USEEU7 - WiFi and 5G Convergence in 6G

Mis à jour le 05-05-2025

Code : USEEU7

Unité spécifique de type cours

3 crédits

Responsabilité nationale :
EPN05 - Informatique / Stefano SECCI

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Présentation

Prérequis

Computer networks, basic principles of digital communications and linux.

Objectifs pédagogiques

The main goal of this course is to cover the main aspects related to WiFi and 5G technologies with special attention to their convergence in 6G for connected industries. This course also presents the integration of the cloud computing continuum in such an environment.

Programme

Contenu

The course is divided into two parts. In the first three days, the students will learn all the theoretical aspects as described below. In the last two days they will focus on practical aspects with directed studies on an Edge distributed platform with nodes integrating 5G and Wi-Fi cards.

Topics:

- Service and network architecture of 5G
- Evolution of mobile communication systems to 5G networks
- Use cases (eMBB, mMTC, URLLC) and KPIs
- Software Defined Networking (SDN)/Network Functions Virtualization (NFV)
- 3GPP reference model and core network functionalities
- Cloud RAN and functional split
- Network slicing
- Quality of Service in 5G
- NR (New Radio)
- Frequency bands
- Radio access techniques and numerology
- Bandwidth parts
- Massive MIMO and beamforming
- IEEE 802.11
- IEEE 802.11 PHY/MAC
- IEEE 802.11be – Enhancements for Extremely High Throughput (Wi-Fi 7)
- IEEE 802.11bn – Ultra High Reliability (Wi-Fi 8)
- IEEE 802.11bd – Enhancements for Next Generation V2X
- IEEE 802.11bf – Enhancements for Wireless LAN Sensing
- Future directions
- Wi-Fi – 5G convergence towards 6G
- Uses cases (V2X, Industry 4.0 TSN, WiFi and Private 5G, Offloading)
- 3GPP Access Traffic Steering, Switching and Splitting (ATSSS), Licensed-Assisted Access (LAA)
- Artificial Intelligence in 5G and WiFi
- New trends and studies

complementary content:

Digital infrastructure, Internet of Things, 6G

Modalités de validation

- Contrôle continu
- Projet(s)

Description des modalités de validation

Lab reports, in-class quizzes. A project assignment to perform after the STC execution will also be evaluated.