



Course Code ECE-454	Course Title Wireless Communications	ECTS Credits 6
Department Engineering	Semester Fall or Spring	Prerequisites ECE-350
Type of Course Elective	Field Engineering	Language of Instruction English
Level of Course 1 st Cycle	Year of Study 4 th	Lecturer(s) Dr Antonis Hadjiantonis
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) and 3rd Generation (e.g. UMTS) mobile systems
- apply cellular design and planning knowledge in GSM systems
- introduce the trends and evolution of wireless communications beyond 3G (B3G)

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 and Doppler shift
8. summarize the basic operation of GSM and UMTS cellular systems
9. apply cellular design and planning knowledge in GSM 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 Generation Systems
12. Universal Mobile Telecommunications System (UMTS/WCDMA) architecture and deployment
13. Trends and Evolution of Wireless Communications Beyond 3G (B3G)

Learning Activities and Teaching Methods:

Lectures, Practical Exercises and Assignments.

Assessment Methods:

Homework, Project, 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
J. Eberspaecher, H-J. Voegel, C. Bettstetter	GSM Switching, Services, and Protocols, (2 nd Edition),	Wiley	2001	047149903X
V. K. Garg, J. E. Wilkes	Principles and Applications of GSM	Prentice Hall	1999	0139491244
D. Collins, C. Smith	3G Wireless Networks	McGraw-Hill	2001	0071363815