Bachelor program,

Instrument Engineering (INEN) program, "Instrument Engineering" department

Course Unit Title	Biomedical technical methods and instruments. Introscopy
Course Unit Code	VTES-B03-3
Type of Course Unit	Compulsory
Level of Course Unit	3rd year INEN program
National Credits	0
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	2
Practice (hour/week)	0
Laboratory (hour/week)	1
Year of Study	3
Semester when the course unit is delivered	6
Course Coordinator	Timur Aliyev
Name of Lecturer (s)	Timur Aliyev
Name of Assistant (s)	-
Mode of Delivery	Face to Face, Seminar.
Language of Instruction	English
Prerequisites	-
Recommended Optional Program Components	-

Course description:

The subject of this discipline is a set of hardware research tools that allow you to determine the state of a biological system with as much objectivity as possible.

Groups of biomedical systems based on the registration of physical parameters and being the methodological basis for the development of hardware for research of the body's vital activity are considered.

Objectives of the Course:

The main purpose of the course is to familiarize students with the general principles of building medical diagnostic equipment using various methods and means of obtaining information about the state of the human body, and installed in various medical institutions.

Learning Outcomes

At the end of the course the student will be able to		Assessment
1	To know the theoretical foundations of medical introscopy, the main parameters and characteristics of diagnostic equipment.	1,2,3
2	Be able to theoretically analyze the device of the main nodes of the diagnostic equipment of introscopy.	1,2,3
3	Understand the principles of construction of measuring and diagnostic systems for X-ray introscopy, transmission and emission tomography, ultrasound tomography, nuclear magnetic tomography.	1,2

Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm exam

Course's Contribution to Program

		CL
1	Ability to develop as a specialist in the field of fundamental sciences and apply basic knowledge.	3
2	Ability to analyze and model functional and structural schemes of various purpose devices and systems.	5
3	Ability to use modern methods and tools, creation, selection, and application of engineering and information technology tools and modern devices and equipment.	5
4	The ability to use the strategy of team cooperation in the exchange of information, knowledge, and experience to achieve the set goal.	4
5	As a result of training, the ability to use engineering knowledge, mathematical models, and basic concepts of physics and chemistry in production and technological processes, automation, measurement, and control systems.	4
6	The ability to use modern software to process technical documents of devices, design their structures, and algorithmize processes.	4
7	The ability to apply artificial intelligence to improve the quality characteristics of measurement and control systems.	3
8	The ability to process information acquisition, processing, and transmission processes based on schematic and programmable logical integrated circuits.	5

9	Ability to use knowledge to improve quality indicators and environmental safety of production processes.	5
10	Self-development ability to apply theoretical and experimental knowledge in solving modern engineering problems.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Exam
1	[1]: Chapter 1	General information about biomedical diagnostic methods and instruments.	
2	[1]: Chapter 4	Diagnostic methods and instruments of electrocardiology.	
3	[1]: Chapter 4	Diagnostic methods and instruments of electroencephalology.	
4	[1]: Chapter 4	Diagnostic methods and instruments of electromyography.	
5	[2]: Chapter 13	Diagnostic methods and instruments of pulmonary function analysis.	
6	[2]: Chapter 19	X-ray machines and digital radiography.	
7	[2]: Chapter 20	X-ray computed tomography.	Midterm
8	[2]: Chapter 21	Nuclear medical imaging systems.	
9	[2]: Chapter 21	Emission computed tomography.	
10	[2]: Chapter 22	Magnetic resonance imaging system.	
11	[2]: Chapter 23	Ultrasonic imaging systems.	
12	[2]: Chapter 24	Thermal imaging systems.	
13	[3]: Chapter 21	Endoscopy.	
14	[2]: Chapter 14	Clinical laboratory instruments.	
15	[2]: Chapter 18	Patient safety.	
16			Final

Recommended Sources

TEXTBOOK(S)

1. Anthony Y. K. Chan. (2016). Biomedical Device Technology. Principles and Design. Second edition. Charles C. Thomas Publisher, LTD.
2. R.S. Khandpur. (2014). Handbook of Biomedical Instrumentation. Third Edition. McGraw Hill Education (India) Private Limited.
3. Jerome D. Waye, Douglas K. Rex, Christopher B. Williams. (2003). Colonoscopy. Principles and Practice. Second edition. John Wiley & Sons, Ltd.

Assessment

Attendance	0%	At least 75% class attendance is compulsory
Presentation	10%	
Quiz	10%	
Lab. works	10%	
Midterm Exam	20%	Written Exam
Final Exam	50%	Written-Oral Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University for Undergraduate Studies

Course Policies

- Attendance of the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students cannot use calculators during the exam.
- Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including midterm)	15	3	45
Presentation	1	10	10
Tutorials	15	1	15
Preparation for midterm exam	1	15	15
Final Examination	1	3	3
Preparation for final exam	1	32	32
Self-study	15	4	60

Total Workload	**180**
Total Workload/30(h)	**180/30**
ECTS Credit of the Course	**6**