COURSE OUTLINE

1. GENERAL

SCHOOL	ENGINEERING		
DEPARTMENT	PRODUCT AND SYSTEMS DESIGN ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**4301**	**SEMESTER**	**7**
COURSE TITLE	**K3 - Introduction in Mechatronics**		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	**3**	**6**
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	Special background, skills development
PREREQUISITE COURSES:	NONE
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK/ENGLISH
COURSE DELIVERED TO ERASMUS STUDENTS	YES
MODULE WEB PAGE (URL)	https://eclass.uowm.gr/

2. LEARNING OUTCOMES

Learning outcomes

On successful completion of this module the learner will be able to:

The students are able to:

- select the appropriate sensors for an application.
- select the appropriate motors/actuators and corresponding drive systems to perform an operation.
- design a kinematic chain.
- design a control system.
- program a microprocessor/microcontroller to perform an operation.
- select the appropriate interface and protocols for the transmission of data to a mechatronic system.
- analyze a mechatronic system using mathematical models and/or the use of computers.

General Skills

Upon successful completion of the program students will:

- have the theoretical and practical background on the field of product and systems design engineering and the corresponding profession.
- utilize scientific knowledge to understand, analyze and solve problems.
- apply a wide range of scientific and technical knowledge concerning the design and development of products and systems.

3. COURSE CONTENTS

Introduction to Mechatronics, measurement systems, control and feedback systems, design

principles, mathematical model processing, transfer functions, structural diagrams, introduction to sensors, sensor types and principle of operation, sensor characteristics, sensor selection, signal processing input, time response and system stability, operational amplifier, analog and digital signals, analog-digital and digital-analog (A/D and D/A) converter, mechanical systems (wheels, chains, belts, gears, bearings), AC and DC motors (DC and AC) - stepper motors and servomotors, motor selection, electric motor drive, power electronics - converters (DC-DC, voltage drop, DC-AC, voltage rectifiers), pulse width modulation (PWM), switches and solenoids, hydraulic and pneumatic systems (actuators, valves), microprocessors, microcontrollers and logic programming, logic system design communications systems (networks, protocols, interfaces).

4. TEACHING METHODS - ASSESSMENT

<table>
<tr><td>MODE OFDELIVERY</td><td>In class, face to face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>• Video and slide presentations via projector
• Support of teaching process via the electronic platform e-class
• Communication with students.</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>90</td></tr>
<tr><td>Non-directed study</td><td>60</td></tr>
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<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>150</td></tr>
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<tr><td>ASSESSMENT METHODS</td><td>Final written exam which includes:
i. Short-answer questions
ii. Multiple choice questions
iii. Problem solving</td></tr>
</table>

5. ATTACHED

- Suggested bibliography:

1. Βιβλίο [50661508] Μηχατρονική, Ηλεκτρονικά Συστήματα Ελέγχου για Επιστήμονες και Μηχανικούς, 6η Έκδοση, Bolton William Λεπτομέρειες
2. Βιβλίο [68401264]: Εισαγωγή στη Μηχατρονική και στα ενσωματωμένα συστήματα, Αλατσαθιανός Σταμάτης Λεπτομέρειες
3. Βιβλίο [18548929]: Μηχατρονική, Nesculescu Dan Λεπτομέρειες