

# WM9PW-15 Sustainable Manufacturing & Materials

**24/25**

**Department**

WMG

**Level**

Taught Postgraduate Level

**Module leader**

Nick Golsby

**Credit value**

15

**Assessment**

100% coursework

**Study location**

University of Warwick main campus, Coventry

---

## Description

### Introductory description

This module provides the theoretical basis and wider context of sustainability and sustainable development applied to the area of Manufacturing and Materials. Students will examine and explore the social, economic and environmental challenges presented by the UN Sustainability Development Goals. It will provide the necessary knowledge and understanding for student to design organisational processes and strategies to address these challenges.

### Module aims

To provide an understanding of the challenges presented to the Design and Manufacturing organisations by the quest for more sustainable development. Students will learn how to critically review the designs in relation to key aspects of life cycle and assess the economic viability of sustainable materials and manufacturing approaches, whilst considering societal factors. Students will develop their capabilities to make sustainable judgements and recommendations based on the contextual challenges of sustainability in 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.

- Carbon science and cycle
- Climate change
- Ecosystems
- Environmental challenges of limited resources
- The role of the United Nations and its Sustainability Development Goals
- Working with standards and regulations such as ISO14001
- Life cycle analysis
- Principles of the “Circular Economy”, engineering waste and recycling
- Carbon trading
- Ethical and commercial concerns of sustainability
- Corporate, social, and engineering responsibility

## **Learning outcomes**

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

- Develop a critical understanding of the theoretical basis of sustainability as applicable to a Design and Manufacture organisation.
- Analyse and evaluate the applicability and impact of the UN Sustainable Development Goals, for an organisation working in the Design and Manufacture sector.
- Evaluate the environmental and societal impact of solutions to complex problems using Life Cycle Analysis to assess environmental burdens in systems, products and processes.
- Develop a CSR (Corporate and Social Responsibility) strategy appropriate for an organisation informed by relevant analysis.

## **Indicative reading list**

Everett, B. 2021. Energy Systems and Sustainability. Oxford University Press. Jacobson, M. 2021. 100% Clean Renewable Energy. Cambridge University Press. MacKay, D. 2009. Sustainable Energy. UIT Cambridge. Mavropoulos, A. 2020.

Industry 4.0 and Circular Economy. Wiley. Rosa, A. 2022. Fundamentals of Renewable Energy 4th Ed. Academic Press. Young, S. 2013. Sustainability: Essentials for Business. Sage.

## **Subject specific skills**

- Life cycle analysis
- Interpretation of engineering data
- Carbon foot printing
- Energy efficiency calculations

## **Transferable skills**

- Evaluation and judgement
- Communication

- Critical thinking
  - Reasoning
  - Decision making
  - Presentational skills
- 

## Study

### Study time

Type	Required
Lectures	14 sessions of 1 hour (13%)
Tutorials	16 sessions of 1 hour (15%)
Online learning (independent)	16 sessions of 1 hour (15%)
Assessment	60 hours (57%)
Total	106 hours

### Private study description

Directed by a module study guide issued at the start of the module. This will direct students to relevant text and journal readings and other learning activities, including flipped classroom activities, with indicative time allocations for each.

### Costs

No further costs have been identified for this module.

---

## Assessment

You must pass all assessment components to pass the module.

### Assessment group A

	Weighting	Study time	Eligible for self-certification
Case Study Report	60%	36 hours	Yes (extension)
A case study report that covers the sustainability performance of an organisation operating in the Design and Manufacturing sector, to inform the production of organisational CSR strategy.			
Industry impact evaluation	40%	24 hours	Yes (extension)
Students will conduct a sustainability impact evaluation of an existing company in the design and			

**Weighting****Study time****Eligible for self-  
certification**

manufacturing sector, with respect to the UN's Sustainability Development Goals.

**Feedback on assessment**

- Verbal feedback given during seminar/tutorial sessions
  - Written individual formative feedback on the 1st assignment report
- 

**Availability**

There is currently no information about the courses for which this module is core or optional.