

# ES2D1-15 Manufacturing Engineering Design

**23/24**

**Department**

School of Engineering

**Level**

Undergraduate Level 2

**Module leader**

Helen Neal

**Credit value**

15

**Module duration**

12 weeks

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

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## Description

### Introductory description

ES2D1-15 Manufacturing Engineering Design

[Module web page](#)

### Module aims

This module will develop strategies to identify product requirements, identify design constraints, think creatively, solve problems, identify solutions and foster a holistic approach between design and manufacturing.

### Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

- Manufacturing design strategy
- Manufacturing design criteria
- Creative design practices

- Risk reduction
- Cost reduction through manufacture
- Design review
- Management role

## **Learning outcomes**

By the end of the module, students should be able to:

- Use computational tools to aid in decision making processes of design and identify which process parameters influence variation in final product characteristics.
- Identify which design features really matter and how to modify a design to give it greater robustness against variation in the manufacturing process.
- Apply risk reduction techniques at the design stages to reduce manufacturing and assembly problems.
- Appreciate and apply the principles of value analysis for design for manufacture (DFM) and design for assembly (DFA) to identify opportunities for cost reduction.
- Apply software simulation and programming tools in the analysis of functional components.
- Function as part of a team and demonstrate understanding of the importance of personal and shared responsibility, teamwork, and communication e.g. by producing professional quality design documentation.

## **Indicative reading list**

- Product Design for Manufacture and Assembly, 3rd edition 2011, Boothroyd, Dewhurst & Knight, CRC Press
- Shigley's Mechanical Engineering Design, 10th edition 2014, Budynas and Nisbett, McGraw-Hill Higher Education
- Form, structure and Mechanism, M.J.French 2012, Springer
- Engineering Design a systematic approach, Pahl, Beitz, Feldhusen and Grote, 3rd edition 2007, Springer
- Product design, Otto and Wood, 2001, Pearson

[View reading list on Talis Aspire](#)

## **Subject specific skills**

Plan and manage the design process, including cost drivers, evaluating outcomes, and working with technical uncertainty.

Ability to apply relevant practical and laboratory skills.

## **Transferable skills**

Communicate (written and oral; to technical and non-technical audiences) and work with others.

Overcome difficulties by employing skills, knowledge and understanding in a flexible manner

Exercise initiative and personal responsibility, including time management, which may be as a team member or leader

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## Study

### Study time

| Type                         | Required                     |
|------------------------------|------------------------------|
| Lectures                     | 5 sessions of 1 hour (3%)    |
| Seminars                     | 10 sessions of 2 hours (13%) |
| Practical classes            | 5 sessions of 1 hour (3%)    |
| Supervised practical classes | 4 sessions of 4 hours (11%)  |
| Private study                | 104 hours (69%)              |
| Total                        | 150 hours                    |

### Private study description

## 104 hrs Guided independent learning

### Costs

| Category                    | Description  | Funded by  | Cost to student |
|-----------------------------|--|------------|-----------------|
| Equipment and project costs | Materials for manufacturing models for group projects. | Department | £0.00           |

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## Assessment

You must pass all assessment components to pass the module.

### Assessment group A3

|  | Weighting | Study time |
|--|-----------|------------|
| Group Design Report<br>1,000 words plus portfolio - total max 30 pages, to include peer assessment | 50%       |            |
| Individual Design Proposal<br>1,000 words plus portfolio - total max 10 pages                      | 50%       |            |

### Feedback on assessment

Written feedback on group design reports.

In session feedback of developing design.

Group feedback on performance tests.

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## **Availability**

### **Courses**

This module is Core for:

- Year 2 of UESA-H335 BEng Automotive Engineering
- Year 2 of UESA-HH75 BEng Manufacturing and Mechanical Engineering
- Year 2 of UESA-H336 MEng Automotive Engineering
- Year 2 of UESA-HH76 MEng Manufacturing and Mechanical Engineering

This module is Option list A for:

- Year 2 of UESA-H113 BEng Engineering
- Year 2 of UESA-HN15 BEng Engineering Business Management
- UESA-H112 BSc Engineering
  - Year 2 of H112 Engineering
  - Year 2 of H112 Engineering
- Year 2 of UESA-HN11 BSc Engineering and Business Studies
- Year 2 of UESA-H114 MEng Engineering