

## Liverpool John Moores University

Title: Introducing Materials and Processing  
Status: Definitive  
Code: **4505ENGRIV** (117206)  
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.