

Liverpool John Moores University

Title: INVESTIGATING FORM AND FUNCTION
Status: Definitive
Code: **4010TECH** (105276)
Version Start Date: 01-08-2016

Owning School/Faculty: Maritime and Mechanical Engineering
Teaching School/Faculty: Maritime and Mechanical Engineering

Team	Leader
Glynn Rothwell	Y

Academic Level: FHEQ4 **Credit Value:** 24 **Total Delivered Hours:** 72
Total Learning Hours: 240 **Private Study:** 168

Delivery Options

Course typically offered: Standard Year Long

Component	Contact Hours
Lecture	24
Practical	24
Seminar	24

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	AS1	Service requirements research	25	
Essay	AS2	Material selection procedure	25	
Essay	AS3	Form optimisation practical	50	

Aims

The aim of this module is to provide an understanding of the basic principles of material and form selection as practiced in design. Emphasis is placed on identifying service requirements and the relationship between the material, form and function of a product.

Learning Outcomes

After completing the module the student should be able to:

- 1 identify service requirements of particular components
- 2 define material properties and select generic materials.
- 3 optimise the form and shape of the component and define the material specification.

Learning Outcomes of Assessments

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

CW	1
CW	2
CW	3

Outline Syllabus

Service Requirements:

Relative importance of a products form compared with its function. Aesthetics, ergonomics, and feel. Causes of, and mechanisms of failure; durability, environmental issues. Cost and value analysis.

Material properties and selection:

Mechanical and physical properties, strength, toughness, stiffness, fatigue, creep and temperature resistance, density, corrosion resistance and wear resistance. Ashby materials selection charts, material databases and selection method. Plastics, composites, metal alloys and ceramics. Primary and secondary manufacturing process.

Design Optimization:

Use of simple hand calculations to aid the iterative phase of material and form definition. Factors of safety, deflection, deformation and simple stress distribution, use of standard formula for calculation.

Learning Activities

Emphasis is placed on identifying component service requirements and the relationship between material, form and function. An investigative; case study and seminar driven delivery style will be adopted. A practical analysis and design optimisation process will be followed. This will be supported by a structured lecture programme.

Notes

This module will be delivered through a number of case studies where a products form is optimised with the aid of computational analysis as a visualisation tool. The visual output will give students a valuable practical insight into how form affects a products functional performance and how simple hand calculations can be used to predict performance.