Course guide
205214 - SR - Safety Robotics and Automation for Industry 4.0

Last modified: 19/04/2023

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

Degree:	BACHELOR'S DEGREE IN CHEMICAL ENGINEERING (Syllabus 2009). (Optional subject).
	BACHELOR'S DEGREE IN ELECTRICAL ENGINEERING (Syllabus 2009). (Optional subject).
	BACHELOR'S DEGREE IN INDUSTRIAL ELECTRONICS AND AUTOMATIC CONTROL ENGINEERING (Syllabus 2009). (Optional subject).
	BACHELOR'S DEGREE IN MECHANICAL ENGINEERING (Syllabus 2009). (Optional subject).
	BACHELOR'S DEGREE IN TEXTILE TECHNOLOGY AND DESIGN ENGINEERING (Syllabus 2009). (Optional subject).
	BACHELOR'S DEGREE IN AEROSPACE TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).
	BACHELOR'S DEGREE IN AEROSPACE VEHICLE ENGINEERING (Syllabus 2010). (Optional subject).
	BACHELOR'S DEGREE IN INDUSTRIAL DESIGN AND PRODUCT DEVELOPMENT ENGINEERING (Syllabus 2010). (Optional subject).
	BACHELOR'S DEGREE IN INDUSTRIAL TECHNOLOGY ENGINEERING (Syllabus 2010). (Optional subject).

Academic year: 2023   **ECTS Credits:** 3.0   **Languages:** English

LECTURER

Coordinating lecturer:	RITA MARIA PLANAS DANGLA
Others:	

TEACHING METHODOLOGY

The course is divided into parts:

• Theoretical and work group sessions
• Laboratory sessions

Self-study (including proposed exercises and activities) will be also contemplated.

In the theory classes, teachers will introduce the theoretical basis of the concepts, methods and results and illustrate them with examples appropriate to facilitate their understanding. Students, working in groups will use the new concepts to specify its solution in order to solve the proposed challenge.

In the lab sessions, teachers guide students in applying theoretical concepts to solve problems, always using critical reasoning.

Students, independently, need to work on the materials provided by teachers in order to fix and assimilate the concepts.

The teachers provide the syllabus and monitoring of activities (by ATENEA)

LEARNING OBJECTIVES OF THE SUBJECT

This course is based on the practical development of a "hands-on" application on Safety Robotics and Automation under Industry 4.0 specifications. The applications to be developed, will be proposed as real challenges from a leading company in the industrial security sector, and will be supervised by lecturers.

Depending on proposed challenges, applications will be developed by pairs or by groups and in both cases, teachers will assess and supervise each student's teamwork in order to help them in the project development and to solve possible doubts.

- To acquire knowledgement about Industry 4.0 and safety concepts and standards
- To acquire knowledgement about industrial safety.
- To design safety automation
- To acquire knowledge about safety robotics.

STUDY LOAD

Type	Hours	Percentage
Hours large group	30,0	40.00
Self study	45,0	60.00

Total learning time: 75 h

CONTENTS

MODULE 1

Description:
Introduction to Industry 4.0
Introduction to Industrial Safety

Safety Automation:
- Safety Design (ISO 13849-1/ EN 62061)
- Risk Assessment
- Security components

Safety Robotics.
- Safety Design
- Safe human-robot collaboration (COBOTS)
- Security components

Related activities:
To develop the complete solution about safety automation and safety robotics for the given challenge. The developed work should cover all the steps to obtain a complete solution: Risk calculation, selection of components, physical installation of the different elements, secure controller programming, etc.

Full-or-part-time: 75h
Theory classes: 30h
Self study : 45h

GRADING SYSTEM

Laboratory test (individually): 20%
Project results (in group): 50%
Oral presentation of the solution adopted to solve the challenge: 30%

RESOURCES

Other resources:
Varied product manuals from the PILZ house