Materials and Processes

Module Information

2022.01, Approved

Summary Information

Module Code	5501MDLBHG
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
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Beaconhouse Group

Learning Methods

Learning Method Type	Hours
Online	33

Module Offering(s)

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

Aims and Outcomes

Aims	To have a thorough understanding of the properties and applications of a range of structural engineering materials and their associated manufacturing processes.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explain the microstructural and macrostructural properties of metallic, ceramic, composite and polymeric structural engineering materials
MLO2	2	Critically evaluate the typical mechanical properties of metallic, ceramic, composite and polymeric structural engineering materials
MLO3	3	Make an informed choice with regards to the selection of appropriate structural engineering materials for particular applications
MLO4	4	Select suitable methods from a range of manufacturing processes
MLO5	5	Calculate processing parameters from processing data
MLO6	6	Plan manufacturing strategies for a range of technologies

Module Content

Outline Syllabus	A list of possible topics that may be covered is shown below.MaterialsMicrostructure and strengthening mechanisms in steels and ferrous materials : thermal treatments, alloying elements, high performance steels.Mechanical properties of advanced metallic materials (including light weight –high strength alloys and super alloys).Engineering ceramics: structures-property relationships, applicationsPolymeric and composite materials: structure and property relationships, applications and selectionsStructure, properties and applications of advanced materials, including CMCs and MMCs.Factors affecting materials properties and performance; Materials developments. ManufacturingMoulding processes for polymers:-injection moulding and extrusion processes. Blow moulding/blown film extrusion. Design considerations when processing polymersPowder metallurgy techniques applied to metals and ceramics.Modern developments in metal cutting processes:-grinding theory and practice. CNCmachining processes. Hard turning versus grindingDeformation processes:-evaluation of forming loads based on principal stresses andyield criteria. Extrusion and drawing. Sheet metal working processes, an investigation of bending and shearing
Module Overview	
Additional Information	This module builds on the knowledge gained from the level 4 materials and manufacture 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 regards to material and process selection.

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Exam	Examination	60	2	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6
Portfolio	Port	40	0	MLO1, MLO2, MLO3, MLO4, MLO5, MLO6

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Russell English	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings