



Module Definition Form (MDF)

Module code: MOD004047	Version: 5 Date Amended: 07/Feb/2023
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1. Module Title
Innovative Product Design and Manufacture

2a. Module Leader
Peter Marshall

2b. School
School of Engineering and the Built Environment

2c. Faculty
Faculty of Science and Engineering

3a. Level
7

3b. Module Type
Standard (fine graded)

4a. Credits
30

4b. Study Hours
300

5. Restrictions			
Type	Module Code	Module Name	Condition
Pre-requisites:	None		
Co-requisites:	None		
Exclusions:	None		
Courses to which this module is restricted:			

LEARNING, TEACHING AND ASSESSMENT INFORMATION

6a. Module Description

You will gain an in-depth knowledge of innovative design methods together with time compression technologies that will reduce the time of delivering new products to market. Using a range of design tools, you will apply innovative design methods to improve the design of an existing product so that it can be manufactured and assembled at a minimum cost, maintaining the level of quality and reliability demanded by customers. You will use tools such as 3-D solid modelling and engineering software extensively used throughout the module.

This module will enable you to plan the method of manufacture of a product using suitable modern manufacturing and prototyping methods giving you an introduction to modern equipment, such as CNC machines, rapid prototyping machines and automated inspection.

6b. Outline Content

- Cost analysis techniques. Elements involved in total cost. - Critical analysis the benefits of standardisation & standard parts - Critical evaluation of appropriate manufacturing processes for a given design - Innovative design - Practical application of design for ease of manufacture and assembly (Boothroyd/Dewhurst method). - Critical awareness of product development elapse time. - Critically evaluate the influence on product design of manual and automatic manufacturing and assembly systems and methods. - Practical work with modern equipment such as CNC machine and Rapid prototyping machine - Part of the module takes the form of a mini project. Students working in small groups will critically analyse and then develop a novel design/redesign of a product. Typically the brief will direct the students towards developing/improving the product in some but not all of the following areas; functionality, assembleability, manufacturability, aesthetics and ergonomics, profitability, reliability and quality.

6c. Key Texts/Literature

The reading list to support this module is available at: <https://readinglists.aru.ac.uk/>

6d. Specialist Learning Resources

CAD/CAM Software, DFMA analysis software

7. Learning Outcomes (threshold standards)		
No.	Type	On successful completion of this module the student will be expected to be able to:
1	Knowledge and Understanding	Demonstrate in-depth understanding of modern manufacturing and assembly techniques, and systematically select the most appropriate system for a given product.
2	Knowledge and Understanding	Critically analyse costs using the principles of design for ease of manufacture and assembly
3	Knowledge and Understanding	Design a complex product based on the principles of "design for manufacture and assembly" techniques to improve functionality and relevant qualities of design. Select and critically evaluate technical literature or other sources to support your solution.
4	Knowledge and Understanding	Plan the manufacturing of a quality product at an economic price and evaluate the environmental and societal impact of the product lifecycle.
5	Intellectual, practical, affective and transferrable skills	Use modern manufacturing equipment to manufacture engineering parts
6	Intellectual, practical, affective and transferrable skills	Demonstrate the ability to work as a member of a design team, evaluate effectiveness of own and team performance, and effectively communicate design to a third part.

8a. Module Occurrence to which this MDF Refers				
Year	Occurrence	Period	Location	Mode of Delivery
2025/6	ZZF	Template For Face To Face Learning Delivery		Face to Face

8b. Learning Activities for the above Module Occurrence			
Learning Activities	Hours	Learning Outcomes	Details of Duration, frequency and other comments
Lectures	36	1,2,3,6	3 hours per week of lectures.
Other teacher managed learning	36	1,2,3,6	3 hours per week of tutorials and lab work
Student managed learning	228	3,4,5,6	Student managed learning
TOTAL:	300		

9. Assessment for the above Module Occurrence					
Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
010	Coursework	1 2 6	50 (%)	Fine Grade	40 (%)
Group Project: 2000 words + Engineering drawings and DFA (equivalent to 1000 words), maps to Engineering Council Learning Outcome M16					
Assessment No.	Assessment Method	Learning Outcomes	Weighting (%)	Fine Grade or Pass/Fail	Qualifying Mark (%)
011	Coursework	3 4 5	50 (%)	Fine Grade	40 (%)
Individual Project: 2500 words + drawings (equivalent to 500 words), maps to Engineering Council Learning Outcomes M4, M7					

In order to pass this module, students are required to achieve an overall mark of 40% (for modules at levels 3, 4, 5 and 6) or 50% (for modules at level 7*).

In addition, students are required to:

- (a) achieve the qualifying mark for each element of fine graded assessment as specified above**
- (b) pass any pass/fail elements**

[* the pass mark of 50% applies for all module occurrences from the academic year 2024/25 – see Section 3a of this MDF to check the level of the module and Section 8a of this MDF to check the academic year]