

Liverpool John Moores University

Title: ACTUATION SYSTEMS
Status: Definitive
Code: **5511ENGIOM** (107405)
Version Start Date: 01-08-2011

Owning School/Faculty: Engineering
Teaching School/Faculty: Isle of Man College

Team	Leader
Gary Colquhoun	Y

Academic Level: FHEQ5
Credit Value: 12.00
Total Delivered Hours: 26.00
Total Learning Hours: 120
Private Study: 94

Delivery Options

Course typically offered: Semester 1

Component	Contact Hours
Lecture	18.000
Practical	3.000
Tutorial	3.000

Grading Basis: 40 %

Assessment Details

Category	Short Description	Description	Weighting (%)	Exam Duration
Exam	AS1	Examination	70.0	2.00
Essay	AS2	lab assignment	15.0	
Essay	AS3	lab assignment	15.0	

Aims

To develop the students understanding of the principles of hydraulic, pneumatic and electrical actuation within the context of mechanical equipment and automation systems.

Learning Outcomes

After completing the module the student should be able to:

- 1 explain the characteristics of the elements of actuation systems.
- 2 discuss circuit design and recall international standards.
- 3 employ appropriate theory to the design and appraisal of actuation systems.
- 4 use hydraulic, pneumatic and electrical actuators in the design of mechanical systems
- 5 discuss the electrical and electronic interfaces necessary to control hydraulic and pneumatic systems

Learning Outcomes of Assessments

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

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

Outline Syllabus

Cylinders, rotary and linear actuators, hydraulic power units. International standards, understanding and analysing circuit diagrams. Force analysis for mechanical applications. Flow, pressure and energy considerations in circuit design. Valve actuation and control, electrical interfaces including different types of transducers. Electrical actuation systems. The use of PLC control, the design of integrated electrical/electronic/fluid systems and cost considerations in circuit design. Commercial equipment, selection criteria and software for circuit design.

Learning Activities

A series of lectures supported by tutorials and laboratories.

References

Course Material	Book
Author	Bolton, W.
Publishing Year	2003
Title	Mechatronics
Subtitle	
Edition	3rd ed
Publisher	Pearson
ISBN	

Course Material	Book
Author	Cetinkunt, S.
Publishing Year	2007
Title	Mechatronics
Subtitle	
Edition	
Publisher	Wiley
ISBN	

Notes

The module provides a broad view of hydraulic, pneumatic and electrical actuation systems. On completion a student should be able to competently design or analyse a basic system including specification, circuit, mechanical analysis and electrical interfaces.