Liverpool John Moores University

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Title:	Materials and Processes
Status:	Definitive
Code:	**4053ENG** (117167)
Version Start Date:	01-08-2016
Owning School/Faculty:	Maritime and Mechanical Engineering
Teaching School/Faculty:	Maritime and Mechanical Engineering

Team	Leader
James Ren	Y

Academic Level:	FHEQ4	**Credit Value:**	24	**Total Delivered Hours:**	74
Total Learning Hours:	240	**Private Study:**	166		

Delivery Options
Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	12
Practical	36
Tutorial	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	Exam		50	2
Portfolio	Port		25	
Portfolio	Port		25	

Aims

To provide a broad based introduction to the mechanical and physical properties of materials and manufacturing processes and develop an understanding of the basic principles of material/processes selection in a product design process.

Learning Outcomes

After completing the module the student should be able to:

1	Understand the structure and properties of a wide range of materials and their applications
2	Employ different testing techniques for evaluating materials/structures and analyse testing data in product design
3	Recommend a range of processing methods for common metals, polymers, ceramics and composites and understand the design limitations for each processing method
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
Portfolio 1	4	
Portfolio	3	

Outline Syllabus

Structure of materials: atomic and molecular structures - effect on microscopic and macroscopic properties.
Classification of metals, polymers, ceramics, foams and composites.
Material properties and selection: mechanical and physical properties, strength, toughness, stiffness, fatigue, creep, corrosion resistance and wear resistance.
Materials testing: common destructive and non-destructive techniques - presentation and analysis of results.
Manufacturing processes: classification of production processes - casting, machining and joining.
Basic of plastic moulding processes: vacuum casting, injection moulding, compression moulding, blow moulding, rapid prototyping.
Non-traditional processes such as laser cutting/machining, water jet cutting etc.
Materials selection charts, material databases and selection method.
Modern materials and development: energy, environment, etc.

Learning Activities

A series of lectures supported by tutorials, practical laboratory work and seminars. Case study based group investigative projects.

Notes

This module provides an introduction to the modern selection and application of materials based on service requirements and relates their properties to the atomic and molecular structures. The module allows the student to study modern materials processing methods to a depth which provides an understanding of the process and its controlling variables.