

Course guide

220238 - 220238 - Applied Robotics

Last modified: 11/04/2025

Unit in charge: Terrassa School of Industrial, Aerospace and Audiovisual Engineering
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2013). (Optional subject).
MASTER'S DEGREE IN AERONAUTICAL ENGINEERING (Syllabus 2014). (Optional subject).
MASTER'S DEGREE IN SPACE AND AERONAUTICAL ENGINEERING (Syllabus 2016). (Optional subject).
MASTER'S DEGREE IN INDUSTRIAL ENGINEERING (Syllabus 2025). (Optional subject).

Academic year: 2025 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Jordi Damunt

Others:

TEACHING METHODOLOGY

The course is divided into theory sessions and laboratory sessions.

The theory sessions introduce the basic concepts that will be worked on later in the practice sessions.

In the practice sessions, you will work with the ABB robots in the laboratory and with the ABB RobotStudio simulator

LEARNING OBJECTIVES OF THE SUBJECT

- . To authorize the student for the comprehension and analysis of the problems that appear during the process of automation of tasks using robots.
- . To acquire skills in the use of robots.
- . To acquire skills in order to robotize tasks and processes.
- . To introduce the student to the complexity of the integration of different technologies with the robotics world.

STUDY LOAD

Type	Hours	Percentage
Hours large group	27,0	36.00
Self study	48,0	64.00

Total learning time: 75 h



CONTENTS

Applied Robotics

Description:

This course is based in the practical development of a "hands-on" application of a robotized system applied to a real case study. The applications must be proposed by lecturers and will include a real case based industrial robot application. Projects will be mainly based on ABB industrial robots using RAPID as a program language, but some other robotic platforms as another kind of manipulators can be also considered.

Applications will be developed by groups and teachers will assess and supervise each student's teamwork in order to help them in the project development and to solve possible doubts. Nevertheless students, organized in teamwork need to work also in autonomous way, on the used equipment in order to develop solutions according to the project goals. Students could be asked to prepare written reports, oral presentations and public demonstration of the project functionality.

Specific objectives:

- . To authorize the student for the comprehension and analysis of the problems that appear during the process of automation of tasks using robots.
- . To acquire skills in the use of robots.
- . To acquire skills in order to robotize tasks and processes.
- . To introduce the student to the complexity of the integration of different technologies with the robotics world.

Full-or-part-time: 75h

Theory classes: 27h

Self study : 48h

GRADING SYSTEM

Final theory test: 40%

Lab sessions results: 50%

Theory deliverables: 10%

Students who cannot attend the final theory exam or who want to improve their result, will have the option to recover it by means of an additional written test that will be taken on the day set in the final exam calendar for the renewal of optional bimonthly subjects. The grade of this recondition test will be between 0 and 10, replacing that of the partial exam whenever and wherever it is higher.

EXAMINATION RULES.

The final theory exam will be individual and written.

The laboratory sessions can be worked on individually or in groups. A report must be made for each practice.

The theory deliverables will be individual and delivered by Atenea.

BIBLIOGRAPHY

Basic:

- RAPID reference manual: system data types and routines on-line [on line]. Västerås: ABB Robotics Products AB, [2013?] [Consultation: 22/06/2020]. Available on: https://library.e.abb.com/public/688894b98123f87bc1257cc50044e809/Technical%20reference%20manual_RAPID_3HAC16581-1_revJ_en.pdf.

- Fu, K. S.; González, Rafael C.; Lee, C.S.G. Robotics : control, sensing, vision, and intelligence. New York: McGraw-Hill, cop. 1987. ISBN 0070226253.

RESOURCES

Other resources:

RobotStudio Simulator (ABB)