WIRELESS DATA NETWORKS SYLLABUS

The course examines the network architecture as well as the functional details of the key protocols for the basic Wireless Data Network paradigms (WLAN/WPAN IEEE 802.X, MANET, WSN). In particular, the course lectures cover the following topics:

- Classification of Wireless Data Network types with respect to their key attributes (topologies, performance figures, services).
- Overview of the fundamental technical challenges examined side by side with the corresponding state of the art technical solutions in each layer of the OSI Protocol Architecture: Physical layer and Transmission - Encoding Technologies (Forward Error Correction - Digital Modulations– OFDM – MIMO) – Link Layer (MAC) and multiple access, Quality of Service (QoS), Security / Privacy, Energy Consumption challenges and solutions– Network Layer and routing, mobility, handover, ad-hoc and dynamic network topologies constraints and solutions – Transport Layer and the impact of the wireless channel limitations.
- The 802.11 (1997) as a Wireless Local Area Network implementation: Network Architecture – Physical layer transmission and encoding techniques – Operational principles of the 802.11 (1997) MAC layer – 802.11 (1997) Security and Privacy. Significant upgrades (1997-today) with respect to the 802.11 (1997) Physical and MAC layer (OFDM – MIMO – QoS - Security).
- Technical constraints from user mobility and Mobile Network layer protocols. Technical constraints due to the wireless channel impairments and technical solutions on the Transport layer protocol level.

Introduction to the Mobile Ad Hoc Networks (MANET) and Wireless Sensor Networks (WSN)