Course description:

Wireless and mobile networks experienced a continuous growth during the last years and are expected to provide more and more services in the near future. Development of wireless communication systems requires solving several challenging problems. This course covers both theoretical issues related to wireless networking and practical systems for both wireless data networks and cellular wireless telecommunication systems. Students will also work on a project that addresses some recent research issues in wireless and mobile networking.

Aims of the course:

Students are expected to:

- Learn about the unique challenges in wireless networking, starting point is "regular" wired networks
- Gain an understanding of wireless technologies at the physical, MAC, and higher layers , focus is on the wireless protocol layer
- Get experience in working with wireless networks, implementing protocols, algorithms, and measurements of wireless networks
- Get a broad view of the ongoing research in the wireless domain, focus on the protocol level

Intended Learning Outcomes (ILOs):

Upon successful completion of this course, students will be able to:

A. Knowledge and Understanding

A1. Concepts and Theories:

- Understand the concepts of wireless networking techniques and technologies.
- Learn the concepts of wireless protocol
- Trace the generations of wireless networks.
- List the components and the architecture of a wireless network.

A2. Contemporary Trends, Problems and Research:

- Know the state-of-the art in wireless technology

A3. Professional Responsibility: Abide by laws and regulations of software development and design

B. Subject-specific skills

B1. Problem solving skills:

- Investigate the problems that encounter a wireless network
- Enhance the performance of a wireless network.

B2. Modeling and Design:

- Model a cell in a wireless network for better performance.
- Interact to keep wireless network operates.

B3. Application of Methods and Tools:

- Investigate examples of different wireless networks.
- Investigate how wireless networks contribute to other applications.

C. Critical-Thinking Skills

C1. Analytic skills:

- Asses the efficiency of wireless networks

C2. Strategic Thinking:

- How to interoperate a wireless network to other wired or different wireless technologies?
- How to adapt wireless networks to operate well the traditional applications?

C3. Creative thinking and innovation:

- Suggest a solution to some open issues related to wireless networks.

D. General and Transferable Skills (other skills relevant to employability and personal development)

Communication: Express and communicate ideas in written and oral forms.

Teamwork and Leadership: Be cooperative member of a team

Organizational and Developmental Skills: plan, prioritize, and achieve defined goals

Ethical and Social Responsibility: Understand that they are accountable for their actions and there must be a balance between economic growth and the welfare of the society and environment.

Course Structure:

Week	Hours	ILO	Course Outline	Procedure	Assessment
1		A1	- Overview - Introduction -Wireless history	Lectures, presentations, quizzes	Quizzes, homework
2, and 3		A1, B1	Mobile Radio Propagation	=	=
4, and 5		A1, A2, A3, B1, B2	Channel Coding and Error Control	=	=
			First Exam		
6		A1, A2, A3,B1, C1, C2	Cellular Concept	=	=
7		A1, A2, A3,B1, C1, C2,C3	Multiple Radio Access	=	=
8		A1, A2, A3,B1, C1, C2,C3	Multiple Division Techniques for Traffic Channels	=	=
9, and 10		A1, A2, A3,B1, C1, C2,C3	Mobile Communication Systems	=	=
			Second Exam		

11		A1, A2, A3,B1, B2, B3, C1, C2,C3	Satellite Systems	=	=
12		A1, A2, A3,B1, B2, B3, C1, C2,C3, D1, D2, D3	Ad Hoc Networks	=	=
13, and 14		A1, A2, A3,B1, B2, B3, C1, C2,C3, D1, D2, D3, D4	Wireless LANs, MANs, and PANs	=	=
15		A1, A2, A3,B1, B2, B3, C1, C2,C3, D1, D2, D3, D4	Recent Advances	=	=
16			**Final Examination**		

References:

A. Main Textbook:

Introduction to Wireless & Mobile Systems, 3rd edition, Dharma Prakash Agrawal and Qing-An Zeng, Cengage Learning, 2011.

B. Supplementary Textbook(s):

-William Stallings, "Wireless Communications And Networks", Prentice Hall, 2005.
-Vijay Garg, Morgan Kaufmann, "Wireless Communications & Networking", June 2007.

Assessment Methods:

Methods	Grade	Date
First Exam	20%	
Second Exam	20%	
Assignments (Reports /Quizzes/ Seminar / Tutorials ….)	10%	
Final Examination	50%	