



# CENG513 Wireless Communication and Networks

Middle East Technical University  
Department of Computer Engineering  
2024-2025 Spring

<b>Instructor:</b>	Dr. Ertan Onur	<b>Location:</b>	BMB5
<b>Email:</b>	eronur@metu.edu.tr	<b>Class Day</b>	Mondays
<b>Office Hours:</b>	Fri 13:00-13:30 or email me	<b>Class Time</b>	13:40-16:30
<b>Office Hours:</b>	B211	<b>Credits:</b>	3
<b>Phone:</b>	+90 (312) 210 5534	<b>Term:</b>	2024-2025 Spring

**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 **1) describe** the fundamental concepts of wireless transmission, **2) compare and contrast** centralized and distributed approaches in wireless networks, **3) evaluate and devise** various medium access control and routing protocols and **justify** applicability of those protocols in various network design challenges, **4) infer and solve** specific challenges of wireless systems related to network and transport layers.

**Communication:** Odtuclass (moodle) at <https://odtuclass.metu.edu.tr> is the primary means for communication. E-mail is the secondary method for official communication.

**Textbook (TB):** C. Beard and W. Stallings, Wireless Comm. Networks and Systems, Pearson 2016.

## Topics:

- **Week 01:** Courseware, syllabus and background
- **Week 02:** Recap of CENG435 (Introduction to Computer Networks)
- **Week 03:** Physical Layer: Transmission Fundamentals
- **Week 04:** Physical Layer: Radio Channel
- **Week 05:** Physical Layer: OFDM and Spread Spectrum
- **Week 06:** Link Layer: Ad-hoc Networks, Modeling and Medium Access Control
- **Week 07: Midterm**
- **Week 08:** Network layer: Ad-hoc Networks, Routing
- **Week 09:** Wireless Local Area Networks (WLAN), IEEE 802.11
- **Week 10:** Wireless Personal Area Networks (WPAN), Bluetooth and Zigbee
- **Week 11:** Mobile Networks: 2G - 3G
- **Week 12:** Mobile Networks: 4G (LTE), 5G (NR)
- **Week 13: (Student Presentations)**
- **Week 14: (Student Presentations)**

## Grading:

Term project .....	40%
Term project presentations .....	10%
Midterm.....	25%
Final .....	25%

**Prerequisite:** C++ programming is a must for carrying out the term project. If you do not master C++, please drop the course.

**NA Grade:** Regardless of your overall grade at the end of the class, you will get an NA grade if you have not submitted a satisfactory term project or give a presentation.

**Late Submission:** Work submitted late and without prior communication with the teaching assistant or lecturer will not be accepted. Please communicate with the teaching assistants or the lecturer as



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soon as you know you cannot meet a deadline if you would like to request an extension on a specific assignment.

**Attendance Policy:** Attendance to lectures and accomplishing activities are compulsory. It is essential that you are present and engage in the course and discussion forums.

**Accommodation Policy:** If you have special needs, please inform the instructor ASAP.

**Mutual Expectations:** Please remember, if you have any questions, concerns, or comments, to let me know right away. I welcome any feedback you are willing to offer. Mutual expectations are the following: **1)** Please be active and participate in class, ask questions, raise concern and make remarks, **2)** Listen and respect others, **3)** Be comfortable taking risks, **4)** Complete all assignments, **5)** Turn off your cell phones and communication devices during the lectures, **6)** Be punctual for all classes, **7)** Discuss class concerns either after class or during designated office hours, **8)** Be prepared for class by reading chapter prior to lesson.

**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.

**METU Code of Honour:** As reliable, responsible and honorable individuals, all members of Middle East Technical University embrace only the success and recognition they deserve, and act with integrity in the use, evaluation and presentation of facts, data and documents.

**Reminders:** **1)** Carefully read the documents concerning academic integrity which have been issued to you and the related regulations on the University's website. **2)** Learn in detail which situations fall into the scope of plagiarism in academic studies from relevant resources (e.g. ODTU UEAM website). In cases of plagiarism, excuses such as "I wasn't aware that what I've done is within the scope of plagiarism" are unacceptable. Be informed that the responsibility for such behavior is entirely yours. **3)** Use your own ideas in all of your work such a piece of homework, project etc. Indicate the source of any thought, idea, text, document or finding which does not belong to you. **4)** Prepare all your homework, projects, reports etc. by referring to the accessible original (primary) sources. **5)** During examinations, abide by the rules in the Middle East Technical University Guide for Rules To Be Followed in an Examination Environment as well as the rules determined by the instructor of the course.