



ULTRA-WIDEBAND ANTENNA from THEORY to PRACTICE
Dr. Kamyā Yekeh Yazdandoost

21 - 24 November 2011 at the University of Oulu

Lectures:

Mon: 8:30 – 10:00, 10:30 – 12:00

Tue: 8:30 – 10:00, 10:30 – 12:00

Wed: 8:30 – 10:00, 10:30 – 12:00 (11:15 – 12:00 Questions and Problems)

Final Exam: Thu November 24th 9:00 – 12:00.

This course provides the comprehensive coverage of the UWB antenna. The course also provides a deeper understanding of basic antenna property definitions, antenna design fundamentals and considerations, numerous antenna types and RF propagation fundamentals.

Topics covered include

- Introduction
- Basic Antenna Concepts
- UWB antenna vs Conventional Antenna
 - Classification of Antenna Types
 - Omni-directional Antennas
 - Resonant antenna
 - Non-resonant antenna
 - Principles of wideband radiators
- Design of UWB antenna
 - Antenna form
 - Current Distribution
 - Discontinuity
 - Feeding
- UWB antenna for Body Area Network

Upon completion of the course, students will:

- Understand the concepts associated with antenna performance, operation and classification
- Understand, evaluate and define antenna performance specifications
- Describe and understand a broad spectrum of antenna types
- Illustrate antenna operating principles with a factual knowledge of antenna theory
- Understand the basic performance trade-offs associated with antenna design
- Understand, differences between, resonant, non-resonant, and UWB antenna
- Be able to design an UWB antenna

Conduction:

- Mandatory Lectures & Class work (25%) and Written Exam (75%).
- Students need to attend the course, to be eligible for the exam.

Literature:

1. H. B. Li, K. Yekeh Yazdandoost, B. Zhen, *Wireless Body Area Network*, River Publishers, 2010.
2. K. Siwiak, D. McKeown, *Ultra-Wideband Radio Technology*, Wiley, 2004.
3. J. D. Taylor (Ed.), *Ultra-Wideband Radar Technology*, CRC Press, 2001.
4. C. A. Balanis, *Antenna Theory: Analysis and Design*, 3rd Edition, Wiley-Interscience, 2005.
5. H. G. Schantz, *The Art and Science of Ultrawideband Antennas*, Artech House, 2005.
6. Z. N. Chen & M.Y.W. Chia, *Broadband Planar Antennas: Design and Applications*, John Wiley & Sons Inc., 2006.
7. C.-C. Chen, "Ultrawide Bandwidth Antenna Design," Chapter 19 in *The Antenna Engineering Handbook*, Fourth Edition, McGraw-Hill, 2007.
8. B. Allen, M. Dohler, E.E. Okon, W.Q. Malik, A.K. Brown, and D. J. Edwards, "Ultra-Wideband Antennas and Propagation for Communications, Radar and Imaging", John Wiley & Sons Ltd., 2006.
9. O. Boryszenko and D. H. Schaubert, "Characterization of Antenna Broadband Dispersive Features," *IEEE APS Digest*, 2007, pp. 1409-1412.
10. Akdaglil, C. Ozdemirli, S. Yamacli, "A Review of Recent Patents on Ultra Wide Band (UWB) Antennas," *Recent Patents on Electrical Engineering*, 2008, 1, pp. 68-75.
11. F. S. Barnes and B. Greenebaum, *Handbook of Biological Effects of Electromagnetic Fields*, Bioengineering and Biophysical Aspects of Electromagnetic Fields, Taylor & Francis, 2007.
12. O. P. Gandhi, "Biological Effects and Medical Applications of Electromagnetic Energy," Prentice Hall, 1990.