

SYLLABUS

General information	Title and code of subject, number of credits	ETR 454 Signals and Systems 6 ECTS	
	Department	Physics & Electronics	
	Program	Bachelor	
	Academic semester	Fall, 2023	
	Lecturer	M.Sc Babak Emdadi	
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	Lecture room/Schedule	11 Mehseti Street, AZ1096 Baku, Azerbaijan (Neftchilar campus)	
	Consultations		
Course language	English		
Type of the subject	Major		
Textbooks and additional materials	<p><i>Textbooks:</i></p> <ol style="list-style-type: none"> A. V. Oppenheim, A. S. Willsky with S. Hamid Nawab; <i>Signals and Systems</i>, Prentice Hall, 1997 (2nd edition). Mohammed Ferdjallah: <i>Introduction to Digital Systems</i>, 2011 John Wakerly: <i>Digital design, Principles and practices</i>, 2000 		
Teaching methods	Lecture		+
	Solving exercises		+
Assessment	Components	Date/ Deadline	Percent (%)
	Active participation	At each lesson	10
	Quizzes	During the semester	10
	Attendance		10
	Mid-term exam		30
	Final exam		40
	Final		100
Course description	The purpose of this course is to teach underground students the features of signals and systems. The Students must know the Continuous-time and discrete-time signals and systems, Linear time-invariant systems: impulse response, convolution, Fourier series, Continuous-time Fourier transform, Discrete-time Fourier transform, and Sampling theory.		
Course objectives	The purpose of the subject "Signals and Systems" is to teach the characteristics of signals and systems, analog and discrete signals, parameters and characteristics, theory and methods of signal analysis, methods of mathematical representation of signals, email methods of analog and digital signals to undergraduate students studying "Radio engineering and telecommunication engineering". is to teach. Students should know continuous-time and discrete-time signals and systems, linear time-invariant systems: impulse response, convolution, Fourier series, Continuous-time Fourier transform, Discrete-time Fourier transforms.		
Learning outcomes (LO))	<p>Having successfully completed this course, they should know:</p> <ul style="list-style-type: none"> • Characteristics of signals and systems, • Characteristics of analog and discrete signals. • Signal parameters and characteristics. • Signal analysis theory and methods, • Methods of mathematical representation of signals. • Email methods of analog and digital signals. <p>Students will be able to:</p> <p>LO-1: Define continuous-time and discrete-time signals and systems.</p> <p>LO-2: Identify linear time-invariant systems.</p> <p>LO-3: Calculate impulse response and convolution.</p>		

	<p>LO-4: Calculate Fourier series coefficients.</p> <p>LO-5: Define and calculate continuous-time Fourier transform.</p> <p>LO-6: Define and calculate discrete-time Fourier transform.</p> <p>LO-7: Express sampling theory.</p>
<p>Rules (Educational policy and behavior)</p>	<ul style="list-style-type: none"> ▪ Preparation for class The structure of this course makes your individual study and preparation outside the class extremely important. The lecture material will focus on the major points introduced in the text. Reading the assigned chapters and having some familiarity with them before class will greatly assist your understanding of the lecture. After the lecture, you should study your notes and work relevant problems and cases from the end of the chapter and sample exam questions. ▪ Withdrawal (pass/fail) This course strictly follows grading policy of the School of Humanities, Education and Social sciences. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year. ▪ Cheating/plagiarism Cheating or other plagiarism during the Quizzes, Mid-term and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0), without any considerations. ▪ Professional behavior guidelines The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly prohibited. ▪ Attendance Students who attend the whole classes will get 5 marks. for three absence student loses 1 mark. ▪ Quizzes There will be a quizzes per two weeks. The quizzes will be announced in the classroom two weeks before and will relate to homework. ▪ Activity Students who will be active during discussion of past lessons will be awarded with one activity mark.

This program reflects the comprehensive information about the subject and information about any changes will be provided in advance.

Week	Dates (planned)	Subject topics	Textbook/ Assignments
1		<i>Classification of Signals and Systems:</i> Standard signals. Step, Ramp, Pulse. Impulse. Real and Complex exponentials and Sinusoids	[2] p. 2-16
2		<i>Classification of Signals and Systems:</i> Classification of Signals- Continuous Time (CT) and Discrete Time (DT) signals, Periodic and Aperiodic signals .	[1] p. 4-20 [1] p.30-52 [1] p. 24-28 [1] p. 67-81
3		<i>Classification of Signals and Systems:</i> Deterministic and Random signals. Energy and Power signals	[2] p. 31-57 [2] p. 76-85
4		<i>Classification of Systems:</i> CT systems and DT systems. Linear and non- Linear Time variant and Time-invariant. Causal and Non-causal . Stable and Unstable	[2] p. 113-146 [2] p. 153-155
5		<i>Analysis of Continuous Signals:</i> Fourier series for periodic signals. Fourier Transform.	[1] p. 216-240 [3] p. 124-148
		<i>Quiz 1(Lec1-Lec4)</i>	[1] p. 242-251

6		<i>Analysis of Continuous Signals:</i> Properties. Laplace Transforms and properties	[2] p. 173-198 [2] p. 201-208 [2] p. 201-208
7		<i>Linear Time Invariant Continuous Time Systems:</i> Impulse response Convolution Integrals Differential equations Quiz 2(Lec5-Lec6)	[2] p. 271-300 [2] p. 310-314
8		Mid-term exam	
9		<i>Linear Time Invariant Continuous Time Systems:</i> Fourier and Laplace transforms in Analysis of CT systems Systems connected in series	[2] p. 384-422 [2] p. 425-427
10		<i>Analysis of discrete time signals</i> Baseband Signal Sampling Fourier Transform of discrete time signals (DTFT)	[2] p. 565-588 [2] p. 596-600
11		<i>Analysis of discrete time signals</i> Properties of DTFT Quiz 3 (Lec9-Lec10)	[2] p. 602-635 [2] p. 667-693 [2] p. 636-638 [2] p. 694-698
12		<i>Linear Time Invariant- Discrete Time Systems</i> Impulse response- Difference equations Convolution Sum Discrete Fourier Transform	[2] p. 764-788 [2] p. 801-805
13		<i>Linear Time Invariant- Discrete Time Systems</i> DT system connected in series and parallel	[2] p. 807-825 [2] p. 845-850
14		Recap of all covered material Quiz 4 (Lec11-Lec13)	
15		Solving problems and ambiguities of students about the course Solving extra examples	
		Final Exam	

