



SYLLABUS FOR EE 312 – COMMUNICATION SYSTEMS I

TED UNIVERSITY

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

Academic Year & Semester

2025 Fall

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Course Code	EE 312	Course Title	Communication Systems I	
Type of Course	<input checked="" type="checkbox"/> Compulsory <input type="checkbox"/> Elective	Semester	<input type="checkbox"/> Fall <input checked="" type="checkbox"/> Spring <input type="checkbox"/> Summer	
Credit Hours / ECTS credits	(3+0+0) 3 Credits / 5 ECTS	Pre-requisite	EE 311	
		Co-requisite	NONE	
Mode of Delivery	<input checked="" type="checkbox"/> Face-to-face <input type="checkbox"/> Distance learning	Language of Instruction	<input checked="" type="checkbox"/> English <input type="checkbox"/> Turkish	
Course Level	<input checked="" type="checkbox"/> Undergraduate <input type="checkbox"/> Graduate (MS) <input type="checkbox"/> Graduate (PhD)	Year of Study	<input type="checkbox"/> First Year <input type="checkbox"/> Sophomore <input checked="" type="checkbox"/> Junior <input type="checkbox"/> Senior	<input type="checkbox"/> Masters <input type="checkbox"/> Doctorate

Course Coordinator	Dr. Serkan Şahin E-mail: serkan.sahin@tedu.edu.tr Room: B147 Phone: -		
Office Hours	Wednesday (14:00–16:00)		
Teaching Assistant(s)	To be determined		
Office Hours	To be determined	To be determined	
Course Schedule	Section 01	Tuesday (16:00–18:00) @G101, Wednesday (13:00–14:00) @F404	

Catalog Description	Fourier Theory and Communication Signals: Filters, Low-Pass and Band- Pass Signals, Phase and Group Delay, Amplitude Modulation: Double Sideband-Suppressed Carrier, Single-Sideband and Vestigial-Sideband Modulation Methods, Frequency Division Multiplexing, Phase and Frequency Modulation: Phase-Locked Loop, Superheterodyne Receivers, Random Variables and Processes: Power Spectral Density, Transmission of a Random Process Through a Linear Filter, Noise in Analog Modulation.
Course Objectives	This course provides the basic principles of modern communication systems. As a fundamental element of a communication system, modulation will be the main focus of this course. We will cover spectral analysis of signals and systems that are relevant to communication systems. The principles of analog communication systems and analysis of their performance will be studied. Through this course, students will acquire the basic concepts of communication theory and engineering and understand the trade-offs (power, bandwidth, complexity) for continuous-wave modulation (AM and FM) and performance limitations in communication systems through both theoretical and MATLAB studies.
Required Reading	Haykin, S., & Moher M. (2010). <i>Communication Systems</i> . Intl. Student Version, 5 th Ed. Wiley.
Suggested / Recommended Reading	Proakis, J. G., & Salehi, M. (2015). <i>Fundamentals of Communication Systems</i> . Global Edition, 2 nd Ed., Pearson.



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Software Usage	MATLAB with Communications Toolbox (https://www.mathworks.com/products/communications.html)
Course Learning Outcomes (LOs)	Having successfully completed this course, students will be able to: LO-1: Understand basic elements of general communication systems and their importance. LO-2: Understand Fourier series and transform, why it is important and its applications, analysis of signals in time and frequency domains, and their relations through Fourier transform. LO-3: Understand signal multiplexing, analog modulation, and demodulation; bandwidth requirements, amplitude modulation with different forms, and its advantages and disadvantages. LO-4: Investigate frequency and phase modulation, their bandwidth requirements, advantageous and disadvantageous, and how they compare. LO-5: Treat noise in communication systems by using the aspects of probability theory and random processes. LO-6: Understand the effect of channel noise on the performance of continuous-wave modulation systems.
Course Evaluation	Course feedback survey will be conducted in the last two weeks of the semester.
Course Web Page	The class has already been enrolled in Moodle (https://lms.tedu.edu.tr/). All announcements and course-related materials will be posted on the Moodle course page.
Some Useful Website References	N/A

Learning Activities & Teaching Methods	<input checked="" type="checkbox"/> Brainstorming <input type="checkbox"/> Case Study/Scenario Analysis <input checked="" type="checkbox"/> Collaborating <input type="checkbox"/> Concept Mapping <input checked="" type="checkbox"/> Demonstrating <input checked="" type="checkbox"/> Discussions / Debates <input type="checkbox"/> Drama / Role Playing <input type="checkbox"/> Experiments <input type="checkbox"/> Field Trips <input type="checkbox"/> Guest Speakers	<input type="checkbox"/> Hands-on Activities <input checked="" type="checkbox"/> Inquiry <input type="checkbox"/> Microteaching <input type="checkbox"/> Oral Presentations / Reports <input type="checkbox"/> Peer Teaching <input type="checkbox"/> Predict-Observe-Explain <input checked="" type="checkbox"/> Problem Solving <input checked="" type="checkbox"/> Questioning <input checked="" type="checkbox"/> Reading	<input type="checkbox"/> Scaffolding / Coaching <input type="checkbox"/> Seminars <input type="checkbox"/> Service Learning <input checked="" type="checkbox"/> Simulations & Games <input checked="" type="checkbox"/> Telling / Explaining <input type="checkbox"/> Think-Pair-Share <input type="checkbox"/> Video Presentations <input checked="" type="checkbox"/> Web Searching <input checked="" type="checkbox"/> Other(s): Active Learning Exercises
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Assessment Methods & Criteria	<input type="checkbox"/> Case Studies / Homework	(...%)	<input type="checkbox"/> Presentation (Oral, Poster)	(...%)
	<input type="checkbox"/> Lab Assignment	(...%)	<input type="checkbox"/> Project	(...%)
	<input type="checkbox"/> Observation	(...%)	<input checked="" type="checkbox"/> Quiz	(10%)
	<input type="checkbox"/> Oral Questioning	(...%)	<input type="checkbox"/> Self-evaluation	(...%)
	<input type="checkbox"/> Peer Evaluation	(...%)	<input checked="" type="checkbox"/> Test/Exam	(90%)
	<input type="checkbox"/> Performance Project (Written, Oral)	(...%)	<input type="checkbox"/> Other(s):	(...%)
	<input type="checkbox"/> Portfolio	(...%)		



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Student Workload	<input type="checkbox"/> Case Study Analysis	(... hrs)	<input type="checkbox"/> Online Discussion	(... hrs)
	<input checked="" type="checkbox"/> Course Readings	(42 hrs)	<input type="checkbox"/> Oral Presentation	(... hrs)
	<input type="checkbox"/> Debate	(... hrs)	<input type="checkbox"/> Poster Presentation	(... hrs)
	<input type="checkbox"/> Demonstration	(... hrs)	<input type="checkbox"/> Report on a Topic	(... hrs)
	<input checked="" type="checkbox"/> Exams/Quizzes	(42 hrs)	<input type="checkbox"/> Research Review	(... hrs)
	<input type="checkbox"/> Field Trips/Visits	(... hrs)	<input type="checkbox"/> Resource Review	(... hrs)
	<input type="checkbox"/> Hands-on Work	(... hrs)	<input type="checkbox"/> Team Meetings	(... hrs)
	<input type="checkbox"/> Lab Applications	(... hrs)	<input type="checkbox"/> Web Designs	(... hrs)
	<input checked="" type="checkbox"/> Lectures	(42 hrs)	<input type="checkbox"/> Work Placement	(... hrs)
	<input type="checkbox"/> Mock Designs	(... hrs)	<input type="checkbox"/> Workshop	(... hrs)
	<input type="checkbox"/> Observation	(... hrs)	<input checked="" type="checkbox"/> Other(s): Homework Assignments	(28 hrs)
	Total Workload			154 hrs

TENTATIVE OUTLINE

Any changes and updates will be announced on the course web page.

Week	Topics	LOs	Textbook Reading	Assignments
1	Fourier Theory and Comm. Signals	1	Ch. 2	
2	Fourier Theory and Comm. Signals	1	Ch. 2	
3	Amplitude Modulation	2	Ch. 3	
4	Amplitude Modulation	2	Ch. 3	
5	Amplitude Modulation	2	Ch. 3	
6	Phase and Frequency Modulation	3	Ch. 4	
7	Phase and Frequency Modulation	3	Ch. 4	
8	Phase and Frequency Modulation	3	Ch. 4	Quiz
9	Random Variables and Processes	4	Ch. 5	
10	Random Variables and Processes	4	Ch. 5	Midterm
11	Random Variables and Processes	4	Ch. 5	
12	Noise in Analog Modulation	5,6	Ch. 6	
13	Noise in Analog Modulation	5, 6	Ch. 6	



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14	Noise in Analog Modulation	5, 6	Ch. 6	
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FINAL EXAMS WEEK (*date and time to be announced later*).

COURSE ASSIGNMENTS & GRADING

A. Midterm Exam [30%]

There will be one closed-book & closed-note midterm exam, which is 30%. Midterm Exam will be on the 10th week.

B. Final Exam [50%]

There will be a cumulative closed-book final exam covering all topics. The date and time of the final exam will be announced at the end of the semester.

C. Quizzes [20%]

There will be 1 closed-book quiz.

COURSE ASSESSMENTS & LEARNING OUTCOMES MATRIX

Assessment Methods	Course Learning Outcomes
Quizzes	LO# 1–5
1 st Midterm Exam	LO# 1, 2
2 nd Midterm Exam	LO# 3, 4
Final Exam	LO# 1–5

COURSE POLICIES

I. Attendance

- Regular class attendance is expected for all students at the University. You are not required but advised to attend all classes.
- Please send your professor a brief e-mail to explain your absence in advance.
- Your absence will not reduce your attendance rate *if and only if* you have a legitimate reason for missing a class (such as illness, death in the family, a traffic accident, *etc.*). In case of a disease or emergency, you must supply formal documentation that supports your claim.
- Classes start at the hour. Please be respectful of your classmates by being on time.
- All electronic equipment should be turned off and kept out of sight before the lecture starts.

II. Make-up Policy

There will be a single make-up exam for Midterm Exam 1 and 2 which will be available if and only if you have a legitimate reason for missing the exam (such as illness, death in the family, a traffic accident, *etc.*). In case of an illness or emergency, you must supply a formal documentation that supports your claim. The topics for the make-up exam are from everything that is covered in class at the time of the exam. There will be *no* make-up for the quizzes.

III. Late Submission Policy

Late submissions will not be graded. Missed quizzes without any clarification will result in a grade of zero (0).

IV. Cheating & Plagiarism



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Collaboration is strongly encouraged; however, the work you hand in must be solely your own. Cheating and plagiarism are severe offenses and will be penalized accordingly by the university disciplinary committee. Cheating has a comprehensive description which can be summarized as "acting dishonestly." Some of the things that can be considered cheating are the following:

- Copying answers on exams, home works and lab works,
- Using prohibited material on exams,
- Lying to gain any advantage in class,
- Providing false, modified, or forged data in a report,
- Plagiarizing (see below),
- Modifying graded material to be re-graded,
- Causing harm to colleagues by distributing false information about an exam, homework, or lab.

All of the following are considered plagiarism (www.plagiarism.org):

- Turning in someone else's work as your own,
- Copying words or ideas from someone else without giving credit,
- Failing to put a quotation in quotation marks,
- Giving incorrect information about the source of a quotation,
- Changing words but copying the sentence structure of a source without giving credit,
- Copying so many words or ideas from a source that it makes up the majority of your work, whether you give credit or not.

V. Disability Support

If you have a disabling condition that may interfere with your ability to complete this course successfully, please contact Dr. Serkan Şahin (email: serkan.sahin@tedu.edu.tr). For more information, please see the [Handbook for Registered Students](#) (Turkish Content).

Prepared By	Dr. Serkan Şahin	Date	01/10/2025
Revised By	Dr. Serkan Şahin	Rev. Date	01/10/2025