

## Liverpool John Moores University

Title: AUTOMOTIVE MATERIALS SELECTION AND RECYCLING  
Status: Definitive  
Code: **6093ENG** (115908)  
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:** FHEQ6  
**Credit Value:** 10  
**Total Delivered Hours:** 51  
**Total Learning Hours:** 100  
**Private Study:** 49

### Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	21
Practical	6
Tutorial	21

**Grading Basis:** 40 %

### Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70	3
Report	AS2	Coursework	15	
Report	AS3	Coursework	15	

### Aims

*To develop a sound understanding of the selection of automotive materials and the principles involved in the design of products and processes with regard to recycling, substitution and disassembly.*

## Learning Outcomes

After completing the module the student should be able to:

- 1 Select materials to meet the performance requirements of a range of automotive applications.
- 2 Justify an appropriate manufacturing process for a given material selection.
- 3 Critically evaluate the design process in relation to green engineering and environmentally conscious manufacturing
- 4 Demonstrate the use of life cycle analysis and maintainability principles and practices with respect to recycling issues.
- 5 Propose recommendations in the choice of materials with recycling and substitution in mind.
- 6 Explain and develop methods for controlling the composition and minimisation of industrial process residues with a view of improving environmental conditions and recycling scarce mineral resources.

## Learning Outcomes of Assessments

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

EXAM	1	2	3	4	5	6
CW	1	2	3			
CW	4	5	6			

## Outline Syllabus

*Critically review the selection of automotive materials on basis of performance requirements:-strength, stiffness, toughness, fatigue resistance and energy absorption.*

*Development of new automotive materials: Lightweight structures/materials, composites.*

*Process selection based on design requirements, material characteristics and costs with the aid of computer-based techniques.*

*Material recycling and use of recycled materials: metals, plastics and composites.*

*Life cycle analysis of automotive materials and structures, maintainability, and disassembly.*

*Designing material resource sustainability systems involving limitation and minimisation of the usage of scarce non-renewable material resources*

## Learning Activities

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

## **Notes**

This module provides an insight into the modern selection and application of automotive materials. It also develops an understanding of the recycling, substitution and disassembly of automotive materials currently in use.