Future Internet

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:	2500WETFUI
Study Domain:	Computer Science
Semester:	1E SEM
Contact Hours:	60
Credits:	6

Study Load (hours):	168
Contract Restrictions:	No contract restriction
Language of Instructions:	ENG
Lecturer(s):	T Juan Felipe Botero
Examperiod:	exam in the 1st semester

1. Prerequisites *

speaking and writing of:

- English

extra commentary:

This course is taught in English. Thorough knowledge of the English language is thus necessary.

reading and comprehending of:

- English

specific prerequisites for this course

- **Networking: Computer networks and protocols**
- **Programming experience (with different languages)**
- **Data structures, Algorithms, Complexity**
- **Introduction to Artificial Intelligence**

2. Learning outcomes *

- You are able to understand the difference between the traditional network management paradigm and a software-defined networking-based paradigm.

- You are able to use the mininet network emulator and to implement basic control programs to solve network management tasks using the POX SDN controller.

- You understand the need for programming data planes and are able to implement simple data plane functionality in the P4 programming language.

- You are able to identify what AI/ML techniques should be used to solve what network management problems.

- You are able to identify the upcoming challenges in the Future Internet and how to tackle them by combining new network management technologies and network automation based on AI.

3. Course contents *

Future Internet will always be a paramount topic that allows knowing how the Internet is evolving.
In this course, we will cover the basics of new network management paradigms as Software Defined Networking and Data Plane Programmability. Moreover, we will detail how network automation is gaining momentum in the Future Internet.
The main contents of the course are:
- Software-Defined Networking
  - Introduction
  - Control and Data plane Separation
  - Mininet and controllers
- Data plane programmability
  - Introduction - Applications
  - P4 language
- Networking meets AI
  - Regression-Classification
  - Hands-on (Examples)
  - Regression and Classification in networking

4. International dimension *

- This course stimulates international and intercultural competences.

5. Teaching method and planned learning activities

5.1 Used teaching methods *

Class contact teaching

- Lectures

- Practice sessions

- Laboratory sessions

Personal work

Assignments

- In group

5.2 Planned learning activities and teaching methods

The theoretical part mainly consists of lectures, where the main concepts of the Future Internet are introduced and detailed. Active participation will be encouraged through in-class exercises and small-scale projects.
The practical part consists of lab sessions, where small-scale SDN and P4 applications should be implemented. These programming exercises can partly be performed during the weekly lab sessions, but a continuation of this work at home will also be required.

5.3 Facilities for working students *

6. Assessment method and criteria *

6.1 Used assessment methods *

6.2 Assessment criteria *

7. Study material

7.1 Required reading *

The course material for the lectures consists of the lecture slides and documents referred to in the slides (mainly research papers).

7.2 Optional reading

The following study material can be studied voluntarily :

Research papers will be provided in the course and optional (additional) reading.

8. Contact information *

Questions regarding the theoretical part
• Juan Felipe Botero - JuanFelipe.Botero@uantwerpen.be
Questions regarding the lab sessions: To be announced

9. Tutoring

Both the lecturer and the teaching assistant are available for additional questions (see above).