

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

<b>Course Unit Title</b>	Hardware and Software of Computer Systems	
<b>Course Unit Code</b>	VTSS-B07	
<b>Type of Course Unit</b>	Compulsory	
<b>Level of Course Unit</b>	1 <sup>st</sup> year INEN program	
<b>National Credits</b>	0	
<b>Number of ECTS Credits Allocated</b>	7	
<b>Theoretical (hour/week)</b>	2	
<b>Practice (hour/week)</b>	2	
<b>Laboratory (hour/week)</b>	2	
<b>Year of Study</b>	4	
<b>Semester when the course unit is delivered</b>	7	
<b>Course Coordinator</b>	Kamala Aliyeva	
<b>Name of Lecturer (s)</b>	Kamala Aliyeva	
<b>Name of Assistant (s)</b>	-	
<b>Mode of Delivery</b>	Face to Face, Seminar.	
<b>Language of Instruction</b>	English	
<b>Prerequisites</b>	-	
<b>Recommended Optional Program Components</b>	-	
<b>Course description:</b>		
This course introduces the field of informatics—computer science with an emphasis on software and systems design and the human, organizational, and social context surrounding what we design. This course will not only broaden technical horizons but also focus on systematic problem solving.		
<b>Objectives of the Course:</b>		
This course does not expect any previous experience in computer science or computer programming. If you do have some experience, you will find some topics familiar, but many others will certainly be new to you. We do expect each student to be able to navigate the Windows systems in our labs, to navigate the World-Wide Web, to download and read documents in Adobe Acrobat (pdf) format, and to read and send electronic mail. Some of our assignments will require these skills. If you need to pick these skills up or sharpen them, do it in the first week of the quarter; speak with us if you need a hand.		
<b>Learning Outcomes</b>		
At the end of the course the student will be able to		Assessment
1	Present and describe data and information properly.	1,3
2	Draw conclusions about hardware of different computer systems.	1,2,3
3	Make reliable decision by using different software methods.	1
Assessment Methods: 1. Final Exam, 2. Presentation, 3. Midterm exam		
<b>Course’s Contribution to Program</b>		
		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.	5
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.	4
8	The ability to process information acquisition, processing, and transmission processes based on schematic and programmable logical integrated circuits.	4
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.	5

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)			
<b>Course Contents</b>			
Week	Chapter	Topics	Exam
1	[1]: Chapter 1	<b>Introduction to the course and computing.</b> Hardware and Software of Computer Systems. Data. Data Processing Systems. LAB. Word, Excel , PowerPoint and other Programs in Microsoft Office Are Used to Support Various Work Environments.	
2	[1]: Chapter 2	<b>Organizing and Presentation of Categorical and Numerical Data. Summary Measures.</b> LAB. Supporting Various Work Environments by Microsoft Word program	
3	[1]: Chapter 3	<b>Basic Concepts of Computer Hardware and Software. Typical digital von Neumann computer</b> LAB. Supporting Various Work Environments by Microsoft Excel program.	
4	[1]: Chapter 4	<b>Numbering Systems and Binary Arithmetic.</b> LAB. Supporting Various Work Environments by Microsoft PowerPoint program.	
5	[1]: Chapter 5	<b>Binary Math</b> LAB. Computer Software Components. Programmed Lessons.	
6	[1]: Chapter 6	<b>Computer Hardware Components.</b> LAB. Arithmetic Expressions. Variables. The INPUT Statement.	
7	[1]: Chapter 7	<b>Computer Software Components.</b> LAB. Chart of the Program. Symbolic differentiation, integration, series operations, limits, and transforms.	Midterm
8		<b>MIDTERM EXAM</b>	
9	[1]: Chapter 8	<b>Computer Generations. Types of Computers.</b> LAB. Modular arithmetic operations and sequences of numbers. Single branch IF Statements.	
10	[1]: Chapter 9	<b>Boolean Algebra and Digital Logic.</b> LAB. Loop Conditions. Example Programs with Loops Creating Large Programs.	
11	[1]: Chapter 10	<b>Boolean Logic and Gates</b> Lab. SCREEN Statement.	
12	[1]: Chapter 11	<b>Algorithms and Flowcharts.</b> LAB. Setting Many Pixels. The COLOR Statement.	
13	[1]: Chapter 12	Basic processor operations. LAB. Calculations with Graphics.	
14	[1]: Chapter 13	<b>Machine-level and high-level languages. Memory organization and data representation in memory</b> LAB. Variables with Graphics.	
15	[1]: Chapter 14-15	<b>Representing graphics. Data compression.</b> Programmed Lessons Arithmetic Expressions. Variables. The INPUT Statement. LAB. A Paint Program. Complete Program.	
16		Final	Exam
<b>Recommended Sources</b> <b>TEXTBOOK(S)</b> <ol style="list-style-type: none"> <li>1. Aliyeva K.R. Hardware and Software of Computer Systems, 2023, Textbook.</li> <li>2. David A. Patterson, John L. Hennessy. Computer Organization and Design MIPS Edition, The Hardware/Software Interface, 2020.</li> <li>3. David A Patterson. Computer Organization and Design: The Hardware/Software Interface, 4Th Edition Paperback – January 1, 2010.</li> </ol>			
<b>Assessment</b>			
Attendance		0%	At least 75% class attendance is compulsory
Presentation		10%	

Quiz	5%		
Lab. works	10%		
Course work	10%		
Midterm Exam	15%	Written Exam	
Final Exam	50%	Written- Exam	
Total	100%		
<b>Assessment Criteria</b>			
Final grades are determined according to the Academic Regulations of Azerbaijan State Oil and Industry University for Undergraduate Studies			
<b>Course Policies</b>			
<ul style="list-style-type: none"> <li>• Attendance of the course is mandatory.</li> <li>• Late assignments will not be accepted unless an agreement is reached with the lecturer.</li> <li>• Students cannot use calculators during the exam.</li> <li>• Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Azerbaijan State Oil and Industrial University General Student Discipline Regulations</li> </ul>			
<b>ECTS allocated based on Student Workload</b>			
Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including midterm)	15	6	90
Presentation	1	10	10
Tutorials	15	1	15
Preparation for midterm exam	1	10	10
Final Examination	1	3	3
Preparation for final exam	1	22	22
Self-study	15	4	60
<b>Total Workload</b>			<b>210</b>
<b>Total Workload/30(h)</b>			<b>210/30</b>
<b>ECTS Credit of the Course</b>			<b>7</b>