

## SYLLABUS

<b>General information</b>	<b>Title and code of subject, number of credits</b>	ETR 480 Electrotechnology 6 ECTS	
	<b>Department</b>	Physics and Electronics	
	<b>Program</b>	Bakalavr	
	<b>Academic semester</b>	2024 Fall	
	<b>Lecturer</b>	PhD, dosent Hasanov Elchin	
	<b>E-mail:</b>	elgafgas@yahoo.com	
	<b>Phone number:</b>	+994 50 5287740	
	<b>Lecture room/Schedule</b>	11 Mehseti Street, AZ1096 Baku, Azerbaijan (Neftchilar campus), room	
	<b>Consultations</b>	II, 15:00 – 16:00	
	<b>Office hours</b>	Sunday 10-00	
<b>Prerequisites</b>			
<b>Course language</b>	English		
<b>Type of the subject</b>	Major		
<b>Textbooks and additional materials</b>	<p>Ədəbiyyat</p> <ol style="list-style-type: none"> <li>1. Special Electrical Machinery , J./Berns 2019 .112 p.</li> <li>2. Engineering Science Y/Right 2007, 75 p.</li> <li>3. Industrial Electronics N/Cobind 2004, 231 p.</li> <li>4. Renewable Energy and Climate Change Volker V. Quaschnig 2013 129 p/</li> </ol>		
<b>Teaching methods</b>	<b>Lecture</b>	+	
	<b>Group discussions at seminars</b>	+	
<b>Assessment</b>	<b>Components</b>	<b>Date/ Deadline</b>	<b>Percent (%)</b>
	<b>Tests</b>	During the semester	5
	<b>Active participation</b>	At each lesson	10
	<b>Quizzes</b>	During the semester	15
	<b>Attendance</b>	During the semester	5
	<b>Midterm exam</b>		30
	<b>Final exam</b>		35
	<b>Final</b>		<b>100</b>
<b>Course description</b>	<p>In the course "Electrotechnology" focuses on the processes and systems for implementation of such technological processes, which are based on phenomena that occur when passing an electrical current in solid, liquid and gas environments, and the ongoing transformation of energy electro-magnetic fields. The theoretical foundations of these methods and industrial use examine.</p>		
<b>Course objectives</b>	<p>The purpose of the "Electrotechnology" course is to provide undergraduate students in the "Electrical and Electronics Engineering" program with a thorough understanding of key technological processes based on the unique properties of electricity, as well as the working principles and characteristics of electro technological devices.</p> <p>In teaching this subject, special emphasis should be placed on studying the electromagnetic and electromechanical aspects of electrical energy transformation in electro technological processes, its conversion into mechanical, chemical, and other forms of energy, and the processes involved in obtaining these forms. The course should also focus on the equipment used to carry out these processes.</p> <p>The primary objective of the Electrotechnology course is to equip students with a strong theoretical foundation in the mathematical and physical principles underlying modern electrotechnology and its devices. Additionally, students should learn methods for controlling and monitoring electro technological processes and develop skills in applying the principles of physics, electrical engineering, and electronics to the processes and equipment involved in electrotechnology.</p>		
<b>Learning outcomes</b>	<p><b>Expected Learning Outcomes:</b></p> <p>At the end of the course, students and trainees are expected to have acquired the following knowledge and skills:</p> <p><b>Knowledge:</b></p>		

	<ul style="list-style-type: none"> <li>• Understand the physical phenomena involved in electro technological processes;</li> <li>• Know the methods of converting electrical energy into other forms of energy;</li> <li>• Comprehend the basic laws governing energy distribution and movement;</li> <li>• Identify the different types of electro technological processes and devices, along with their applications;</li> <li>• Understand the operating modes of electro technological devices and energy-saving techniques;</li> <li>• Recognize sources of basic scientific and technical information related to electro technological processes and equipment.</li> </ul> <p><b>Skills:</b></p> <ul style="list-style-type: none"> <li>• Understand the components and functional purposes of electrical equipment and devices used in electrical power systems and electrotechnical objects;</li> <li>• Experimentally determine the parameters and characteristics of electro technological devices;</li> <li>• Measure key electrical and non-electrical quantities related to the operation of electro technological facilities;</li> <li>• Calculate the operating modes of electro technological devices;</li> <li>• Ensure the proper operation of electrical devices.</li> </ul>
<p><b>Rules (Educational policy and behavior)</b></p>	<ul style="list-style-type: none"> <li>• Lesson organization General information on the subject will be provided for the students during lectures. Student's knowledge on the previous topics will be evaluated and new topic will be explained by mins of visual aids during seminars. Student's knowledge level will be tested orally and in written forms before midterm and final exams. Submission of the individual works by the end of course is obligatory.</li> <li>• Effectiveness (pass/fail) This course strictly follows the assessment policy conducted by the subject teaching faculty. Hence a student must score at least 60% to pass the course normally. In case of failure he will be forced to repeat the course in the next term or year.</li> <li>• Plagiarism Cheating or other forms of plagiarism during review surveys, midterms and final exams will result in disqualification. In this case a student will automatically receive zero "0" without further discussion.</li> <li>• Professional conduct directives Students will behave professionally during class hours to create a conducive academic environment. Off course discussions and unethical behavior are strictly prohibited.</li> <li>• 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.</li> <li>• Quizzes. Quizzes will be four times during semester. The time of quizzes will be announced in the classroom three weeks before. The quizzes will be related to the homework material.</li> <li>• Activity Students who will be active during discussion of past lessons will be awarded with one activity mark.</li> </ul>

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	17.09./24	Physical principles and technical implementation of modern electrotechnological installations	[1] p.709-741
2	24.09./24	Principles of Electricity Electro technological processes in ecology  Problem solving.	[1] p.750-773 [1] p-780-795

3	01./10/24	Automatic control of electrical technological processes	[1] p.800-815
		Problem solving.	
4	08/10/24	Features of mathematical modeling of electrotechnological processes	[1] p.815-838
		Problem solving.	
5	15/10/24	Induction heating technologies	
		Problem solving.	
6	22/10.24	Fundamentals of thermal calculation of electrothermal installations.	[1] p.846-872
		Problem solving.	
7	29/10/24	Direct electric resistance heating	[1]p.881-900,
		Indirect electric resistance heating. Problem solving	
8	05.11/24	Electro-technological industrial installations	[1] p.957-984
		Induction and dielectric heating Problem solving.	
9		<b>Midterm Exam</b>	
10	12.11/24	Electric water heaters and steam boilers	[1] p.916-947
		Thermoelectric heating and cooling Problem solving	
11	19.11.24	Electropulse technology	[4]p. 73-96
		Electrohydraulic effect and its use Problem solving	
12	26.11.24	Ultrasonic and magnetic processing of materials	[1] p.1061-1085
		Problem solving	
13	03/12/24	Tubular Electric Heaters	[3]p.555-611
		Induction Heater Problem solving.	
14	10/12/24	Electrical equipment for electrophysical and electrochemical installations	[1] page 9-6
		. Problem solving	[1] page 10-6
15	17/12/24	Electric current treatment Ultrasonic technology	[1] page 11-6