

Course guide

300114 - STCAGR - Communications for Precision Agriculture and Farming

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: Stefano Giordano (Univ. Pisa), Athanasios Iossifides (International Hellenic University)

Others: Stefano Giordano (Univ. Pisa), Athanasios Iossifides (International Hellenic University)

PRIOR SKILLS

Basic knowledge of wireless, mobile communications and networking: MOBCOMM, NETARCH

REQUIREMENTS

Basic knowledge of wireless, mobile communications and networking: MOBCOMM, NETARCH

TEACHING METHODOLOGY

Basic knowledge of wireless, mobile communications and networking: MOBCOMM, NETARCH

LEARNING OBJECTIVES OF THE SUBJECT

The purpose of this course is to delve into the most significant communication techniques and protocols available for Precision Agriculture and Farming. It offers an end-to-end understanding of the ecosystem and the appropriate communication and networking options that can be used in different settings and setups based on their specific KPIs and requirements.

STUDY LOAD

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

Total learning time: 75 h

CONTENTS

Communications for Precision Agriculture and Farming

Description:

The course provides the IoT architectures and communication models that can be used for precision agriculture and farming. It describes the contemporary IoT protocol stack, the networking (including physical and medium access control) and application layer protocols, their pros and cons, their combinations to deliver end-to-end communication, and their suitability for different use cases, systems and device types. In addition, it provides relevant end-to-end examples as well as future trends and directions.

Topics:

Introduction to IoT for precision agriculture and farming.

IoT systems (architectures), devices, communication models and protocol stacks.

Radio access and networking protocols for IoT including, RFID, Bluetooth (LE), IEEE 802.15.4 family (ZigBee, WirelessHART, Wi-SUN, etc.), IEEE 802.11, LoRa, SigFox, LTE-M, NB-IoT, 5G.

Application layer protocols (MQTT, CoAP, etc.).

Service composition, virtualization, visualization and digital twins.

Use cases.

Future directions and conclusion.

Full-or-part-time: 75h

Theory classes: 27h

Self study : 48h

GRADING SYSTEM

Written exam, assignments, and short in-class quizzes. A project assignment to perform after the STC execution will also be evaluated.