

Materials Engineering

Module Information

2022.01, Approved

Summary Information

Module Code	6110MECH
Formal Module Title	Materials Engineering
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 6
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	11
Online	11
Practical	6
Tutorial	11

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
SEP-CTY	CTY	September	12 Weeks

Aims and Outcomes

Aims	To provide an in-depth understanding of advanced engineering materials together with techniques for material property and performance improvements.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Critically review the structure-properties relationships of advanced materials and techniques for performance improvements
MLO2	2	Relate how the properties and behaviour of materials govern their design and manufacture through consideration of the basic mechanisms involved
MLO3	3	Apply a range of techniques for improving the properties and performance of materials
MLO4	4	Use of different materials data and analysis methods for design and product developments
MLO5	5	Select materials to meet the performance requirements of a range of engineering applications
MLO6	6	Use of life cycle analysis in design with respect to recycling and environmental issues

Module Content

Outline Syllabus	Materials High performance materials and applications Advanced materials, composition design, processing and applications (high performance alloys, ceramics and composites) High strength low weight materials, composites and high performance alloys High performance alloys: alloying elements, structure improvements, processing methods, structural integrities, and applications Structure and property design of different types of composites, failure mechanisms and performance enhancing methods. New modern materials developments; Use of engineering principles in smart materials design and developments. Performance oriented materials design and selection. Performance of materials in service and structural considerations. Material selection: computer-based techniques for material selection. The selection of materials on the basis of performance requirements: strength, stiffness, toughness, fatigue resistance and energy absorption. Use of modelling techniques in materials selection and product developments. Material recycling and use of recycled materials: metals, plastics and composites. Life cycle analysis of materials and structures.
Module Overview	The aim of the module is to provide an in-depth understanding of advanced engineering materials together with techniques for material property and performance improvements.
Additional Information	This module will provide an in-depth understanding of the structure and properties of advanced materials together with techniques available for improving properties and performances of materials. The selection of materials based on applications will also be developed.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Centralised Exam	Examination	70	2	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6
Dissertation	Portfolio	30	0	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
James Ren	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings
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