



Course Code ECE-554	Course Title Wireless Communications	Credits (ECTS) 8
Department Engineering	Semester Fall or Spring	Prerequisites None
Type of Course Elective	Field Engineering	Language of Instruction English
Level of Course 2 nd Cycle	Year of Study 1 st	Lecturer(s) Prof. John Sahalos
Mode of Delivery Face-to-face	Work Placement N/A	Co-requisite None

Objectives of the Course:

The main objectives of the course are to:

- develop an in-depth understanding of the concepts behind modern wireless and cellular/mobile systems
- introduce the frequency reuse concept and apply it in the design and planning of cellular/mobile systems
- introduce the principles and theory of radio wave propagation
- develop the skills to design radio links and estimate the link budget
- introduce the operation and architecture of 2nd Generation (e.g. GSM), 3rd Generation (e.g. UMTS) and 4th Generation (e.g. LTE) mobile systems
- apply cellular design and planning knowledge in mobile systems
- introduce the trends and evolution of wireless communications beyond 4G

Learning Outcomes:

After completion of the course students are expected to be able to:

1. cite the concepts behind modern wireless and cellular systems
2. underline the frequency reuse concept
3. apply the frequency reuse concept in the planning of cellular systems
4. experiment with the design and planning of a cellular system
5. recite the principles and theory of radio wave propagation
6. design radio links in various frequencies and estimate the link budget
7. rank the effects of multipath propagation
8. summarize the basic operation of GSM, UMTS and LTE cellular systems
9. apply cellular design and planning knowledge in mobile systems

Course Contents:

1. Introduction to wireless concepts and wireless communication systems
2. Cellular Concepts
3. Frequency bands and frequency reuse
4. Channel assignment and handoff strategies
5. Interference and system capacity

6. Cell splitting and sectoring
7. Radio wave propagation, transmission problems and propagation models
8. Advanced Modulation Techniques and Multiple Access for wireless systems
9. Introduction to GSM, the GSM network elements and system architecture
10. GSM signaling and GSM air interface
11. 3rd & 4th Generation Systems
12. Universal Mobile Telecommunications System (UMTS/WCDMA) architecture and deployment
13. Trends and Evolution of Wireless Communications Beyond 4G
14. Additional independent work/project will be assigned to graduate students

Learning Activities and Teaching Methods:

Lectures, Practical Exercises and Assignments, independent work, project.

Assessment Methods:

Homework, Project, independent work, Mid-Term, Final Exam.

Required Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
T. S. Rappaport	Wireless Communications: Principles & Practice (2 nd Edition)	Prentice Hall	2002	0130422320

Recommended Textbooks/Reading:

Authors	Title	Publisher	Year	ISBN
David Tse and Pramod Viswanath	Fundamentals of Wireless Communication	Cambridge University Press	2005	978-0521845274
W. Stallings	Wireless Communications & Networks	Pearson Prentice Hall	2005	0131918354
D. Collins, C. Smith	3G Wireless Networks	McGraw-Hill	2001	0071363815