COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF SCIENCES		
DEPARTMENT	DEPARTMENT OF CHEMISTRY		
LEVEL OF STUDIES	ISCED level 6 – Bachelor's or equivalent level		
COURSE CODE	EN18	**SEMESTER**	7th Semester
COURSE TITLE	Robotics Principles and Mechatronics		

TEACHING ACTIVITIES *If the ECTS Credits are distributed in distinct parts of the course e.g. lectures, labs etc. If the ECTS Credits are awarded to the whole course, then please indicate the teaching hours per week and the corresponding ECTS Credits.*	**TEACHING HOURS PER WEEK**	**ECTS CREDITS**
	3	3
Please, add lines if necessary. Teaching methods and organization of the course are described in section 4.		

COURSE TYPE *Background, General Knowledge, Scientific Area, Skill Development*	General Background
PREREQUISITES:	
TEACHING & EXAMINATION LANGUAGE:	Greek
COURSE OFFERED TO ERASMUS STUDENTS:	NO
COURSE URL:	-

(2) LEARNING OUTCOMES

Learning Outcomes
Please describe the learning outcomes of the course: Knowledge, skills and abilities acquired after the successful completion of the course.

The course is preparatory for practice and advanced study in robotic systems. It intends to introduce the student to the basic principles of robot and sensor operation. The purpose of the course is threefold: (i) to provide theoretical and practical understanding of robotic systems, (ii) to provide practical experience in the use of robotic systems, and, (iii) to encourage and encourage further study in the area of Robotics. The presentation aims to develop interest in applying the course material in the laboratory. Particular emphasis is placed on problem solving.

Upon successful completion of the course, students will:

• Have demonstrated knowledge and understanding of topics in the subject area, which is based on their general secondary education and, while supported by advanced-level scientific textbooks, also includes views arising from modern developments at the cutting edge of their field of knowledge.

• They are able to use the knowledge and understanding they have acquired in a way that demonstrates a professional approach to their work or profession and have the skills which are typically demonstrated by developing and supporting arguments and solving problems within the context of the course's cognitive field

General Skills

Name the desirable general skills upon successful completion of the module

Search, analysis and synthesis of data and information,	*Project design and management*
ICT Use	*Equity and Inclusion*
Adaptation to new situations	*Respect for the natural environment*
Decision making	*Sustainability*
Autonomous work	*Demonstration of social, professional and moral responsibility and*
Teamwork	*sensitivity to gender issues*
Working in an international environment	*Critical thinking*
Working in an interdisciplinary environment	*Promoting free, creative and inductive reasoning*
Production of new research ideas	

- Search, analyze and synthesize data and information, using the necessary technologies
- Adapt to new situations
- Make decisions
- Work in an interdisciplinary environment

(3) COURSE CONTENT

1. Basic concepts and definitions. Historical review. Advantages and requirements of Mechatronics.

2. Applications of Mechatronics with detailed examples.

3. Energy converters - Basic principles. Pneumatic, hydraulic and electromagnetic actuators and motors.

4. Determination of angular position and speed of a motor shaft.

5. DC motor control. Stepper motor driving.

6. Microcontrollers for mechatronic systems.

7. Measurements and sensors for mechatronic systems. General.

8. Position, velocity, force, torque, displacement, distance, proximity, conductivity, level, flow, piezoelectric, pressure sensors.

9. Acceleration, optical, thermographic, infrared, ultrasonic, temperature, voltage and current sensors.

(4) LEARNING & TEACHING METHODS - EVALUATION

TEACHING METHOD *Face to face, Distance learning, etc.*	Face to face	
USE OF INFORMATION & COMMUNICATIONS TECHNOLOGY (ICT) *Use of ICT in Teaching, in Laboratory Education, in Communication with students*	Use of ICT in Teaching Use of ICT in Communication with students	
TEACHING ORGANIZATION	**Activity**	**Workload/semester**

The ways and methods of teaching are described in detail. *Lectures, Seminars, Laboratory Exercise, Field Exercise, Bibliographic research & analysis, Tutoring, Internship (Placement), Clinical Exercise, Art Workshop, Interactive learning, Study visits, Study / creation, project, creation, project. Etc.* *The supervised and unsupervised workload per activity is indicated here, so that total workload per semester complies to ECTS standards.*	Lectures: 39 Bibliographic research & analysis: 36
STUDENT EVALUATION *Description of the evaluation process* *Assessment Language, Assessment Methods, Formative or Concluding, Multiple Choice Test, Short Answer Questions, Essay Development Questions, Problem Solving, Written Assignment, Essay / Report, Oral Exam, Presentation in audience, Laboratory Report, Clinical examination of a patient, Artistic interpretation, Other/Others* *Please indicate all relevant information about the course assessment and how students are informed*	**Student evaluation languages** Greek **Method (Formative or Concluding)** Summative **Student evaluation methods** Written Exam with Problem Solving **Rate** **100**

(5) SUGGESTED BIBLIOGRAPHY

1. Εισαγωγή στη ΜΗΧΑΤΡΟΝΙΚΗ και στα ενσωματωμένα συστήματα, Αλατσαθιανός Σ
2. Εισαγωγή στη Ρομποτική, Graig John
3. Μηχατρονική, Bolton William