

Course guide

300112 - STCSMART - Smart Industry 4.0 Systems

Last modified: 04/07/2026

Unit in charge: Castelldefels School of Telecommunications and Aerospace Engineering
Teaching unit: **Degree:** MASTER'S DEGREE IN ARTIFICIAL INTELLIGENCE FOR CONNECTED INDUSTRIES (AI4CI) (Syllabus 2025). (Optional subject).
Academic year: 2026 **ECTS Credits:** 3.0 **Languages:** English

LECTURER

Coordinating lecturer: Khaldoun Al-Agha (Green Communications), Guy Pujolle (Green Communications)

Others:

PRIOR SKILLS

Computer networks, Introduction to Machine Learning, basic principles of security and linux.

REQUIREMENTS

Computer networks, Introduction to Machine Learning, basic principles of security and linux.

TEACHING METHODOLOGY

Lectures, assignments, lab

LEARNING OBJECTIVES OF THE SUBJECT

The main goal of this course is to cover the main aspects related to Smart Industries 4.0 systems. Students will be capable of understanding the importance of AI to Industry 4.0 as well as the different kinds of applications. The course also presents security and sustainability issues concerning Smart Industry scenarios.

STUDY LOAD

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

Total learning time: 75 h

CONTENTS

Smart Industry 4.0 Systems

Description:

The course is divided into two parts. In the first part, the students will learn all the theoretical aspects as described below. In the last part they will focus on practical aspects with directed studies on an Edge distributed platform with green nodes.

Topics:

1- Artificial intelligence

The Role of Artificial Intelligence in Industry 4.0

Machine learning, deep learning,

Behavioral and generative Artificial Intelligence

Big Data Analytics and Industry 4.0

Some examples of AI for the Industry 4.0

2- Cloud services

Cloud Networking and Computing for Industry 4.0

Digital Twin for Industry 4.0

Additive Manufacturing

3- Connected worker

Human-Machine Collaboration in Industry 4.0

Networks for connected workers

The role of public and private 5G

Digital twin

Digital twin potential

Digital twin schemes

Digital twin examples

4- Edge

Edge Computing and Edge Analytics in Industry 4.0

Embedded Edge for the Industry 4.0

Networks for the Edge

5- Extended reality

Augmented Reality and Virtual Reality in Industrial Settings

Metaverse for Industry 4.0

6G vision for Industry 4.0

6- Industrial IOT (IIOT)

IoT Applications in Smart Manufacturing

Robotics and Automation in Modern Factories

Predictive Maintenance and Condition Monitoring

7- Security and sustainability

Cybersecurity Challenges in the Era of Industry 4.0

Blockchain Technology and Supply Chain Management

Sustainable Practices in Industry 4.0

Complementary content: Metaverse, blockchain.

Full-or-part-time: 75h

Theory classes: 27h

Self study : 48h



GRADING SYSTEM

Lab reports.