General information	**Title and code of subject, number of credits**	ETR 510 Optoelectronic devices transmitting and processing information 8 ECTS	
	Department	Physics and Electronics	
	Program	Master	
	Academic semester	2024 Fall	
	Lecturer	PhD, dosent, Gasanov Elchin	
	E-mail:	elgafgas@yahoo.com	
	Phone number:	+994 50 5287740	
	Lecture room/Schedule	11 Mehseti Street, AZ1096 Baku, Azerbaijan (Neftchilar campus), room	
	Consultations	II, 15:00 – 16:00	
	Office hours		
Prerequisites			
Course language	English		
Type of the subject	Major		
Textbooks and additional materials	List of used literature. 1. Handbook of Optoelectronics, Edited by John P. Dakin, Robert Brown, 2017, 2. R. G. Hunsperger, Integrated Optics: Theory and Technology, Berlin and Heidelberg, Springer-Verlag, 1999 3. K. Kasahara, T. Tashiro, M. Sugimoto, N. Hamano, and T. Yanase, "Double Heterostructure Optoelectronic Switch as a Dynamic Memory with Low-Power Consumption", Appl. Phys. Lett., vol. 52, 2011, pp 679–681		
Teaching methods	**Lecture**		+
	Group discussions at seminars		+
Assessment	**Components**	**Date/ Deadline**	**Percent (%)**
	Tests (oral questioning)	During the semester	5
	Activity	At each lesson	10
	Quizzes	During the semester	15
	Attendance	During the semester	5
	Midterm exam		30
	Final exam		35
	Final		**100**
Course description	Optoelectronics is one of the most developed areas in functional microelectronics, since optical and photoelectric phenomena are well studied, and technical means based on these phenomena have been used in electronics for a long time (photocells, photomultipliers, photodiodes, phototransistors, etc.).		
Course objectives	Optoelectronic devices have found their application in personal electronics, in computers. Since the creation of the first computer, the question arose of the need to store data. From the beginning, data was stored on punched cards and punched tapes, then magnetic media appeared. But with the development of technologies to produce microprocessors, the performance of computers is also growing. At the same time, software products for computers (especially games and databases) became more complex and, accordingly, increased in volume, and their delivery on floppy disks turned out to be excessively expensive and unreliable. Therefore, magnetic media have been replaced by optical devices for storing data on a CD-ROM (Compact Disk, Read-Only Memory) CD.		
Learning outcomes	The student must know the following: 1. A semiconductor laser generates a low-power infrared beam that hits a reflective mirror. 2. The servomotor, on command of the built-in microprocessor, shifts the movable carriage with a reflective mirror to the desired track on the CD. 3. The beam reflected from the disk is focused by a lens located under the disk, reflected from the mirror and hits the separating prism. 4. The separating prism directs the reflected beam to another focusing lens. 5. This lens directs the reflected beam to a photosensor, which converts light energy into electrical impulses. 6. Signals from the photosensor are decoded by the built-in microprocessor and transferred to the computer as data.		
Rules (Educational	• Lesson organization		

policy and behavior)	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 oraly and in written forms before midterm and final exams. Submission of the individual works by the end of course is obligatory. • Effectiveness (pass/fail) This course strictly follows the assessment policy conducted by the subject teaching faculty. Hencew a student must score at least 60% to pass the course normally. In case of failure he will be forced to repeate the course in the next term or year. • 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 furher discusstion. • Professional conduct directives Students will behave professionally during class hours to create a conductive academic environment. Off course discussions and unethical behavior are strictly prohibited. • 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. • Quizzes. Quizzes will be four times during semester. The time of quizzes will be announced in the classrom three weeks before.The quizzes will be related to the homework material. • 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 (planned)	Subject topics	Textbook/ Assignments
1	***21/09/24***	Optoelectronic storage devices. -Destination.	[1] p.709-741
		Problem solving.	
2	***28/09/24***	Types and characteristics: CD-ROM DRIVE DEVICE Data transfer rate.	[1] p.750-773 [1] p-780-795
		Problem solving.	
3	***05/10/24***	Optoelectronics - development prospects.	[1] p.800-815
		Problem solving.	
4	***12/10/24***	Holographic storage device. Theory and principle of physical action.	[1] p.815-838
		Problem solving.	
5	***19/10/24***	Optoelectronics. Semiconductor light emitting structures	
		Problem solving.	
6	***26.10/24***	Calculation and design of the LED Design Examples	[1] p.846-872
		Problem solving.	
7	***02/11./24***	Optoelectronics In discrete execution; micro execution	[1]p.881-900,
		Problem solving	
8	***09/11/24***	Physical and technological foundations of optoelectronics	[1] p.957-984
		Problem solving.	

9		***Mid term exam***	
10	***16/11/24***	Fiber Optic Sensors Measured physical quantity Used physical phenomenon, property	[1] p.916-947
		Problem solving	
11	***23/11/24***	Laser optoelectronic devices Typical structure of an electronic meter	[4]p. 73-96
		Problem solving	
12	***30/11/24***	Machine memory Information and memory Accumulation of information.	[1] p.1061-1085
		Problem solving	
13	***07/12/24***	Main characteristics, classification and hierarchy of memory	[3]p.555-611
		Problem solving.	
14	***14/12/24***	Magnetic storage devices Magnetic recording	[1] page 9-6
		Problem solving	[1] page 10-6
15	***21. 12/24***	Memory in cognitive psychology Computer metaphor in the study of the structural organization of memory	[1] page 11-6