Internet of Things

2025 - 2026

Is part of the next programmes:

- M0012004 Master of Computer Science: Software Engineering

- M0012005 Master of Computer Science: Data Science and Artificial Intelligence

- M0012006 Master of Computer Science: Computer Networks

- M0048004 Master of Computer Science: Software Engineering

- M0048005 Master of Computer Science: Data Science and Artificial Intelligence

- M0048006 Master of Computer Science: Computer Networks

- U0001008 Courses open to exchange students in Sciences

Course Code:	2500WETINT
Study Domain:	Computer Science
Semester:	2E SEM
Contact Hours:	60
Credits:	6

Study Load (hours):	168
Contract Restrictions:	No contract restriction
Language of Instructions:	ENG
Lecturer(s):	Ⓣ Miguel Camelo
Examperiod:	exam in the 2nd semester

1. Prerequisites *

speaking and writing of:

- English

reading and comprehending of:

- English

general notion of the basic concepts of

- Computer network and architectures
- Distributed systems
- Artifitial Intelligence
- Cloud and Edge Computing

specific prerequisites for this course

- Programming in C, C++, Python (1Ba course "Inleiding Programmeren" or equivalent)
- Knowledge on computer network protocols (2Ba course "Computernetwerken" or equivalent)
- Knowledge on distributed system (3Ba course "Distributed Systems" or equivalent)
- Knowledge on computer and network security (3Ba course "Computer en netwerkbeveiliging" or equivalent)

- Knowledge on artificial intelligence (3Ba course "Artificial Intelligence" or equivalent)

2. Learning outcomes *

- To understand what is the IoT and its components.

- To make a trade-off analysis between different IoT technologies (e.g., devices, sensors, operating system, network standards, cloud solutions) and select the right set of technologies for a given application.

- To understand, analyze, and evaluate IoT communication technologies.

- To develop secure, robust, and scalable end-to-end IoT solutions (from device to cloud).

- Understand the role of machine learning and data analytics for IoT and apply them.

- Understand the security risk in IoT environments and how to mitigate them.

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- Translate business and technical requirements for an IoT system into a concrete solution.

3. Course contents *

This course provides an in-depth overview of all aspects of the design and development of modern Internet of Things (IoT) systems, including low-power wireless networks, embedded software, sensor systems, localization, and cloud integration. Specifically, the following topics will be addressed:
- Internet of Things (IoT) general concepts
- Architecture and Core Components (sensors, actuators, processing)
- Data Communication for IoT Fog, edge, and cloud computing for IoT
- Data analytics and machine learning in the cloud and edge for IoT
- IoT and edge Security

4. International dimension *

- This course stimulates international and intercultural competences.

- Students use course materials in a foreign language.

- The lecturer invites international guest lecturers.

5. Teaching method and planned learning activities

5.1 Used teaching methods *

Class contact teaching

- Lectures
- Guest lectures
- Laboratory sessions

Personal work

Project

- In group

5.2 Planned learning activities and teaching methods

5.3 Facilities for working students *

Individual work

- In group: individual alternative assignment possible

6. Assessment method and criteria *

6.1 Used assessment methods *

Examination

- Written examination without oral presentation

- - Closed book

- - Open-question

Other assessment methods

- Project

6.2 Assessment criteria *

Assessment consists of two equally weighted parts: (1) a closed-book theoretical exam in written form, and (2) a project where the students develop a distributed IoT application in groups of 2. The project is executed during the semester, and is submitted at the end of the last full week before the start of the exam period (either in May or in August).

As a minimal requirement to pass the course, it is necessary to obtain at least 4/10 on each of the two course parts (and 10/20 on average over both parts together). In case the student receives a grade lower than 4/10 on one part, the maximum total grade is limited to 8/20. As an example, if a student receives 9/10 on the project and 2/10 on the exam, his total grade will be 8/20, while if he instead receives 4/10 on the exam, his total grade will be 13/20.

If a student obtains at least 4/10 on either part of the course, they can receive an exemption to redo that part in the second assessment period. However, partial grades are not transferred to the next academic year.

7. Study material

7.1 Required reading *

The required course material consists of slides used during the lecture and the accompanying notes.

7.2 Optional reading

8. Contact information *

Miguel Camelo (miguel.camelo@uantwerpen.be)

9. Tutoring