

Liverpool John Moores University

Title: CLASSICAL DESIGN
Status: Definitive
Code: **4007TECH** (105273)
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: 12
Total Delivered Hours: 60
Total Learning Hours: 120
Private Study: 60

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	12
Practical	48

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Essay	AS1	Application of design principles assignment	25	
Essay	AS2	Simple machine design assignment	75	

Aims

The module introduces the universal principles of design by combining classical design principles with historic and contemporary examples of product design.

Learning Outcomes

After completing the module the student should be able to:

- 1 Appreciate the contribution to design by a range of famous historic scientists and engineers.
- 2 Identify and apply a range of design principles to solve a given problem
- 3 Identify and apply a range of machine elements to solve a given problem.

Learning Outcomes of Assessments

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

CW	1	2	3
CW	1	2	3

Outline Syllabus

Classic geometry:

Golden section; Fibonacci series; 80/20 rule; phi;pi; proportion,principles of thirds; symmetry and disposition.

- Pythagoras, Fibonacci, Leonardo da Vinci.

Simple machine elements:

Inclined planes; wheel and axle; pulleys; screws; levers; gears; rack and pinion; cams; chain and belts; ratchets.

-Archmedes, Pythagoras, Newton

-Mechanical advantage, Energy, forces, and motion.

Design principles:

Saint- Venants bearing principle; pivots, slides and flexures, structures, exact constraint design, degrees of freedom, principles of least constraint, principles of elastic constraint, force paths, centres of gravity, stiffness and friction, robust design, self principles, stability, parallels with nature.

Saint-Venant, Pythagorus, Leornado da Vinci, Pythagorus, Newton.

Basic Scientific Principles:

Newton's Laws; Vectors - Motion and Forces in Two Dimensions; Momentum and Its Conservation; Work, Energy, and Power; Circular Motion and Satellite Motion.

Learning Activities

A visual and qualitative approach will be taken to deliver this module. Allowing students with limited technical and analytical skills to develop and evaluate proposed design solutions. This will be achieved by a series of lectures, practical activities and case studies of particular historic interest.

Notes

This module will be made accessible and interesting to the student by relating to historical famous scientists and their philosophy and principles to design. It will also use a range of pivotal case studies and instances of these practices are found in modern consumer products.