

UNIVERSITY OF MAURITIUS
MODULE SPECIFICATION SHEET

1. GENERAL INFORMATION

Academic Year: 2009/2010

Semester(s): 1

Title	Code	Duration (hrs per week)	N° of credits
<u>PNEUMATICS AND HYDRAULICS SYSTEMS</u>	MECH 4011 (5)	Lectures: 2	2.5
		Practicals: 1	
		Total: 3	

2. PRE-REQUISITE(S)/PRE-REQUIREMENT(S): NIL

3. AIMS

This course is an introduction to the use of pneumatics and hydraulics in industrial automation. The objectives of the course are to enable the student to:

- Understand the basic principles of pneumatics and hydraulics
- Identify pneumatic and hydraulic components and their functions
- Integrate Basic Electrical Control in the Pneumatics/Hydraulics circuits.
- Read and interpret basic Hydraulics/Pneumatics, and electro-pneumatics/hydraulics circuits using ISO symbols
- Design and draw basic and advanced circuits for given problem descriptions
- Perform troubleshooting on pneumatic/hydraulic and electro pneumatic/hydraulic systems

4. OUTLINE SYLLABUS

- Pneumatics: Generation of pneumatic power, Valves, actuators, design of pneumatic circuits
- Hydraulics: Generation of hydraulic power, Valves, actuators, design of hydraulic circuits
- Sensors
- Electrohydraulic & Electropneumatic Systems and Components; Design of electrical control circuits.
- Introduction to Proportional Control
- Fluidics - Wall attachment principle; Fluidic elements- applications
- Safety Aspects
- Applications and Comparisons between Different Systems
- Systems Integration and Interfacing to PLC's and Microprocessors.
- Mini-project.

5. LEARNING OUTCOMES

Having studied this module, the students should be able to:

- Assess the suitability of a particular power and control medium for specific industrial applications
- Select the appropriate components and sensors.
- Design and implement a circuit to perform a specified task.
- Troubleshoot and maintain the system.

6. COORDINATOR/S and LECTURER:

	Programme Coordinator	Lecturer
Name	D K HURREERAM	S. VENKANNAH
Department	Mechanical & Prod Engg	Mechanical & Prod Engg
Building	5 th Floor, Engg. Tower	5 th Floor, Engg. Tower
Room Number	5.2	5.4
Phone No.	4037840	4037845
E-mail address	Elahee@uom.ac.mu	sv@uom.ac.mu
Consultation Time	N/A	0900hrs-1500hrs

8. VENUE AND HOURS/WEEK

8.1 **Lectures:** All lectures will be held in the rooms given in the Table below (or contact Lecturer for more details).

Day	Time	Room No.	Remarks
Wednesdays	0900-1030	4.2	
Saturdays	1300-1430	42	

8.2 **Practicals:** Robotics and Fluid Power lab., Fifth Floor, Engg Tower, (Ext. 7846)

- *Technician* : Mr Rioux

9. RECOMMENDED BOOKS/JOURNALS/WEBSITES

(All books Available in the UoM Library) :

- a. Fluid Power with Applications by Anthony Esposito, 6th Edition. Mc Graw Hill
- b. Basics for the Fluid Power Mechanic by J J Pippenger & Gordon, TJ 950.P5 1994
- c. Fluid Power Design Handbook by F Yeaple, TJ 843.Y43 1995
- d. Handbook of Hydraulic Fluid Technology by Totten, TJ 843.H36 2000
- e. Additional notes available at <http://courses.uom.ac.mu/>

10. MODULE MAP

Week No	Topic
1 & 2	Introduction to Pneumatics and Hydraulics; Basics of Fluid Power – Pressure, Volume, Force Etc..
	Generation of Pneumatic & Hydraulic Power Applications and Comparisons between different systems / <i>Tutorials</i>
Weeks 3-5	Configuration and operating systems including constraints, linear and rotational drives, actuators / <i>Tutorials</i>
	Safety Aspects when designing Pneumatic and Hydraulic Systems Distributed systems and control devices Design of cascade circuits and troubleshooting/ Tutorials
6-7	Electropneumatic/ Electrohydraulic Systems Circuit Designs /Tutorials/ Test 1
8	Introduction to Proportional Control Fluidics - Wall attachment principle; Fluidic elements- applications
9-10	Systems Integration and Interfacing to PLC's and Microprocessors /Test 2

11. ASSESSMENT

- Exams : A two hour paper at the end of the semester
 - Coursework : Assessment by three compulsory class tests of one hour duration each and one assignment. Students will have to submit lab reports on all circuits designed and implemented or simulated.
 - Maximum Marks : 100 %
 - Grading
- | | |
|-------------|-----|
| Exams | 70% |
| Course Work | 30% |

(i) **Written Examination:** Weighting (%): 70

Paper Structure	
Sections (if any): 1	No. of questions to be answered: 4
Multiple Choice Questions: Nil	Compulsory Questions (if any): Nil
Exams date: NA	Paper Duration: 2 hrs
Weighting (%): 70	
Total Marks: 100	Overall Pass Mark: 40

(ii) **Continuous Assessment** - Weighting (%): 30

	Weighting (%)
Assignment(s) & Lab: Attendance and reports	10
Test(s): 3	20
Total Marks:	30

Note: Marks will be given to a student for the Lab reports only if the student has implemented and tested or simulated the design/s in the lab.

OTHERS:

- ❖ *Labwork : Labworks are compulsory and will be conducted in the Robotics and Fluid Power Lab., Fifth Floor, Engg Tower. There are scheduled lab sessions but students can have access any other time/day to work on the equipment, if the lab is free. Technician and Lecturer must be informed accordingly .*
- ❖ *All students will have to sign in the log book before using any equipment in the lab.*
- ❖ *Students will not be allowed further access to the Lab. in case they are caught misbehaving and/or tampering with other equipment in the Lab.*
- ❖ *Students are requested to tidy up the workbench before they leave the lab.*