

**Course Syllabus (Proyecto/Guía docente de la asignatura)**

Subject	INDUSTRIAL INFORMATICS		
Degrees	1) Bachelor of Engineering in Industrial Technologies (twinned) 2) Industrial Engineering International Semester		
Plan	493	Code	46471
Semester	Spring	Type	Optional
Level/cycle	Bachelor	Year	4th
ECTS	6		
Language	English		
Teaching staff	Ana Cisnal Fernando Tadeo		
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Department	Systems Engineering and Automatic Control		
Fecha de revisión por el Comité de Título	19/06/2026		



1. Sense of the Course (Situación / Sentido de la Asignatura)

1.1 Contextualization (Contextualización)

Industrial Informatics focuses on the analysis, design, and implementation of computer-based applications that respond to the needs of industrial production.

Industrial Informatics is currently a field that is under a strong development of technologies as part of the fourth industrial revolution or Industry 4.0. It is crucial for the engineer to understand the possibilities and opportunities that Industry 4.0 brings with it.

1.2 Relationship with other subjects (Relación con otras materias)

This subject is related to some previous subjects:

- *Basics of computer programming*. Principles of computer programming and Operating Systems, where the student develops the basic skills to work with computers in industrial environments.
- *Fundamentals of automatic control*. Basic concepts of dynamic systems, feedback, and controllers.
- *Production and Manufacturing Systems*. Introduction to industrial communication, robotic technologies, and industrial control systems.

1.3 Recommended Prior Knowledge (Prerrequisitos)

Basic knowledge of computer programming is needed.



2. Competences

2.1 General competences

- CG1. Ability to analyze and synthesize.
- CG2. Organizational capacity and time planning.
- CG5. Ability to learn and work autonomously.
- CG6. Problem-solving capability.
- CG7. Critical reasoning/logical analysis capability.
- CG8. Ability to apply knowledge to practice.
- CG9. Ability to work as a team effectively.

2.2 Specific competences

- CE2. Advanced knowledge about automatic control, its components, constraints, and control methods.
- CE3. Advanced knowledge about computing and programming in industrial environments: use and programming of computers, operating systems, databases, and development environments.
- CE5. Knowledge of basic industrial technologies for the proper functioning of any industrial environment.
- CE12. Knowledge about the fundamentals of automation and control methods.



3. Course goals

- Contextualize the different **techniques and computer applications in the industrial environment**.
- Analyze, program, and design **control systems for industrial applications**.
- Understand the use of **data** in industrial environments.
- Analyze, program, and design **intelligent systems** in industry.





4. Learning Units

Unit 1: Industrial Control Systems

Workload in credits ECTS (Carga de trabajo en créditos ECTS): 2.0

a. Course goals (Objetivos de aprendizaje)

- Contextualize the different **techniques and computer applications in the industrial environment**.
- Analyze, program, and design **control systems for industrial applications**.

b. Contents (Contenidos)

- Introduction to Industrial Control Systems
- Measurement Systems and Instrumentation
- Design of Industrial Control Systems
- Control system technologies and strategies .

c. Bibliography (Bibliografía)

- Seborg, Dale E.; Edgar, Thomas F.; Mellichamp, Duncan A.; Doyle III, Francis J. Process Dynamics and Control (4th Edition). Hoboken, NJ: Wiley, 2019.
- Bolton, William. Instrumentation and Control Systems. 3rd Edition. Oxford: Newnes (Elsevier), 2021.

d. Timing (Temporalización)

ECTS	PERIODO PREVISTO DE DESARROLLO
2.0 credits	Work in classroom: Weeks 1-5

**Unit 2: Industrial Data****Workload in credits ECTS (Carga de trabajo en créditos ECTS):** 1.0**a. Course goals (Objetivos de aprendizaje)**

Students will be able to understand industrial databases and manage them to deal with the large amount of data that manufacturing facilities generate.

b. Contents (Contenidos)

- Introduction to databases
- Relational database model
- SQL Structured Query Language

c. Bibliography (Bibliografía)

- Anthony Molinaro. SQL Cookbook. O'Reilly Media, Inc., 2006 - 595 pages
- Knaflitz, C. N. (2015). *Storytelling with data: a data visualization guide for business professionals*. Hoboken, New Jersey: John Wiley & Sons, Inc.

d. Timing (Temporalización)

CARGA ECTS	PERIODO PREVISTO DE DESARROLLO
1.6 credits	Work in Classroom: Weeks 6-9

**Unit 3: Intelligent Industrial Systems****Workload in credits ECTS (Carga de trabajo en créditos ECTS):** 3.0**a. Course goals (Objetivos de aprendizaje)**

Students will be able to design, analyze and program computer systems for fields like industrial inspection and robot guidance.

b. Contents (Contenidos)

- Components of an intelligent system
- Advanced Python programming
- Intelligent Systems

c. Bibliography (Bibliografía)

- W. McKinney Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython. O'Reilly Media, 1 edition, (Feb 5, 2013)

d. Timing (Temporalización)

CARGA ECTS	PERIODO PREVISTO DE DESARROLLO
2.4 credits	Classroom work: weeks 9-15



5. Teaching and Learning Methods (Métodos docentes y principios metodológicos)

The course consists of 3 learning units that include theoretical lessons, practices, in-group corrections or checking, concerted tutorials and technical visits.

The lectures will mainly use oral presentation for teaching the fundamental knowledge of the subject. Active student participation will be encouraged.

The practical lessons will support the understanding and assimilation of the concepts provided in theoretical lectures. The assignments will be done individually or in small groups, depending on the activity and the number of students enrolled. Some of the assignments will be done in the classroom and at home. The assignments of each learning unit will be presented to the lecturer and other students and handed in to the teacher within the deadlines indicated in the schedule presented at the beginning of the course.

Tutorials will involve personal assistance and will be carried out individually or in small groups to monitor the proper development of the work prior to final assignment submission. These tutorials should be previously arranged.

6. Dedication of the student to this subject (Tabla de dedicación del estudiante a la asignatura)

PRESENIAL ACTIVITIES (ACTIVIDADES PRESENCIALES)	HOURS (HORAS)	NON PRESENIAL ACTIVITIES (ACTIVIDADES NO PRESENCIALES)	HOURS (HORAS)
Unit 1: Industrial Control Systems	20	Student personal work	30
Unit 2: Industrial Data	16	Student personal work	24
Unit 3: Intelligent Industrial Systems	24	Student personal work	36
Total presential	60	Total non presential	90

7. Activities evaluated and grading system (Sistema y características de la evaluación)**Ordinary call:**

- o Written exam including all the contents 50%
- o Activities and Assignments: 50%

To pass the course it is necessary to pass both tools: if not, the final mark will be the lower one.

Extraordinary call (resit):

- o Written exam of all the contents 50%
- o Practical exercises: 50%

To pass the course it is necessary to pass both tools: if not, the final mark will be the lower one.

8. Additional Considerations (Consideraciones finales)

The course is configured in such a way that it requires the presence of the student for its effective use, although videoconferences might be used if needed. The means of communication with the students is the Virtual Campus of the University of Valladolid, where the support material for the teaching is provided. This material is not intended to be exclusive material for study; the student should use his/her personal notes and consult the recommended bibliography.

Use of Artificial Intelligence: The use of artificial intelligence (AI) tools without previous written authorization for assignments, reports or any other evaluable activity is not allowed. Such authorization shall be valid only for the specific activity for which it was granted, and declared in the documentation.

