COURSE OUTLINE

(1) GENERAL INFORMATION

SCHOOL	FACULTY OF ENGINEERING			
DEPARTMENT	ELECTRICAL AND COMPUTER ENGINEERING			
LEVEL OF STUDIES	POSTGRADUATE			
COURSE CODE	SEMESTER 2nd			
COURSE TITLE	HYDRAULIC AND PNEUMATIC POWER SYSTEMS			
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS CREDITS	
Lectures		3	5	
Add extra space if necessary				
COURSE TYPE	Special knowledge			
Scientific field	Development of special skills			
special knowledge Development of special skills				
PREREOUISITES:				
LANGUAGE OF INSTRUCTION and	Greek			
EXAMS:				
COURSE AVAILABLE TO ERASMUS	yes			
STUDENTS:				
COURSE WEB PAGE (URL)	https://eclass.uowm.gr/courses/MPE103/			

(2) LEARNING OUTCOMES

Learning Outcomes

The aim of the course is to introduce the student to the theory and applications of Hydraulic and Pneumatic Power Systems and their control. The cases where these systems have advantages over electrical systems are examined and their basic characteristics are discussed. The basic building blocks of basic hydraulic and pneumatic circuits are analysed and the operation of basic circuits is explained through theoretical presentation and through tutorial exercises to explain their functional characteristics in detail. An appropriate software program (Automation Studio) is used to simulate hydraulic and pneumatic systems in order to better understand their operation and design control modes. The student will be engaged in selected laboratory exercises and attend demonstrations of hydraulic and pneumatic systems in the laboratory. Also after each laboratory exercise the student will be required to deliver an individual paper in which he/she will analyze the operation of the corresponding circuit and present the measurements of the quantities recorded with appropriate annotation to substantiate the answers to the questions of the exercise. At the same time, emphasis is given to the design of hydraulic and pneumatic power systems in practical problems.

Upon completion of the course, the student should

- Identify and describe the basic components of hydraulic and pneumatic power systems

- Understand and explain the principles of hydraulic and pneumatic power systems

- compare and evaluate the advantages and disadvantages of hydraulic and pneumatic power systems

- Implement experimental devices in the laboratory and analyse their operation

- Simulate and explain the operation of hydraulic and pneumatic systems and correctly record the operational characteristics of the circuit

- Analyse and design hydraulic and pneumatic power systems - Design control circuits for hydraulic and pneumatic power systems and dimension the necessary circuit elements based on the required

function

- Use the knowledge gained to understand systems in various practical applications

General Skills

- Search, analysis and synthesis of data and information, using the necessary technologies
- Autonomous work
- Decision-making
- Planning and managing projects Using the necessary skills and knowledge
- Work autonomy - Decision-making and management
- - Ability to work in an international environment

(3) COURSE CONTENT

- 1. Hydraulic power systems
- Hydraulic fluids
- Basic principles of hydraulics
- Hydraulic pumps, motors, cylinders
- Valves and control components
- Hydraulic system accessories Applications
- 2. Pneumatic power systems
- Basic principles
- Pneumatic cylinders, motors, compressors
- Circuits, applications
- Electrical Control
- Simulation of hydraulic and pneumatic systems and control

3. Electrical Control

- Simple electrical control with switches and contacts
- Control with PLC
- 4. Simulation of hydraulic and pneumatic systems and control

(4) TEACHING and LEARNING METHODS - ASSESSMENT

COURSE DELIVERY MODE lectures, face-to-face, distance learning etc.	Distance learning		
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY e.g. use of audiovisual media and computers etc.	 Learning process support through the e-class electronic platform. Specialized software for system simulation and controller calibration. 		
TEACHING METHODS	Method Description	Semester workload	
Derailed description of the teaching methods used: Lectures Seminars Laboratory exercises Study	Lectures	26	
	Laboratory exercises	13	
& bibliography analysis, Tutoring,	Study & bibliography	30	
Internship/Practicum, Art Workshop, Interactive	analysis,		

Teaching, Projects, Written Assignments, Artistic creation etc. Study hours for each learning activity are included along with the non-guided study hours according to the ECTS principles	Final Project	81
ASSESSMENT METHODS AND CRITERIA Description of the assessment methods and criteria: Language of Assessment, Assessment Methods, Formative or Concluding Assessment, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Reports, Oral Exam, Essay, Oral Presentation, Clinical Examination of patient, Artistic Performance, Others Assessment criteria are explicitly defined and stated.	Laboratory work (20%) - Individual project assign - Final project (50%)	ıment (30%)

(5) RECOMMENDED BIBLIOGRAPHY

-Recommended Bibliography:

- Th. N. Kostopoulos Hydraulic and Pneumatic power systems, Symeon publications, ISBN:978-960-7888-97-6, Code Eudoxos: 50658650.
- A. Routoulas, Hydraulic and Pneumatic power systems applications, Sychrnoni Ekdotiki publications, ISBN: 978-960-6674-26-6, Code Eudoxos:16083.- Συναφή επιστημονικά περιοδικά:
- Συναφή επιστημονικά περιοδικά:
- IEEE transactions on industry applications
- IEEE transactions on Power Delivery