

**Bachelor program,
Instrumentation Engineering (INEN) program, “Instrumentation Engineering” department**

Course Unit Title	Qualimetry and quality management	
Course Unit Code	VTES-B06-2	
Type of Course Unit	Elective	
Level of Course Unit	4 th year INEN program	
National Credits	0	
Number of ECTS Credits Allocated	7	
Theoretical (hour/week)	2	
Practice (hour/week)	1	
Laboratory (hour/week)	2	
Year of Study	4	
Semester when the course unit is delivered	7	
Course Coordinator	Hasanova Gunay	
Name of Lecturer (s)	Hasanova Gunay	
Name of Assistant (s)	-	
Mode of Delivery	Face to Face	
Language of Instruction	English	
Prerequisites	-	
Recommended Optional Programme Components	-	
<p>The course on <i>Qualimetry and Quality Management</i> introduces students to the principles and practices of quality management, focusing on techniques for measuring, analyzing, and ensuring quality in various engineering processes, particularly in the instrumentation and control systems fields. Students will gain insights into the importance of quality assurance, measurement standards, and tools required to improve and maintain high-quality production in instrumentation engineering.</p>		
Objectives of the Course:		
<p>To understand the fundamental principles of quality management and qualimetry. To introduce methods and techniques for measuring and assessing the quality of engineering systems and instrumentation. To explore different tools and standards for quality assurance in industrial processes. To learn about the integration of quality control and management within engineering projects. To develop skills in applying statistical and analytical tools to assess the quality of instrumentation systems.</p>		
Learning Outcomes		
At the end of the course the student will be able to		Assessment
1.	Define key terms related to qualimetry and quality management.	1,3
2.	Demonstrate knowledge of quality management principles, including planning, control, and improvement.	1,2,3
3.	Understand and apply quality control tools such as process control charts, Pareto analysis, and cause-and-effect diagrams.	2,3
4.	Understand measurement accuracy, precision, and their impact on instrumentation systems.	2,3
5.	Apply statistical methods for quality control and process improvement in engineering.	1,3
6.	Interpret quality standards and certifications (e.g., ISO, Six Sigma) in the context of instrumentation engineering.	1,3
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.	4
2	Ability to analyze and model functional and structural schemes of various purpose devices and systems.	3
3	Ability to use modern methods and tools, creation, selection, and application of engineering and information technology tools and modern devices and equipment.	4
4	The ability to use the strategy of team cooperation in the exchange of information, knowledge, and experience to achieve the set goal.	5
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.	1
8	The ability to process information acquisition, processing, and transmission processes based on schematic and programmable logical integrated circuits.	3
9	Ability to use knowledge to improve quality indicators and environmental safety of production processes.	4
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], Ch 1; [4], Ch 1, p.3	LECTURE: Introduction to Quality & Qualimetry	
2	[1], Ch 2, p.34; [3], Ch 3, p.71	LECTURE: Principles of Qualimetry	
3	[2], Ch 1, p.5; [4], Ch 2, p.21	LECTURE: Quality Characteristics and Metrics	
4	[2], Ch 2, p.35; [3], Ch 6, p.146	LECTURE: 7 Quality Tools:	
5	[2], Ch 5, p.203	LECTURE: SPC – Part 1: Control charts for variables	
6	[2], Ch 6, p.289	LECTURE: SPC – Part 2: Control charts for attributes	
7	[2], Ch 7, p.377	LECTURE: Process Capability Analysis:	Midterm
8	[2], Ch 8, p.445; [1], Ch 15, p.11	LECTURE: Acceptance Sampling	
9	[3], Ch 5, p.122; [4], Ch 4, p.45	LECTURE: Quality Management Systems:	
10	[3], Ch 7, p.189; [4], Ch 5, p.67	LECTURE: Total Quality Management (TQM)	
11	[1], Ch 10, p.191; [3], Ch 8, p.225	LECTURE: Quality Planning & Improvement	
12	[4], Ch 6, p.95; [3], Ch 10, p.265	LECTURE: Audits and Certification	
13	[4], Ch 7 & 8, p.111–145	LECTURE: Case Studies in Industry	
14	[1], Ch 11, p.215	LECTURE: Quality in Instrumentation Systems:	
15	[6], Ch 16, p.1-4;	LECTURE: Emerging Trends in Quality Management	
16			Final exam

Recommended Sources

TEXTBOOK(S)

Recommended Reading:

- 1 "Principles of Quality Control" by Juran & Godfrey
- 2 "Introduction to Statistical Quality Control" by Douglas C. Montgomery
- 3 "Quality Management for Organizational Excellence: Introduction to Total Quality" by David L. Goetsch & Stanley Davis
- 4 "Total Quality Management: Key Concepts and Case Studies" by D.R. Kiran

Assessment

Attendance	0%	Less than 75% class attendance results in NA grade
Presentation	10%	
Lab. works	10%	
Course work	0%	
Quiz	10%	
Midterm Exam	20%	Written Exam
Final Exam	50%	Written 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

1. Attendance of the course is mandatory.

2. Material presented in the lecture as well as assigned readings will be included in testing.
3. Late assignments will not be accepted unless an agreement is reached with the lecturer.
4. Cheating and plagiarism will not be tolerated.
5. 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	5	75
Presentation	1	10	10
Self-study	15	3	45
Tutorials	15	3	45
Midterm Examination	1	3	3
Preparation for midterm exam	1	10	10
Final Examination	1	3	3
Preparation for final exam	1	20	20
Total Workload			211
Total Workload/30(h)			7.03
ECTS Credit of the Course			7