

## Course guide

# 300113 - STCGREE - Green Ai Computing for Connected Industries

**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:** Pauline Loygue (Green Communications), Guy Pujolle (Green Communications)

**Others:** Pauline Loygue (Green Communications), Guy Pujolle (Green Communications)

### PRIOR SKILLS

Computer networks, equivalent to Network Architecture (NETARCH)

### REQUIREMENTS

Computer networks, equivalent to Network Architecture (NETARCH)

### TEACHING METHODOLOGY

Lectures, Lab reports

### LEARNING OBJECTIVES OF THE SUBJECT

The main goal of this course is to cover the main aspects related to the design of green solutions for AI computing applied to connected industries. Students will learn not only the basic issues but also different applications. Finally, the course will also cover important challenges and future trends in this domain.

### STUDY LOAD

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

**Total learning time:** 75 h

## CONTENTS

### Green AI computing for Connected Industries

#### 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:

Understanding Green environment and environmental impact.  
Introduction to energy consumption and environmental impact  
Overview of the concept and importance of green AI computing.  
Principles of sustainability and environmental responsibility.  
Environmental impacts of traditional computing and AI.  
Fundamentals of AI and Sustainability  
Basics of artificial intelligence and machine learning.  
Basics of Generative and Behavioral artificial Intelligence  
Energy-Efficient Computing Techniques  
Techniques for energy-efficient AI model training and inference.  
Optimization strategies for reducing computational resource usage.

Applications in Connected Industries  
Industry 4.0 and Connected Systems  
Overview of Industry 4.0 and the integration of AI in industrial processes.  
Importance of connectivity and data exchange in modern industrial settings.  
Green AI Applications in Manufacturing  
Energy-efficient process optimization using AI.  
Predictive maintenance and asset management for sustainable operations.  
Smart Energy Management  
AI-driven solutions for optimizing energy consumption in industrial settings.  
Integration of renewable energy sources and demand-side management.

Implementing Green AI Solutions  
Case Studies and Best Practices  
Real-world examples of successful implementations of green AI in connected industries.  
Lessons learned and best practices for achieving sustainability goals.  
Challenges and Opportunities  
Identification of challenges in implementing green AI solutions.  
Opportunities for innovation and collaboration in the field.  
Future Directions and Research Trends  
Emerging technologies and research directions in green AI computing.  
Potential impacts of green AI on the future of connected industries.

Complementary content: New AI techniques and security energy consumption.

**Full-or-part-time:** 75h

Theory classes: 27h

Self study : 48h

## GRADING SYSTEM

Tests, Lab reports