

Summary Information

Module Code	5516USST
Formal Module Title	Materials and Processes
Owning School	Engineering
Career	Undergraduate
Credits	10
Academic level	FHEQ Level 5
Grading Schema	40

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Dante Matellini	Yes	N/A

Module Team Member

Contact Name	Applies to all offerings	Offerings
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Partner Module Team

Contact Name	Applies to all offerings	Offerings
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Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
University of Shanghai For Science and Technology

Learning Methods

Learning Method Type	Hours
Lecture	11
Practical	3
Tutorial	11

Module Offering(s)

Offering Code	Location	Start Month	Duration
JAN-PAR	PAR	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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Learning Outcomes

After completing the module the student should be able to:

Code	Description
MLO1	Select appropriate engineering materials based on their application.
MLO2	Explain the microstructural and macrostructural properties of metallic, ceramic, composite and polymeric engineering materials.
MLO3	Evaluate the typical mechanical properties of metallic, ceramic, composite and polymeric structural engineering materials.
MLO4	Select suitable methods from a range of manufacturing processes.
MLO5	Understanding the relationship between the microstructure and the material properties
MLO6	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)	Learning Outcome Mapping
Exam	Exam	70	2	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6
Report	Report	30	0	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6