ROBOTICS
COURSE OUTLINE

(1) GENERAL

SCHOOL	ENGINEERING		
ACADEMIC UNIT	INFORMATICS AND COMPUTER ENGINEERING		
LEVEL OF STUDIES	UNDEGRADUATE		
COURSE CODE		**SEMESTER**	**7th , 9th**
COURSE TITLE	Robotics		

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	
Laboratory Exercises	1	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).	4	5

COURSE TYPE general background, special background, specialised general knowledge, skills development	Specialised general knowledge, skills development
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes in English
COURSE WEBSITE (URL)	

(2) LEARNING OUTCOMES

Learning outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.
Consult Appendix A

- Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area
- Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B
- Guidelines for writing Learning Outcomes

Upon successfully completing this course, student will be able to:

- Recognize what the parts of a robot manipulator and identify their role in achieving specific tasks.
- Understand the concepts of transformations in space and kinematics problem.
- Solves the direct and inverse kinematic problem of a robotic arm.
- Studies and analyzes the velocities, forces and trajectories of a robotic arms.
- Has the ability to program industrial robots.
- Designs robotic systems as well as their movement for specific scenarios using simulation software.
- Understand, design and critically appraise navigation, guidance and communication for autonomous systems

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the	Project planning and management
	Respect for difference and multiculturalism

necessary technology Adapting to new situations Decision-making Working independently Team work Working in an international environment Working in an interdisciplinary environment Production of new research ideas	Respect for the natural environment Showing social, professional and ethical responsibility and sensitivity to gender issues Criticism and self-criticism Production of free, creative and inductive thinking …… Others… …….
Search for, analysis and synthesis of data and information, with the use of the necessary technology Decision-making Working independently Team work Production of free, creative and inductive thinking	

(3) SYLLABUS

The purpose of the course is to familiarize the students with the basic principles of robotics, which is a constantly evolving, modern and "multi-collective" science, with significant implications in all human activity fields.
Emphasis is placed on the description and analysis of industrial robots, which they are an essential tool in all modern industrial production units.
Contents:

- Introduction to robotics
- Structure and operation of the basic parts of an industrial robot
- Applications of robotics in industry and elsewhere
- Coordinate systems
- Direct and inverse kinematic analysis of robotic arms
- Dynamic analysis of robotic arms
- Trajectory generation
- Control of robots
- Sensory systems in robotics
- Robot programming

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY Face-to-face, Distance learning, etc.	Face-to-face, simulation software, laboratory exercises and projects
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY Use of ICT in teaching, laboratory education, communication with students	Use of ICT in: • Teaching • Laboratory education • Communication with students
TEACHING METHODS The manner and methods of teaching are described in detail. Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc. The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS	**Activity** / **Semester workload** Lectures: 39 Laboratory practice: 10 Project: 21 Fieldwork: 55 Course total: **125**
STUDENT PERFORMANCE EVALUATION Description of the evaluation procedure Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other Specifically-defined evaluation criteria are given, and if and where they are accessible to students.	The final grade of the course is determined by 75% of the grade of the theoretical part and by 25% of the grade of the laboratory part. The grade of the theoretical part is formed by 30% from an intermediate written exam and by 70% of the final written exam. The grade of the laboratory part is formed by submitting and examining one individual work, which contributes 30%, and from the final examination, which contributes by 70%.

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

1. J. Craig, Introduction to Robotics: Mechanics and Control, Pearson, 2022
2. Ζ. Δουλγέρη, Ρομποτική, Εκδόσεις Κριτική, 2009.
3. Δ. Εμίρης, Δ. Κουλουριώτης, Εκδόσεις ΣΕΛΚΑ-4μ, 2015.
4. M. Mataric, Βασικές αρχές Ρομποτικής, Εκδόσεις Κλειδάριθμος, 2010.
5. B. Siciliano, L. Sciavicco, L. Villani, G. Oriolo, Ρομποτική, Εκδόσεις Φούντας, 2013.
6. H. Asada, J. Slotine, Robot analysis and Control, John Wiley & Sons, 1986.
7. R. Siegwart, I. Nourbakhsh, Introduction to Autonomous Mobile Robots, MIT Press, 2004.