

**Tentative Syllabus**  
**CENG513 Wireless Communications and Networks**  
**2017-2018 Spring**

---

**Instructor:** Ertan Onur, eronur@metu.edu.tr, 5534, B211

**Office Hours:** Mondays 11:00-12:00 and by appointment (please send me an email).

**Logistics:** Mondays, BMB3, 13:40-16:30

**Catalog Description:** Introduction to transmission and networks. Antennas, multipath propagation, frequency hopping. Satellite communication. Overview of current systems for cellular for networks, wireless LANs, mobile IP, Ad Hoc networks, the Bluetooth technology and the IEEE802.11 standard.

**Course Objectives:** By the end of the course, you will be able to

**o1: describe** the fundamental concepts of wireless transmission,

**o2: apply** cellular planning concepts to real-life mobile network design problems,

**o3: compare and contrast** centralized and distributed approaches in wireless networks,

**o4: evaluate and devise** various medium access control and routing protocols and **justify** applicability of those protocols in various network design challenges,

**o5: infer and solve** specific challenges of wireless communication in the realm of internetworking, specifically related to network and transport layers.

**Communication:** Moodle at <https://odtuclass.metu.edu.tr>

**Textbook (TB):** C. Beard and W. Stallings, Wireless Communication Networks and Systems, 1st Ed., Pearson 2016.

**Supplemental Books:**

**SB1:** J. Schiller, Mobile Communications, 2nd Ed., Addison Wesley, 2003.

**SB2:** Kurose, J.F. and Ross, K.W., Computer Networking: A top down approach, 6th Ed., Pearson Education, 2012

**Prerequisites:** CENG435 Data Communications and Networking, EE444 Introduction to Computer Networks or similar courses. Undergrads can take the course if they have already taken CENG435 and scored AA. Programming experience in C or python is compulsory.

**Grading:**

Term project .....	50%
Term project presentations .....	10%
Term project peer assessment .....	10%
Final .....	30%

**NA Grade:** Those who do not deliver an acceptable project or who do not give a presentation.

**Academic Honesty:** There will be no tolerance to cheating in the exam and to plagiarism (copying someone else's work as if it is yours). The student who cheats will fail the course and be punished according to METU regulations.

**Course Outline:**

Week	Topic	TB Chapter
1	<b>Courseware, background</b> , history, applications, trends, challenges, reference model, classification of wireless systems	1
2-3	<b>Physical layer</b> : Physical layer aspects, signals, antennas, propagation, multiplexing, capacity, modulation, error control	2, 5, 6, 7, 8, 9, 10
4	<b>Link layer</b> : Medium access control, hidden/exposed terminals, near-far terminals, MACA, MACAW, CSMA	Slides
5-6	<b>Ad hoc networks</b> : modeling, challenges, MAC protocols, routing (DSR, OLSR, AODV)	Slides
7-8	<b>Mobile networks</b> : Cellular concept, GSM, UMTS, LTE	13, 14
9-10	<b>Performance evaluation</b> : Markov chains, birth-death processes, basic queueing theory	Notes
11-12	<b>Wireless local and personal area networks</b> : IEEE 802.11, Bluetooth, Zigbee	11
13-14	<b>Student presentations</b>	

**Term Project:**

The details of the term project will be provided on ODTUCLASS. You will be graded per milestone. The schedule and the milestones are given below. The deadlines cannot and will not be changed. Late submissions will not be accepted. If you miss 3 or more out of 7 milestones, you will get an NA grade. In the peer assessment, you will be assessing at least 5 other reports of your peers. Depending on the number of groups, this number may change. You will use the provided L<sup>A</sup>T<sub>E</sub>X template to write your reports.

Week	Date	Milestone	Project	Points
1	12-Feb			
2	19-Feb	ADD-DROP		
3	26-Feb	Milestone: Kick off	Groups formed, topic selected	5
4	05-Mar			
5	12-Mar	Milestone: Problem	Sect. 1 and 2 (V1)	10
6	19-Mar			
7	26-Mar	Milestone: Initial s/w	Code (V1), Sect. 1 and 2 (V2), Sect. 3 (V1)	5
8	02-Apr			
9	09-Apr	Milestone: Initial results	Init. Results - Sect. 3 (V2), Sect. 4 (V1)	10
10	16-Apr	WITHDRAW		
11	23-Apr	HOLIDAY		
12	30-Apr	Milestone: Final report	Results, Sect. 4 (V2), Final Report	20
13	07-May	Milestone: Presentation		10
14	14-May			
15	21-May	Milestone: Peer grade		10
		Final Exam		30