Universidad del País Vasco — Euskal Herriko Unibertsitatea

COURSE GUIDE 2025/26

Faculty 363 - Faculty of Engineering - Bilbao **Cycle** .

Degree GIEIAU30 - Bachelor's Degree in Industrial Electronics and Automation Engine **Year** Third year

COURSE

25998 - Robotics **Credits, ECTS:** 6

COURSE DESCRIPTION

Faculty: School of Engineering of Bilbao
Degree: Degree in Industrial Electronic and Automatic Engineering
Compulsory. 3rd year

The students of this subject will have the possibility to study the applications and the control of a robot. In addition to acquiring basic and theoretical knowledge of the subject, they will learn to simulate and program within a robotic environment. This subject is closely related with the 2nd year courses of Automation and Control, Industrial Electronics and, in particular, to Automatic Control that was taught last fall.

COMPETENCIES/LEARNING RESULTS FOR THE SUBJECT

Knowledge of principles and applications of robotic systems
Knowledge and ability to model and simulate robotic systems
Ability to analyze and design controls for robotic systems taught last fall

Theoretical and Practical Contents

Unit 1: Introduction to industrial robotics.
Unit 2: Morphology of the robot.
Unit 3: Programming and simulation of robots.
Unit 4: Spatial localization.
Unit 5: Geometric and kinematic models.
Unit 6: Dynamic models and control systems for industrial robots.

TEACHING METHODS

Lecture: Development of the subject through audio-visual media
Seminar: Practical development of the subject through exercises.
Laboratory: Laboratories will be carried out in order to simulate the acquired knowledge.

TYPES OF TEACHING

Types of teaching	M	S	GA	GL	GO	GCL	TA	TI	GCA
Hours of face-to-face teaching	30		15	15					
Horas de Actividad No Presencial del Alumno/a	45		30	15					

Legend: M: Lecture-based; S: Seminar; GA: Applied classroom-based groups; GL: Applied laboratory-based groups; GO: Applied computer-based groups; GCL: Applied clinical-based groups; TA: Workshop; TI: Industrial workshop; GCA: Applied fieldwork groups

Evaluation methods

- Continuous evaluation
- End-of-course evaluation

Evaluation tools and percentages of final mark

- Written test, open questions 60%
- Exercises, cases or problem sets 20%
- Teamwork assignments (problem solving, Project design) 20%

ORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

70% class attendance is compulsory for continuous assessment. Else, a final assessment is automatically considered.
60% Examination (compulsory). The student must have 50% in this exam.
20% Laboratory reports (optional):
They should be delivered the same day of the laboratory.
Reports should be personal.
If no report is delivered its corresponding score in the final grade will be lost.
20% Deliverables (optional):
The students will deliver an electronic portfolio (pdf, ppt, matlab files...) and will perform a public presentation. This work should be proposed individually. It will focus on the control of a given physical system. The system should be as realistic as possible. The controller will be developed and implemented to achieve the requirements of the proposed system.
The presentation of the project will take place in the last weeks of the year. It will consist of a 15 minutes lecture plus 5

minutes for questions and answers.
If no optional task is delivered, its corresponding score will be lost in the final grade.

The student has the right to a 100% Examination evaluation upon request. The request should be addressed to the lecturer up to 4 weeks before the exam, and signed by both the lecturer and the student.

In the event that health conditions prevent face-to-face teaching activity and / or assessment, a non-contact modality will be activated and the students will be duly informed.

EXTRAORDINARY EXAMINATION PERIOD: GUIDELINES AND OPTING OUT

The student has the right to a 100% Examination evaluation upon request. The request should be addressed to the lecturer up to 4 weeks before the exam, and signed by both the lecturer and the student.

In the event that health conditions prevent face-to-face teaching activity and / or assessment, a non-contact modality will be activated and the students will be duly informed.

MANDATORY MATERIALS

Ez da behar

BIBLIOGRAPHY

Basic bibliography

-"Fundamentos de Robótica", Barrientos y cols., Ed. McGraw Hill,1997
-"Robótica Industrial", G. Ferraté y cols., Ed. Marcombo, 1986
-Robotica: Manipuladores y Robots Móviles. A. Ollero. Ed. Marcombo
-Craig, J.J., 1989, Introduction to robotics, mechanics and control (2nd Ed.). Addison-Wesley, Reading,

Detailed bibliography

Robótica: Control, Detección, Visión e Inteligencia. Fu González Lee. Ed. McGraw-Hill, 1988.
-Introduction To Robotics. Phillip John McKerrow. Ed. Addison-Wesley, 1993.
-Spong, M.W. and Vidyasagar, M., 1989, Robot dynamics and control. John Wiley, New York
-Etxebarria v., 1999, Sistemas de control no lineal y robótica., Servicio Editorial de la UPV/EHU. Bilbao

Journals

-Automatica
-International Journal of Humanoid Robotics -Robotics & Automation Magazine, IEEE
-Robotics and Autonomous Systems - Elsevier
-Journal of Robotics and Mechatronics
-The International Journal of Robotics Research
-International Journal of Control - IEEE Transactions on Robotics

Web sites of interest

Web sites
http://www.cea-ifac.es/wwwgrupos/robotica/index.html
http://www.ai.mit.edu/projects/humanoid-robotics-group/
http://www.roboticaeducativa.com http://www.webdearde.com
http://www.infoplc.net/Enlace/Enlaces_ROBOTICA.htm

OBSERVATIONS

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