

Course guide

270541 - TIA - Informatic Technologies for Automation

Last modified: 03/02/2025

Unit in charge: Barcelona School of Informatics
Teaching unit: 707 - ESAII - Department of Automatic Control.

Degree: MASTER'S DEGREE IN INFORMATICS ENGINEERING (Syllabus 2012). (Optional subject).

Academic year: 2024 **ECTS Credits:** 3.0 **Languages:** Catalan, Spanish

LECTURER

Coordinating lecturer: ANTONIO BENITO MARTÍNEZ VELASCO

Others: Segon quadrimestre:
ANTONIO BENITO MARTÍNEZ VELASCO - 10

DEGREE COMPETENCES TO WHICH THE SUBJECT CONTRIBUTES

Specific:

CDG1. Capability to integrate technologies, applications, services and systems of Informatics Engineering, in general and in broader and multidisciplinary contexts.

CTE5. Capability to analyze the information needs that arise in an environment and carry out all the stages in the process of building an information system.

CTE8. Capability to design and develop systems, applications and services in embedded and ubiquitous systems .

Generical:

CG4. Capacity for mathematical modeling, calculation and simulation in technology and engineering companies centers, particularly in research, development and innovation tasks in all areas related to Informatics Engineering.

CG7. Capacity for implementation, direction and management of computer manufacturing processes, with guarantee of safety for people and assets, the final quality of the products and their homologation.

Transversal:

CTR1. ENTREPRENEURSHIP AND INNOVATION: Capacity for knowing and understanding a business organization and the science that rules its activity, capability to understand the labour rules and the relationships between planning, industrial and commercial strategies, quality and profit. Capacity for developing creativity, entrepreneurship and innovation trend.

Basic:

CB6. Ability to apply the acquired knowledge and capacity for solving problems in new or unknown environments within broader (or multidisciplinary) contexts related to their area of study.

TEACHING METHODOLOGY

Teaching methodology is described in Activities

LEARNING OBJECTIVES OF THE SUBJECT

- 1.The objective of this subject is for students to familiarise themselves with the intimate and direct relationship that exists between the technology behind automated production processes and information technology. Students will learn concepts and techniques and the skills to be able to:
- Choose the platforms upon which to execute applications with real time restrictions.
 - Understand the basics of control.
 - Use development tools to simulate, generate and configure applications that can exchange and store information.
 - Program and configure process monitoring systems.

STUDY LOAD

Type	Hours	Percentage
Self study	48,0	64.00
Hours large group	12,0	16.00
Hours small group	12,0	16.00
Guided activities	3,0	4.00

Total learning time: 75 h

CONTENTS

Introduction to industrial automation

Description:

Breu introducció als processos productius i com automatitzar

Requirements of the operating systems for the automation of processes and machines.

Description:

Sistemes de temps real en entorns industrials

Programmable automata, types, architectures and programming

Description:

Introducció als PLC's

Standard communication servers

Description:

Standars MODBUS

Connectivity of SCADA systems with database, other applications and hardware components through 'drivers'

Description:

Sistemes de monitorització de les operacions de les màquines.

ACTIVITIES

AGV computer architecture

Description:

From the given documentation start up the system

Specific objectives:

1

Related competencies :

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Full-or-part-time: 12h

Self study: 2h

Guided activities: 2h

Theory classes: 4h

Laboratory classes: 4h

Kinematics of Mobile Robots

Description:

Introduction to wheeled robots. Wheel types and kinematic equations of motion

Specific objectives:

1

Related competencies :

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Full-or-part-time: 14h

Self study: 2h

Guided activities: 2h

Theory classes: 2h

Practical classes: 4h

Laboratory classes: 4h

Lidar sensors

Specific objectives:

1

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Full-or-part-time: 2h

Theory classes: 2h

Control architectures

Description:

You see the main needs to control a mobile robot: get to a point, follow a line, follow another vehicle, get to a pose

Specific objectives:

1

Related competencies :

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Full-or-part-time: 22h

Self study: 2h

Guided activities: 4h

Theory classes: 4h

Practical classes: 4h

Laboratory classes: 8h

Shortproject

Description:

A mini project will be carried out for a mobile robot to do a task of loading and unloading a pallet

Full-or-part-time: 25h

Self study: 4h

Guided activities: 5h

Laboratory classes: 16h

GRADING SYSTEM

Short Project