

BASICS OF 802.11

This is a 2 day in depth technical course intended to give students a solid understanding of Wi-Fi, how it works and the newly emerging mesh, fast handover and high throughput standards. The course is divided into seven distinct modules.

1. Wi-Fi Market Opportunities and Spectrum Considerations
2. Wi-Fi Standards Evolution
3. 802.11 Physical Layers
 - 802.11b
 - 802.11a / g
 - 802.11n
4. 802.11 Medium Access Control Layer
5. 802.11s Mesh networking
6. 802.11r Fast handover and VoIP
7. Implementation

Objectives:

This is a 2 day technical training class on the IEEE 802.11 standard generally referred to as Wi-Fi. At the end of this course the student should be able to:

- Understand the services provided by Wi-Fi
- List the major strength of the OFDM air interface and understand why this has become the air interface of choice for broadband communications
- Describe the different Wi-Fi physical layers
- Define the major functions and operational procedures of Wi-Fi
- Explain the major enhancements Wi-Fi currently under definition
- Discuss how WiMAX might be considered complementary or competitive to other broadband technologies, such as, 3G, WiMAX and UWB.

Who Should Attend:

This will be of benefit to any one working with Wi-Fi, including marketing and sales, technical support and product development.

Course Prerequisites:

There are no prerequisite requirements to attend this course, although a background in telecommunications and / or wireless communications would be advantageous.

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Module 1: Wi-Fi Market Opportunities and Spectrum Considerations

By the end of this module, course attendees will be able to:

- Describe the WLAN market and how 802.11 is being deployed
- Be aware of the emerging market opportunities for Wi-Fi
- Discuss the major benefits of Wi-Fi
- Understand the implications of operating in license-exempt bands

Module Outline

- Introduction to Wireless Local Area Network (WLAN)
- 802.11 WLAN Network Topologies
- WLAN Deployments
- WLAN Market Status
- Spectrum Considerations
- Module Summary

Module 2: 802.11 Standards Evolution

By the end of this module, course attendees will be able to:

- Describe the IEEE 802 working groups and its standards process
- Explain the key differences between the major 802 wireless standards
- Define the key components and terms of Wi-Fi networks
- Understand the role and activities of the Wi-Fi Alliance

Module Outline

- IEEE 802 Standards Process
- IEEE 802 Family of Standards
- 802.11 Standards Evolution
- 802.11 Study Groups
- Wi-Fi Alliance
- Module Summary

Module 3: 802.11 Physical Layers

By the end of this module, course attendees will be able to:

- Explain the key aspects of the DSSS and OFDM air interfaces
- Discuss the advantage of OFDM over other air interfaces
- List the modulation and coding techniques for the different 802.11 Physical Layer options
- Understanding the major difference between 802.11 a, b, g and n

Module Outline

- Introduction to 802.11 Physical Layer
- Orthogonal Frequency Division Multiplexing (OFDM)
- 802.11b DSSS Physical Layer
- 802.11a, g OFDM Physical Layer
- 802.11n High Throughput
- 802.11h Operation in 5GHz Band
- Module Summary

Module 4: 802.11 Medium Access Control (MAC) Layer

By the end of this module, course attendees will be able to:

- Describe the major functional components of an 802.11 network
- Define the operational procedures for how a Subscriber Station connects to the 802.11 network & sends data
- Explain how Subscriber Stations contend for the Medium
- Describe how a MAC Service Data Unit (SDU) is constructed
- Understand the Quality of Service (QoS) capabilities added with 802.11e

Module Outline

- Network Architecture
- Connecting to the 802.11 Network
- Sending Data on the 802.11 Network
- Handling Contention
- 802.11e QoS Services
- MAC Frame Structure

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Module 5: 802.11 Mesh Networking

By the end of this module, course attendees will be able to:

- Understand the benefits of mesh networking the current status of 802.11s deployments
- Describe the major functional components of an 802.11 mesh network
- Define the operational procedures for how a Subscriber Station finds & joins an 802.11 mesh network
- Explain the changes made to the MAC SDU to support mesh networking

Module Outline

- Introduction to Mesh Architecture
- 802.11s ESS Mesh Networking
- Mesh Packet Frame Format
- Mesh Control Path
- Mesh Data Path
- Mesh Configuration and Interworking
- MAC Operational Procedures
- Summary

Module 6: 802.11r Fast Handover and VoIP

By the end of this module, course attendees will be able to:

- Understand the benefits of mesh networking and the current status of 802.11s deployments
- Describe the major functional components of an 802.11 mesh network
- Define the operational procedures for how a Subscriber Station finds & joins an 802.11 mesh network
- Explain the technical attributes of making WLAN VoIP calls

Module Outline

- Introduction to Roaming and Handover
- Fast Transitioning Network Topology
- Fast Transition Operational Procedures
- VoIP using WLAN
- Interworking with Cellular
- Mobile Station Support
- 802.21 Media Independent Handover (MIH)