Engineering Materials

Module Information

2022.01, Approved

Summary Information

Module Code	4509NCCG
Formal Module Title	Engineering Materials
Owning School	Engineering
Career	Undergraduate
Credits	20
Academic level	FHEQ Level 4
Grading Schema	40

Teaching Responsibility

LJMU Schools involved in Delivery
LJMU Partner Taught

Partner Teaching Institution

Institution Name
Nelson and Colne College Group

Learning Methods

Learning Method Type	Hours
Lecture	48
Practical	12

Module Offering(s)

Display Name	Location	Start Month	Duration Number Duration Unit
APR-PAR	PAR	April	12 Weeks
JAN-PAR	PAR	January	12 Weeks

SEP-PAR	PAR	September	12 Weeks
SEP_NS-PAR	PAR	September (Non-standard start date)	12 Weeks

Aims and Outcomes

Aims	This unit introduces students to the atomic structure of materials and the way it affects the properties, physical nature and performance characteristics of common manufacturing materials; how these properties are tested, and modified by various processing treatments; and problems that occur which can cause materials to fail in service.

After completing the module the student should be able to:

Learning Outcomes

Code	Number	Description
MLO1	1	Explain the relationship between the atomic structure and the physical properties of materials.
MLO2	2	Determine the suitability of engineering materials for use in a specified role.
MLO3	3	Explore the testing techniques to determine the physical properties of an engineering material.
MLO4	4	Recognise and categorise the causes of in-service material failure.

Module Content

Outline Syllabus	Physical properties of materials: classification and terminology of engineering materials, material categories: metallic, ceramic, polymer and composites, atomic structure: electrostatic, covalent and ionic bonding, crystalline structures: body-centred and face-centred cubic lattice and hexagonal close packedCharacteristics and function of ferrous, non-ferrous phase diagrams, amorphous and crystalline polymer structuresCategorising materials by their physical, mechanical, electrical and thermal propertiesThe effect heat treatment and mechanical processes have on material propertiesEnvironmental factors affecting material behaviour of metallic, ceramic, polymer and composite materialsSelection of materials for engineering functions: properties, cost, supply concernsTesting techniques: destructive and non-destructive testsMaterial failure: common mechanisms of failure for metals, polymers, ceramics and composites, preventative measures to extend service life
Module Overview	
Additional Information	

Assessments

Assignment Category	Assessment Name	Weight	Exam/Test Length (hours)	Module Learning Outcome Mapping
Report	Assignment	100	0	MLO1, MLO2, MLO4
Competency	NCC Group Pass/Fail			MLO3

Module Contacts

Module Leader

Contact Name	Applies to all offerings	Offerings
Christian Matthews	Yes	N/A

Partner Module Team

Contact Name	Applies to all offerings	Offerings