

General information	Title and code of subject, number of credits	ETR 330 – Electrical and electronic devices 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>Textbooks:</p> <ol style="list-style-type: none"> 1. The ECE Handbook – Electronics Systems and Technologies, By Engr. Santos S. Cuervo, 2nd edition, 2013 2. Control Systems for Power Electronics, Patil, Mahesh, Rodey, Pankaj, 2015 3. Principles of Electronic Communication Systems, Frenzel, Louis E., McGraw Hill, 2022 4. Electrical Engineering: Principles and Applications, Allan R. Hambley, 6th Edition, 2014 5. Sensors and transducers, Ian R. Sinclair, 3rd Edition, 2001. 6. Attenuator Overview - a brief review of key specifications for fixed and step attenuators. Agilent.1998 7. Power electronics handbook, Muhammad H. Rashid, 2001. 		
Teaching methods	Lecture		+
	Solving exercises		+
Assessment	Components	Date/ Deadline	Percent (%)
	Active participation	At each lesson	10
	Quizzes	During the semester	10
	Attendance	At each lesson	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 electrical and Electronic devices. The Students must know the basic electric circuit quantities and circuit analysis techniques; semiconductor devices such as diodes, transistors and operational amplifiers and their application in power supplies and amplifiers; digital logic and microcontrollers; and finally electrical energy, machines and power systems. It is designed to give a broad understanding of the principles of electrical and electronic engineering.		
Course objectives	This course aims to introduce the devices of Electrical and Electronic devices, and basic Circuits/DC Analysis: electrical quantities, components and sources, circuit analysis laws; Kirchhoff laws, series/parallel circuits, voltage/current divider, superposition, Thevenin theorem, controlled sources. Electronics: Diodes, DC power supplies, transistors and op-amps.		
Learning outcomes (LO))	<p>Having successfully completed this course, students will be able to:</p> <p>LO-1: Gain a basic understanding of semiconductor material and p-n junction properties and ideal current-voltage characteristics</p> <p>LO-2: Learn DC and small-signal AC analysis techniques for diode circuits with one or more diodes using linear and nonlinear equivalent circuit models</p> <p>LO-3: Learn about diode application in rectifier circuits, voltage regulators</p> <p>LO-4: Describe the physical principles, construction, characteristics, modelling and limitations of field-effect and bipolar junction transistors</p> <p>LO-5: Understand and become familiar with DC (including DC biasing) and small-signal AC analysis of field-effect and bipolar junction transistor circuits and examine three basic applications of these circuits</p>		

Rules (Educational policy and behavior)	<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 Those students who are late for lessons for more than 15 minutes to class will be marked absent, despite this, the student can still attend the class. 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.
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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>Electrical devices:</i> Electrical devices categories, control systems, parts of electrical devices <i>Questions and Exercises</i>	[2] p. 2-16
2		<i>Electronic devices:</i> Electronic devices categories, control systems, parts of electronic devices <i>Questions and Exercises</i>	[1] p. 4-20 [1] p.30-52 [1] p. 24-28 [1] p. 67-81
3		<i>Electrical devices:</i> Basic electric circuit quantities and circuit analysis techniques	[2] p. 31-57 [2] p. 76-85
4		<i>Electrical devices:</i> Basic electric circuit quantities and circuit analysis techniques	[2] p. 113-146 [2] p. 153-155
5		<i>Electronic devices:</i> Become familiar with basic circuit elements	[1] p. 216-240 [3] p. 124-148
		<i>Quiz 1(Lec1-Lec4)</i>	[1] p. 242-251

6		<i>Electronic devices:</i> Semiconductor devices such as resistors, capacitors and their application in power supplies	[2] p. 173-198 [2] p. 201-208 [2] p. 201-208
7		<i>Electronic devices:</i> Become familiar with the power supply and this device's function	[2] p. 271-300 [2] p. 310-314
8		<i>Mid-term exam</i>	
9		<i>Electronic devices:</i> Become familiar with the digital multimeter and this device's function	[2] p. 384-422 [2] p. 425-427
10		<i>Electronic devices:</i> Become familiar with the digital storage oscilloscope and this device's function	[2] p. 565-588 [2] p. 596-600
11		<i>Electronic devices:</i> Transistors and op-amps and operational amplifiers and their application in power supplies and amplifiers	[2] p. 602-635 [2] p. 667-693 [2] p. 636-638 [2] p. 694-698
12		<i>Digital devices:</i> Binary code Registers Counters Decoder	[2] p. 764-788 [2] p. 801-805
13		<i>Electronic devices:</i> Become familiar with DSP chip	[2] p. 807-825 [2] p. 845-850
14		<i>Recap of all covered material Quiz 4 (Lec11-Lec13)</i>	
15		Solving problems and ambiguities of students about the course Solving extra examples	
		<i>Final Exam</i>	

