1. BASIC INFORMATION

Course	Project: automation and control
Degree program	Bachelor's Degree in Industrial Systems Engineering
School	School of Architecture, Engineering, Science and Computing
Year	2
ECTS	6
Credit type	Mandatory
Language(s)	English
Delivery mode	Face to face
Semester	S2
Academic year	25-26
Coordinating professor	Javier Fernández

2. PRESENTATION

The subject "Integrative Project: Automation and Control" is a compulsory subject within the planning of the Bachelor's Degree in Industrial Systems Engineering at the European University of Madrid. Students must acquire the necessary knowledge to understand the automation pyramid and know how control systems work. This subject is part of an integrative project called "Construction of an automated mechanical system" coordinated with the subject of Theory of Machines and Mechanisms, in which project-based learning uses aspects such as the approach to professions, entrepreneurship, technological innovation.

3. LEARNING OUTCOMES

Knowledge

KNO9: Knowledge of the fundamentals of automation and control methods

- Identify the components of a simple control system

Skills

SK20: Ability to apply the fundamentals of automation and control methods

- Analyze Simple Continuous Systems
- Using a PLC to Control Discrete Event Systems
- Simulate the dynamic behavior of simple continuous systems

Competences

CP3: Ability to solve problems with initiative, decision-making, creativity, critical reasoning and to communicate and transmit knowledge, skills and abilities in the field of Industrial Engineering.

CP9: Create new ideas and concepts based on known ideas and concepts, reaching conclusions or solving problems, challenges and situations in an original way in the academic and professional environment.

CP13: Cooperate with others in the achievement of a shared academic or professional goal, participating actively, empathetically and exercising active listening and respect for all members

CP14: Integrate analysis with critical thinking in a process of evaluating different ideas or professional possibilities and their potential for error, based on evidence and objective data that lead to effective and valid decision-making.

4. CONTENT

- Introduction to automatic regulation
- Basic instrumentation in control systems
- Discrete event systems
- Signals & Systems
- Introduction to system control and regulation

5. TEACHING-LEARNING METHODOLOGIES

The types of teaching-learning methodologies used are indicated below:

- Master class
- Cooperative learning
- Problem based learning
- Project-based learning (PBL)
- Workshop-based learning
- Simulation environments

6. LEARNING ACTIVITIES

Listed below are the types of learning activities and the number of hours the student will spend on each one:

Campus-based mode:

Learning activity	Number of hours
Master classes	10
Practical seminars	15
Problem solving	10
Written reports and essays	5
Research and projects	40
Autonomous study	60
Debates and panel discussions	5
Face-to-face assessment test	5
TOTAL	**150**

7. ASSESSMENT

Listed below are the assessment systems used and the weight each one carries towards the final course grade:

Campus-based mode:

Assessment system	Weight min. %	Weight max.%
Face-to-face assessment test	50	60
Case/problem	15	40
Performance evaluation	5	5
Research / projects	20	40

When you access the course on the *Campus Virtual*, you'll find a description of the assessment activities you have to complete, as well as the delivery deadline and assessment procedure for each one.

8. SCHEDULE

This table shows the delivery deadline for each assessable activity in the course:

Campus-based mode:

Assessable activities	Deadline
Block Diagram Exercises	Week 2
Sensors and Actuators Exercises	Week 4
Contact Language Programs	Week 6
PLC Practice	Week 8
Final Tests	Week 9
Continuous Systems Modeling Exercise	Week 10
Block Diagram Exercises	Week 12
Error and feedback exercises	Week 14
Matlab and Simulink Practice: Modeling and Simulating Continuous Systems	Week 16
Final Tests	Week 17
Demonstration of operation and delivery of the Integrator Project	Week 18

This schedule may be subject to changes for logistical reasons relating to the activities. The student will be notified of any change as and when appropriate.

9. BIBLIOGRAPHY

The recommended Bibliography is:

- K. OGATA, Ingeniería de control moderna. Tercera Edición, Editorial Prentice-Hall.
- R. DORF, Sistemas modernos de control, Editorial Addison-Wesley.
- Barrientos, Antonio, Control de sistemas continuos: problemas resueltos, McGraw-Hill.
- J. BALCELLS, J. L. ROMERAL, Autómatas programables, Marcombo Boixareu.
- A. PORRAS y A. PLÁCIDO, Autómatas programables: fundamento, manejo, instalación y práctica, McGrawHill.
- Piedrafita Moreno, Ramón, Ingeniería de la automatización industrial, RA-MA

10. EDUCATIONAL GUIDANCE, DIVERSITY AND INCLUSION UNIT

From the Educational Guidance, Diversity and Inclusion Unit we offer support to our students throughout their university life to help them reach their academic achievements. Other main actions are the students inclusions with specific educational needs, universal accessibility on the different campuses of the university and equal opportunities.

From this unit we offer to our students:

1. Accompaniment and follow-up by means of counselling and personalized plans for students who need to improve their academic performance.
2. In terms of attention to diversity, non-significant curricular adjustments are made in terms of methodology and assessment for those students with specific educational needs, pursuing an equal opportunities for all students.
3. We offer students different extracurricular resources to develop different competences that will encourage their personal and professional development.
4. Vocational guidance through the provision of tools and counselling to students with vocational doubts or who believe they have made a mistake in their choice of degree.

Students in need of educational support can write to us at:

orientacioneducativa@universidadeuropea.es

11. ONLINE SURVEYS

Your opinion matters!

The Universidad Europea encourages you to participate in several surveys which help identify the strengths and areas we need to improve regarding professors, degree programs and the teaching-learning process.

The surveys will be made available in the “surveys” section in virtual campus or via e-mail.

Your assessment is necessary for us to improve.

Thank you very much for your participation.