General information	**Title and code of subject, number of credits**	EENG245, Basic Electronics (Computer Eng), 8 ECTS	
	Department	Physics and Electronics	
	Program	Bachelor	
	Academic semester	Spring 2026	
	Lecturer	Master of Science (Electronics Engineering) Telman Askeraliyev	
	E-mail:	telmanaskeraliev@gmail.com	
	Phone number:		
	Lecture room/Schedule	11 Mehseti Street, AZ1096 Baku, Azerbaijan (Neftchilar campus), room	
	Consultations	Friday 10:00 – 12:00	
Course language	English		
Type of the subject	Major		
Textbooks and additional materials	***Textbooks*:** 1. Fundamentals of electric circuits, Charles K. Alexander, Matthew N. O. Sadiku, 5th Edition, 2013 2. Electronic devices: conventional current version, Thomas L. Floyd, 10th Edition, 2018 (required). 3. Electrical Engineering: Principles and Applications, Allan R. Hambley, 6th Edition, 2014 4. Basic Electronics: Devices, Circuits and System, K. Parmar, 2021 Optional Reference Texts: 5. Grob's Basic Electronics, Schultz, Mitchel E., and Bernard Grob. 11th ed. New York, NY:McGraw-Hill, 2011. Additional Resource Texts: 6. Principles and Applications of Electrical Engineering, Giorgio Rizzoni, 5th Edition, 2014 **Auxiliary Web sources:** https://www.youtube.com/watch?v=ZRLXDiiUv8Q&list=PLSQl0a2vh4HCLqA- rhMi_Z_WnBkD3wUka https://www.youtube.com/watch?v=VfXGWWyJPmQ https://www.youtube.com/watch?v=iOSbNTYrc1s https://www.youtube.com/watch?v=P54hVuje4Dg https://www.youtube.com/watch?v=58PzPrjGsG8 https://www.youtube.com/watch?v=paDs-Hnmklo https://www.youtube.com/watch?v=Rgl4OAm9tnU		
Teaching methods	**Case analysis**		x
	Group discussion		x
	Lecture		x
	Simulation		x
Evaluation Criteria	**Components**	**Date/ Deadline**	**Percent (%)**
	Activity	At each lesson	5
	Quizzes	4 quizzes during the	20

		semester	
	Attendance	At each lesson	5
	Midterm exam		30
	Final exam		40
	Final		**100**
Course description	The purpose of this course is to teach undergraduate students the fundamentals of electronics. This course mainly covers topics that are related to direct current circuits. Generally, the course consists of three sections. The first section covers basic concepts and basic laws of electric circuits. The second part studies electronic components such as diodes, capacitors, inductors, transistors, thyristors, operational amplifier and their application. The third section analyzes operation principles of oscillators and active filters. Moreover, along this course students will be introduced Multisim schematic capture and simulation software that make easier to design and analyse electrical circuits.		
Course objectives	The main objectives of this course are to introduce students to the fundamental concepts of electronics and electronic materials, to develop an understanding of the operating principles of basic electronic components and devices (such as diodes, transistors, and operational amplifiers), and to provide essential knowledge of analog and basic digital electronic circuits. Through theoretical instruction and practical laboratory work, students will learn how to analyze, design, and implement simple electronic circuits, interpret circuit schematics, and use basic electronic measurement instruments. The course also aims to develop problem-solving skills, engineering thinking, and practical competence required for further studies in electronics, electrical engineering, and related fields.		
Learning outcomes	After completing this course, students will be able to: ▪ Understand fundamental electronics concepts relevant to computer engineering, including voltage, current, resistance, and basic semiconductor principles. ▪ Identify and describe the function of key electronic components such as diodes, transistors, resistors, capacitors, and logic gates. ▪ Analyze and design simple electronic and digital circuits commonly used in computer hardware. ▪ Build, test, and troubleshoot basic electronic circuits in the laboratory using measurement instruments. ▪ Apply basic electronics knowledge to understand the working principles of computer hardware systems, including microprocessors and memory devices. ▪ Solve practical electronics problems and interpret circuit behavior in the context of computing applications.		

Class 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 on relevant problems and cases from the end of the chapter and sample exam questions. ▪ **Withdrawal (pass/fail)** This course strictly follows the grading policy of the School of Science and Engineering. Thus, a student is 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, Midterm, and Final Examinations will lead to paper cancellation. In this case, the student will automatically get zero (0) without consideration. ▪ **Professional behavior guidelines** The students shall behave in a way to create a favorable academic and professional environment during 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 4 quizzes during the semester. 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.

Week	**Dates (planned)**	**Subject topics**	**Textbook/ Assignments**
1		*Introduction to electronics:* The Atom. Materials Used in Electronics. Current in Semiconductors. N-Type and P-Type Semiconductors. The PN Junction. *Questions and Exercises*	[2] p. 19-37
2		*Basic Concepts and Law:* Systems of units. Charge and current. Voltage. Power and energy. Circuit elements. Ohm's law. Nodes, branches, and loops. Kirchhoff's laws. Series resistors and voltage division. Parallel resistors andcurrent division. *Questions and Exercises*	[1] p. 4-20 [1] p.30-52 [1] p. 24-28 [1] p. 67-81
3		*Diodes and applications:* Diode operation. Voltage-current (*V-I*) characteristics of a diode. Diode models. Half-wave rectifiers. Full-wave rectifiers. *Questions and Exercises*	[2] p. 43-69 [2] p. 76-85

4		*Diodes and applications:* the zener diode. Zener diode applications. The varactor diode. Optical diodes.	[2] p. 121-158 [2] p. 174-178
5		*Capacitor and inductors:* Capacitors. Series and parallel capacitors. Inductors. Series and parallel inductors. Practical inductors Mutual inductance. Applications.	[1] p. 216-240 [3] p. 124-148
		Quiz 1(Lesson 1-Lesson 4)	
6		***Public holiday***	
7		*Bipolar junction transistor:* Bipolar Junction Transistor (BJT) structure. Basic BJT operation. BJT characteristics and parameters. The BJT as an amplifier. TheBJT as a switch. The phototransistor. The DC operating point. Voltage-divider bias. Other bias methods. *Questions and Exercises*	[2] p. 179-205 [2] p. 226-230
8		*BJT amplifiers:* Amplifier operation. Transistor AC models. The common-emitter amplifier. The common-collector amplifier. The common-base amplifier. ***Quiz 2(Lesson 5-Lesson 6)***	[2] p. 274-302 [2] p. 312-316
9		***Mid term exam***	
10		*Field Effect Transistors:* The JFET. JFET characteristics and parameters. JFET biasing. The Ohmic region. The MOSFET. MOSFET Characteristics andParameters. MOSFET Biasing. *Questions and Exercises.*	[2] p. 383-425 [2] p. 426-427
11		*Thyristors:* The Four-Layer Diode. The Silicon-Controlled Rectifier (SCR) SCR Applications. The Diac and Triac. The Silicon-Controlled Switch (SCS). The Unijunction Transistor (UJT) *Questions and Exercises.*	[2] p. 571-593 [2] p. 604-607
12		*The operational amplifier:* Introduction to operational amplifiers. Op-amp input modes and parameters. Negative feedback. Op-amps with negative feedback. Effects of negative feedback on Op-amp. Impedances. Bias current and offsetvoltage. Open-loop frequency and phase responses. Closed-loop frequency response. Comparators. Summing Amplifiers. Integrators and Differentiators. ***Quiz 3(Lesson 9-Lesson 10)***	[2] p. 609-641 [2] p. 674-689 [2] p. 718-622
13		*Basic filter responses:* Filter response characteristics. Active low-pass filters. Active high-pass filters. Active band-pass filters. Active band-stop filters. Filter	[2] p. 772-776

		response measurements. *Questions and Exercises*	[2] p. 780-795
14		*Voltage regulators:* Voltage Regulation. Basic Linear Series Regulators. BasicLinear Shunt Regulator. Basic Switching Regulators *Questions and Exercises*	[2] p. 860-882
15		***Recap of all covered material*** ***Quiz 4(Lesson 11-Lesson 13)***	
		Final Exam