Identification	**Subject (Code, title, credits)**	ETR 390 Basics of Circuitry 6 ECTS credits	
	Department	Physics and Electronics	
	Program	Undergraduate	
	Term	Fall, 2023	
	Instructor	MSc, MIET, Alim Huseynov	
	E-mail:	Alim.Huseynov@gmail.com	
	Phone:	+99455 425 3599	
	Classroom/hours	11 Mehseti str. (Neftchilar campus)	
	Office hours	Monday-Friday, from 9:00 to 18:00	
Prerequisites	-		
Language	English		
Compulsory/Elective	Elective		
Required textbooks and course materials	Textbooks: 1. Electronic Principles - Albert Malvıno, David Bates 2. Electronics Fundamentals. Circuits, Devices, and Applications by David M. Buchla, Thomas L. Floyd 3. Electronic devices and circuit theory by Boylestad, Robert Nashelsky, Louis		
Course outline	The course discusses the basic methods for calculating the steady-state and transient processes in electrical circuits, their application to the most common electronic engineering circuits, including amplifiers, rectifiers, stabilizers, triggers, and other devices. Much attention is paid to the properties and characteristics of semiconductor elements: diodes, bipolar and field effect transistors, thyristors, operational amplifiers, and the simplest logic elements. Separate chapters are devoted to circuitry of digital devices, including DAC and ADC. A set of test and individual tasks will allow you to master the practical skills of designing and calculating electronic circuits necessary for professional activities.		
Course objectives	The course is devoted to the study of the basic laws of electrical engineering, methods for analyzing electrical circuits and circuitry implementations of electronic devices designed to convert analog, pulse, and digital signals. The theoretical knowledge and practical skills of designing digital devices acquired during training provide the basis for further acquaintance with existing approaches to the design of computing devices.		
Learning outcomes	After completing the course, the student not only gets an idea of the basics of designing digital devices, but also masters the design skills of such devices using the most advanced computer-aided design tools. Practical study of the discipline is implemented using the modern element base of programmable logic circuits. They should know: • Basic concepts of analog and digital schematics. • About digital analog converters of communication and electrical signals. • Amplification of communication and electrical signals. About operational amplifiers. • Schematic engineering of Hetti electronic devices. • About the characteristics of the main parameters of integrated microcircuits. • Electronic logic elements integrated circuits. About minimization methods. • About devices with sequential principle (triggers, registers and their combination methods, counters, and their types). • Schematic engineering of non-linear electronic devices (electrical signal generators, modulators, and demodulators). • About combined digital devices (multiplexers, demultiplexers, encoders, decoders. They should be able to: • Designing digital devices. • To design such devices using advanced computer-aided design tools. • To implement the practical study of the discipline using a modern element base of programmable logic circuits. • Research of integrated type elements in digital communication devices.		
Teaching methods	**Lecture**		☑
	Group discussion		☑
	Experiential exercise		☑
	Quiz, Classroom Exams		☑

	Others		☑
Evaluation	**Methods**	**Date/deadlines**	**Percentage (%)**
	Midterm Exam		30
	Attendance	At each lesson	5
	Project	During the semester	20
	Activity	During the semester	5
	Final Exam		40
	Total		100

Policy

- **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.

Tentative Schedule			
Weeks	Date/Day	Topics	Reference to textbooks
1.	19-09-23	Introduction to Electronics and Circuit Components. Conduction of oral and written survey. Problem solving	[1] p2 [2] p1
2.	26-09-23	Semiconductors, Diode Theory, Diode Circuits Conduction of oral and written survey. Problem solving	[1] p28, p56, p86 [2] p703 [3] p1, p57
3.	03-10-23	Special-Purpose Diodes Conduction of oral and written survey. Problem solving	[1] p140
4.	10-10-23	BJT Fundamentals, BJT Biasing Conduction of oral and written survey. Problem solving	[1] p188, p240 [2] p768 [3] p133, p166
5.	17-10-23	Basic BJT Amplifiers Quiz 1 - Lecture 1 – Lecture 4	[1] p280
6.	24-10-23	Multistage, CC, and CB Amplifiers Conduction of oral and written survey. Problem solving	[1] p326
7.	31-10-23	Power amplifiers, JFETs, MOSFET, Thyristors Quiz 2 - Lecture 5 – Lecture 6	[1] p366, p414, p470, p524 [3] p705
8.	07-11-23	Mid term exam.	
9.	14-11-23	Frequency Effects Conduction of oral and written survey. Problem solving	[1] p568
10.	21-11-23	Differential Amplifiers Conduction of oral and written survey. Problem solving	[1] p624
11.	28-11-23	Operational Amplifiers Quiz 3 - Lecture 7 – Lecture 10	[1] p666 [3] p625
12.	05-12-23	Negative Feedback Conduction of oral and written survey. Problem solving	[1] p710 [3] p775
13.	12-12-23	Linear Op-Amp Circuit Applications, Active filters Conduction of oral and written survey. Problem solving	[1] p740, p788
14.	19-12-23	Nonlinear Op- Amp Circuit Applications, Oscillators Quiz 4 - Lecture 11 – Lecture 13	[1] p850, p902 [3] p775
15.	26-12-23	Regulated Power Supplies Solving problems and ambiguities questions.	[1] p958 [3] p705

This syllabus is a guide for the course and any modifications to it will be announced in advance.