Wireless networks

Overview course of 3 days - 21h
Ref.: RSW - Price 2025: 2 750 (excl. taxes)

THE PROGRAMME

last updated: 05/2024

1) Principles of wireless networks

- Introduction to wireless networks.
- Fixed networks vs Wireless networks. Different generations.
- WPAN, WLAN, WMAN, WRAN networks.
- Caracteristics and theoretical performances.
- Handover and integration of the different solutions.
- Wireless networks for businesses.
- Troughputs needed. Available applications. Home, Office and Business networks.
- ISP Wi-Fi « Hot spots ».
- Wi-Fi. Advantages of wireless technologies.
- The Wi-Fi issues for ISPs.
- Handovers.
- Mobility issues. Different types of handovers.
- Integration within mobile networks.

2) Bluetooth, UWB, ZigBee and IEEE 802.15 networks.

- The IEEE 802.15 standard, the UWB, ZigBee and Bluetooth technologies.
- The 802.15.1 standard and bluetooth.
- IEEE 802.15.3. Very high trhoughput technology UWB.
- Wimedia consortium and WUSB.
- IEEE 802.15.4 and ZigBee products.
- Personal networks technologies.

3) Personal networks technologies

- WiFi (IEEE 802.11b/g).
- A massive success. Specifications.
- Wi-Fi devices : cards and access points.
- MAC layer : CSMA/CA. Frequency bands.
- Ethernet integration. Trhoughputs and performances.
- Medium Access technologies.
- Quality of Service and IEEE 802.11e.
- Voice encoding and audio « streams ».
- Wireless controlers and switches.
- Wi-Fi engineering and managment.
- Future of IEEE 802.11b with 802.11n and MIMO.
- Deployment of a Wi-Fi network.
- Constraints. Devices. Cost. Configuration.

4) Mesh-networks and ad-hoc networks

- Definition of a mesh-network and ad-hoc network.
- Mesh-networks routing.
- Different routing protocols : pro-actives (OLSR, DSDV) and reactives (AODV, DSR).

TRAINER QUALIFICATIONS

The experts leading the training are specialists in the covered subjects. They have been approved by our instructional teams for both their professional knowledge and their teaching ability, for each course they teach. They have at least five to ten years of experience in their field and hold (or have held) decision-making positions in companies.

ASSESSMENT TERMS

The trainer evaluates each participant's academic progress throughout the training using multiple choice, scenarios, hands-on work and more.
Participants also complete a placement test before and after the course to measure the skills they've developed.

TEACHING AIDS AND TECHNICAL RESOURCES

• The main teaching aids and instructional methods used in the training are audiovisual aids, documentation and course material, hands-on application exercises and corrected exercises for practical training courses, case studies and coverage of real cases for training seminars.
• At the end of each course or seminar, ORSYS provides participants with a course evaluation questionnaire that is analysed by our instructional teams.
• A check-in sheet for each half-day of attendance is provided at the end of the training, along with a course completion certificate if the trainee attended the entire session.

TERMS AND DEADLINES

Registration must be completed 24 hours before the start of the training.

ACCESSIBILITY FOR PEOPLE WITH DISABILITIES

Do you need special accessibility accommodations? Contact Mrs. Fosse, Disability Manager, at psh-accueil@ORSYS.fr to review your request and its feasibility.

- Security and QoS in ad-hoc networks.

5) IEEE 802.16 standard and IEEE 802.16 standard

- Definition of the Wireless Local Lopp and WDSL access (Wireless DSL).
- WDSL vs fixed networks.
- Technologies and frequencies available.
- WiMAX. Theoretical performances.
- IEEE 802.16 standard. Mobile WiMAX.

6) The other solutions

- The new genration of regional wireless networks.
- Usage of the UHF/VHF bands and IEEE 802.22.
- Cognitive radio. Interactive radio.
- A unified network with wireless networks.
- IEEE 802.21 and the vertical handover.
- Continuity of service and a wireless Internet.

7) Protocols and applications of wireless networks

- The IP environment. The slow-start and buffer-bloat issues.
- MIMO technologies and the increase of the trhoughput.
- Home networks : UPnP and DLNA.
- Applications : voice, production, P2P...
- Pervasive Internet
- Developments. Internet city. Integration with the new IP generation.
- Sensors networks. Dust networks.

8) 3G vs WLAN

- 3GPP/3GPP2 vs Wi-xx.
- Comparison with UMTS.
- Fourth generation of mobile networks and UMA/IMS integration.

9) Wi-Fi security

- Weaknesses by design of wireless networks.
- Protection against Denial of Service possible ? How to control the radio coverage ?
- SSID and security issue.
- Attacks : Man-in-the-middle, ARP spoofing.
- Weaknesses of the authentication solutions.
- Elementary techniques based on SSID and MAC filtering.
- Interests and limits. Risks of the beacon frame usage and ssid probe request.
- Example of attacks : SSID brute forcing....
- Wired Equivalent Privacy – WEP
- Features. Key exchange. Authentication and encryption. Popular attacks. Demonstrations.
- WiFi Protected Access – WPA. Features. Advantages of WPA over WEP.
- Extensible Authentication Protocol – EAP. Temporal Key Integrity Protocol – TKIP.
- Message Integrity Check – MIC. WPA v2 and the 802.11i standard.

10) ILAN and WAN interconnexion

- Radio coverage control.
- Network separaton.
- Firewall and DMZ.
- End-user device protection.
- Mobile users, VPN and wireless networks.

DATES

REMOTE CLASS
2025 : 18 nov.