

Summary Information

Module Code	5303MECH
Formal Module Title	Materials and Processes
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 5
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
Engineering

Learning Methods

Learning Method Type	Hours
Lecture	11
Practical	3
Tutorial	11

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
JAN-CTY	CTY	January	12 Weeks

Aims and Outcomes

Aims	To provide a thorough understanding of the properties and applications of a range of structural engineering materials and their associated manufacturing processes.
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After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Select appropriate engineering materials based on their application.
MLO2	2	Explain the microstructural and macrostructural properties of metallic, ceramic, composite and polymeric engineering materials.
MLO3	3	Evaluate the typical mechanical properties of metallic, ceramic, composite and polymeric structural engineering materials.
MLO4	4	Select suitable methods from a range of manufacturing processes.
MLO5	5	Understanding the relationship between the microstructure and the material properties
MLO6	6	Demonstrate and awareness and understanding of materials recyclability and sustainability.

Module Content

Outline Syllabus	Ferrous (steel, cast iron, high strength steel, advance high strength steel, stainless steel) and non-ferrous (aluminium, titanium, nickel) alloys studies through crystal structure, phase diagram and strengthening processes. Evolution of microstructure under different conditions for the engineering application (e.g. changing alloy composition, altering processing conditions).Factors affecting material properties (e.g. composition, defects).Polymeric and composite materials.Manufacturing processing (e.g. rolling, forming, forging, casting, welding).Mechanical and chemical properties of selected materials.Recycling of various materials: Challenges and opportunities.
Module Overview	
Additional Information	This module builds on the knowledge gained from the level 4 materials module and will deliver engineering students who have a good understanding of the main engineering materials and manufacturing processes. They will be able to make informed choices with regard to material and process selection. This module incorporates content which relates to the following UN Sustainable Development Goals and UK government industrial strategy.SDG12 – This module considers the issues of waste and recycling when designing engineering solutions. The Road to Zero: Next steps towards cleaner road transport and delivering UK government industrial strategy.

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
Report	Report	30	0	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings

Hiren Kotadia	Yes	N/A
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Partner Module Team

Contact Name	Applies to all offerings	Offerings
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