHY**

- 1 CALLISTER W.D., RETHWISCH, D. G., 2014. Materials Science and Engineering. 9th Edition SI Version, New York: Wiley
- 2 KALPAKJIAN, S. and SCMID, S., 2014. Manufacturing engineering & technology. 7th edition. Harlow: Pearson.
- 3 GROOVER, M.P., 2016. Principles of modern manufacturing. Global Edition SI Version. New York: Wiley.