Liverpool John Moores University

Title:	Introducing Materials and Processing
Status:	Definitive
Code:	**4505ENRIOM** (117232)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
Russell English	Y
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Academic Level:	FHEQ4	**Credit Value:**	10	**Total Delivered Hours:**	26
Total Learning Hours:	100	**Private Study:**	74		

Delivery Options
Course typically offered: Semester 1

Component	Contact Hours
Lecture	12
Practical	6
Tutorial	6

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		50	2
Report	Coursework		50	

Aims

To introduce the essential principles of the materials, applications and processing method of different material groups.

Learning Outcomes

After completing the module the student should be able to:

1 Review the range of available materials, their applications and demonstrate knowledge of the basic structures of different groups of materials and processing methods.
2 Relate the properties of engineering materials to their structures and factors affecting materials selection in design.
3 Review the range of metal casting processes and know the techniques for preventing defects.
4 Consider service requirements and environmental issues of particular components when selecting material and processing methods

Learning Outcomes of Assessments

The assessment item list is assessed via the learning outcomes listed:

Exam	1	2	3	4
Investigative Coursework	1	2	4	

Outline Syllabus

Structure of the atom, Bohr theory.
Atomic bonding: primary and secondary bonding and their effects on the material properties
Ideal crystalline solids:-basic crystallography and its influence on mechanical and physical properties.
Classification of engineering materials: metals, ceramics, polymers and composites and typical applications.
Mechanical properties: Destructive tests; tensile, hardness, ductile and brittle failure. Analysis and interpretation of test data.
Classification of materials processing methods: forming, shaping and processing.
Basic procedures in different casting and molding processes: fluid flow and solidification.
Material selection: Introduction to computer-based techniques for material selection.

Learning Activities

A series of lectures supported by tutorials, videos and practical laboratory work.

Notes

This module covers the essential elements of materials science and processing technologies required by engineers studying mechanical and manufacturing disciplines.