SYLLABUS

General	Title and code of subject,	ETR 220 Fundamentals of electrical engineering 8 ECTS			
information	number of credits	Physics and Electronics			
	Program	Bachelor			
	Academic semester	2024 fall			
	Lecturer	Ph. D. Elvin Alizade			
	E-mail:	AlizadeElv@gmail.com			
	Phone number:	+994 503235103			
	Lecture room/Schedule	11 Mehseti Street, AZ1096 Baku, Azer room	baijan (Neftchilar campus),		
	Consultations				
Prerequisites	MATH 101				
Course language	English				
Type of the subject	Major				
Textbooks and	Textbooks:				
additional	1. Electrical Engineering:	Principles and Applications, Allan R. H	ambley, Pearson, 7th Edition		
materials	2021				
	2. Electronics Fundament Buchla 8th Edition, Pe	arson, 2014	homas L. Floyd, David L.		
	Optional Reference Texts:				
	4 Principles and Applica	tions of Electrical Engineering Giorgio	Rizzoni and James Kearns 7th		
	Edition. McGraw-Hill.	2022.	Kizzoni and James Kearns, 7th		
	5. Electrical Engineering:	Principles and Applications by William	Hayt Jr., Jack Kemmerly, and		
	Steven Durbin, McGra	w-Hill, 2021			
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	for solving electrical circuits.
	• Analyze electric fields, capacitance, and the behavior of capacitors in circuits.
	• Evaluate magnetic fields, electromagnetism, and the operation of electromagnetic devices.
	• Study inductors, mutual inductance, and transformers.
	• Analyze alternating current and voltage, including AC generators and motors.
	• Design and analyze filters including low-mass high-mass and hand-mass filters
	 Understand the behavior and applications of diodes BITs and operational amplifiers
	 Apply knowledge of logic circuits and Boolean algebra in digital circuit analysis
	 Apply knowledge of logic enclus and boolean algebra in digital enclut analysis. Develop problem solving and critical thinking skills relevant to electrical engineering.
	Develop protein-solving and entired uninking skins relevant to electrical engineering.
	• Apply leaned principles to real-world engineering chanenges and ensure electrical safety considerations
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(Educational	Constal information on the subject will be provided for the students during lectures
(Educational policy and	Student's knowledge on the previous tonics will be evaluated and new tonic will be evaluated by mins
bohowion)	of visual aids during cominers. Student's knowledge level will be tested orally and in written forms
Dellavior)	before midterm and final exame. Submission of the individual works by the and of course is obligatory
	Attendance
	Participation of students at all classis is important. Students should inform dean's office about missing
	lessons for particular reasons (illness family issues and etc.) Students missing more than 25% of
	lessons are not allowed to take the exam
	Ouizzes
	Those students who have informed the teacher and the dean's office about missing the quiz in advance
	for particular reasons, are allowed to take the quiz next week.
	Exams
	All the issues related to the participation and admission to the exam are regulated by the faculty dean.
	Topics of midterm and final exams are provided for the students before the exams. The questions of
	midterm exams are not repeated in the final exam.
	Violation of the rules of the exams
	Disrupting the quiz and taking copy during midterm and final exams is forbidden. Quiz papers of the
	student who do not follow these rules are canceled and the students are expelled from the quiz by
	getting 0 (zero).
	The rule for completing the course
	In accordance with the University rules the overall success rate to complete the course should be 60%
	or above. The students who failed the exam would be to take this subject next semester or next year.
	Rules of conduct for Students
	Disruption of the lesson and not following ethical norms during the lesson, as well as conduction of the
	discussions by the students without permission and using mobile phones is forbidden.
	Quizzes
	Quizzes will be held 4 times during the semester The quizzes will be announced in the classroom two
	weeks before. Quiz is from homework problems. The homework problems will be selected from
	questions and problems in the end of each chapter. The No. of homework problems will be announced
	after finishing each chapter.
	Lab work
	Will be held 8 times during the semester.
	Attendance
	Students who attend the whole classes will get 5 marks. for two absence student loses 1 mark.
	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	Subject topics	Textbook/
	(planned)		Assignments
1.		<i>Basic Concepts:</i> Systems of units. Charge and current, Voltage, Power and energy, Circuit elements, Applications, Electrical safety. <i>Questions and Exercises</i>	[1],[2]
2.		<i>Basic Laws:</i> Ohm's law. Nodes, branches, and loops. Kirchhoff's laws. Series resistors and voltage division. Parallel resistors and current division. Nodal and Mesh Analysis. <i>Questions and Exercises</i>	[1],[2]

	Final Exam	
15.	Logic Circuits: Number systems. Boolean algebra. Boolean logic gates. Questions and Exercises, Quiz 4	[2]
14.	Semiconductor Devices and Circuits: Operational amplifier. Operational amplifier circuits. Questions and Exercises.	[1],[2]
13.	Semiconductor Devices and Circuits: Operational amplifier. Operational amplifier circuits. Questions and Exercises.	[1],[2]
12.	Semiconductor Devices and Circuits: Bipolar junction transistors. BJT amplifiers. Questions and Exercises. Quiz 3	[1],[2]
11.	Semiconductor Devices and Circuits: Bipolar junction transistors, BJT amplifiers. Operational amplifiers. Questions and Exercises.	[1],[2]
10.	Mid term exam	
9.	Semiconductor Devices and Circuits: The Zener diode. Zener diode applications. The varactor diode. Optical diodes. Questions and Exercises	[1],[2]
8.	Semiconductor Devices and Circuits: Diodes and applications. Half-wave rectifiers. Full-wave rectifiers. Questions and Exercises	[1],[2]
7.	<i>Filters:</i> First-Order Filters, Transfer Functions, Low-Pass Filters, High-Pass Filters, Second-Order Filters, Band-Pass Filters, Band-Stop Filters. <i>Questions and Exercises, Quiz 2</i>	[1],[2]
6.	Alternating Current And Voltage: The Sinusoidal Waveform, Voltage and Current Values of Sine Waves, Angular Measurement of a Sine Wave, The Sine Wave Formula, Analysis of AC Circuits, Alternators (AC Generators), AC Motors. Questions and Exercises	[1],[2]
5.	<i>Inductor and transformers:</i> Inductors and inductance, Inductor circuits, Mutual inductance, Energy stored in magnetic fields, Transformers. <i>Questions and Exercises</i>	[1],[2]
4.	Magnetic Field and Electromagnetic devices: Magnetic field, Electromagnetism, Electromagnetic Devices, Electromagnetic Induction, DC Generators, DC Motors. Questions and Exercises	[1],[2]
3.	<i>Electric Field and Capacitance:</i> Electric field, Capacitors and dielectrics, Capacitor circuits, Energy stored in electric fields. <i>Questions and Exercises, Quiz 1</i>	[1],[2]

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