Wireless Networking Training Kit Team

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Ermanno Pietrosemoli
http://www.eslared.org.ve

- Ermanno is a telecommunications professor at the Universidad de los Andes in Mérida, Venezuela.
- He is also the president of Fundación Escuela Latinoamericana de Redes, EsLaRed, a non profit organization dedicated to training and development activities in ICT.
- Ermanno has been collaborating with ICTP training activities since 1992.
• Marco is with the Aeronomy and RadioPropagation Laboratory of the ICTP.
• His research interest is in Wireless Sensor Networks.
• He claims he understands French.
• Antoine is with the University of Cape Town in South Africa.
• His interest is in Network Engineering and Wireless Sensor Networks.
• He is from DRC.

http://wirelessU.org
Carlo Fonda  
Abdus Salam International Center for Theoretical Physics  

• Wireless trainer at ICTP for 10 years  
• Has performed network installations in Nigeria, Ghana, Malawi, Galapagos, Italy, and Venezuela  
• Engineered a 279 km Wi-Fi link in the Andes mountains in Venezuela  
• Contributor to WNDW and the ICTP Antenna Handbook
Rob Flickenger
Hacker Friendly LLC

- Editor of *Wireless Networking in the Developing World*
- Producer of WirelessU.org
- Teacher at the ICTP since 2004
- Author and editor of several O'Reilly books, including *Linux Server Hacks* and *Wireless Hacks*
- Proud hacker and technology advocate
Pleased to meet you!
The Wireless Training Kit

Materials for training tomorrow’s wireless trainers
Training kit in-a-box

• Includes all equipment and materials needed to hold a wireless training workshop

• Books, access points, training materials, spectrum analyzer, and other gear are configured and ready-to-present

• Ensures compatibility and consistency in teaching methods
Wireless Networking

- Low-cost Access Points
- Nanostation wireless clients
- Inexpensive wireless devices for mesh
- 12 dBi patch antennas
- All connectors and adapters are included
Spectrum Analysis

- Wi-Spy spectrum analyzer
- 2.4 GHz signal source
- Netbook computer
- Reference 2.4 GHz antenna
- Useful for demonstrating interference and long distance antenna alignment
Antenna Construction

- Microwave connectors
- Pigtail cables for supplied wireless devices
- Construction guide
- Example pre-drilled “cantenna”
Reference

- Training materials for students: slides, lab activities, and exercises
- Training materials for teachers: video lecture examples and teacher’s guide
- Copies of the books *Wireless Networking in the Developing World* and *How to Accelerate Your Internet*
- Books are available in English, Spanish, French, Portuguese, Arabic, and Indonesian
Example video lectures on DVD
MONDAY - Topic: Radio physics and antennas

morning:
LECTURE: Radio physics (C) (30 minutes)
LECTURE: dB math (M) (30 minutes)
LECTURE: Antennas and transmission lines fundamentals (E) (60 minutes)

lunch break

afternoon:
LECTURE: Comparative Use of Unlicensed Spectrum (VIDEO, 20 minutes)
EXERCISES:
- Working with AirView and video sender (C)
TUESDAY - Topic: Wireless networking

**morning:**
LECTURE: Introduction to WiFi (A) (120 minutes)
LECTURE: APs and clients (C) (145 minutes)

*lunch break*

**afternoon:**
EXERCISES:
- Exercise: DIY WiFi cantenna (E,C)
- AP configuration (M,C)
Programme - day 3

WEDNESDAY - Topic: Outdoor wireless

morning:
LECTURE: How to choose wireless networking equipment (E) <1 hour
LECTURE: Power over Ethernet, grounding, and lightning protection (E) 1 hour
LECTURE: Link budget (M) 1/2 hour

lunch break

afternoon:
EXERCISES:
- Exercise: Link budget calculation and Radio Mobile (M) (1 hour)
- Setting up a Wireless ISP (M,C) (up to the end)
Programme - day 4

THURSDAY - Topic: Network management and security

morning:
LECTURE: Site survey, outdoor installation, long distance links (E) 60min
LECTURE: Wireless Security, Wireless Tools (C) (60 minutes)
LECTURE: Network management (Alain) (60 minutes)

afternoon:

EXERCISES:
- finish the WISP exercise
- Network management and wireless tools (Alain, C) (60 minutes)
- Example of site survey and outdoor link (E, C) (90 minutes)
Programme - day 5

FRIDAY - Topic: Advanced topics and final review

morning:
LECTURE: Off-Grid Power for wireless networks (E) (60 minutes)
LECTURE: Introduction to Wireless Sensor Networks (M) (30 minutes)
LECTURE: Mesh networking basics (A,M) (30 minutes)
LECTURE: Advanced network management (Alain) ???
lunch break

afternoon:
EXERCISES:
- Dimensioning a solar electrical power system (E)

CASE STUDIES (1 hour)

FINAL REVIEW, Questions and Answers