Ministry of Education of the Republic of Azerbaijan

Approved by Order
No. _____ of the
Ministry of Education of
the Republic of
Azerbaijan dated
_____

Higher Education Bachelor's Degree Program in the Specialty

Educational Program

Code and Title of Specialty (Program): 050628 – "Mechanical Engineering"

BACHELOR'S DEGREE EDUCATIONAL PROGRAM in the Specialty

050628 – “Mechanical Engineering”

1. General Provisions

1.1.The Bachelor's degree program in **“Mechanical Engineering”** (**code 050628**) – hereinafter referred to as the Degree Program – has been developed in accordance with the Law of the Republic of Azerbaijan on Education, relevant resolutions of the Cabinet of Ministers of the Republic of Azerbaijan, as well as the Classification of Specialties (Programs) for the Bachelor's Level of Higher Education (basic higher education).

1.2. **Objectives of the Educational Program:**

• To define the graduate's competencies within the scope of the specialization, the framework of the specialty, teaching and learning methods by subject, assessment methods, learning outcomes, as well as the requirements for infrastructure and human resources necessary for training, and the opportunities available to students for internships, employment, and further education;

• To inform students and employers about the knowledge, skills, and learning outcomes attained by graduates;

• To provide relevant information to experts involved in the evaluation of the compliance of personnel training with the Educational Program.

1.3. The Educational Program is mandatory for all higher education institutions operating in the Republic of Azerbaijan, regardless of their subordination, type of ownership, or organizational-legal form, that offer undergraduate education in the specialty 050628 – Mechanical Engineering.

1.4. The total weekly workload of a student, based on a five-day working schedule, is 45 hours, including both in-class and out-of-class activities (excluding special-purpose higher education institutions). The volume of weekly in-class hours must not exceed 50% of the total weekly workload. Depending on the specifics of the specialty, the total weekly workload may be adjusted accordingly.

2. Graduate Competencies

2.1. At the end of the Educational Program, the graduate should possess the following general competencies:

- Proficiency in oral and written communication in Azerbaijani within the field of study;

- Communication skills in at least one foreign language relevant to the field;

- Comprehensive and systematic knowledge of the historical, legal, political, cultural, and ideological foundations of Azerbaijani statehood, as well as its role and position in the modern world; ability to forecast the development prospects of the national state;

- Ability to identify the threats and challenges facing the national state;

- Ability to use information technologies effectively in the workplace;

- Ability to work in teams and contribute to collaborative problem-solving;

- Adaptability to new environments, initiative, and a strong will to succeed;

- Ability to identify and select additional information resources to solve problems;

- Skills to analyze, generalize, and apply relevant information for professional purposes;

- Ability to plan and organize professional activities, improve existing skills, manage time, and meet deadlines;

- Commitment to social and environmental responsibility, civic consciousness, ethical conduct, and quality orientation in professional activities;

- Ability to reassess situations and oneself for personal and professional development, including self-criticism;

-Ability of Leadership

- Ability to apply the fundamentals of philosophical knowledge;
Capability to analyze the main stages and laws of historical development in order to understand the social significance of one’s activity;

- Ability to utilize the fundamentals of economic knowledge in evaluating the efficiency of activities in various fields;

- - Ability to apply general legal knowledge in various fields of activity;

- Ability to use first aid techniques and protective methods in emergency situations;

- Ability to participate in the preparation of generalized solution options for problems related to the design and construction of machines, and in the selection of optimal solutions based on the analysis and forecasted outcomes of those options.

2.2. At the end of the Educational Program, the graduate should possess the following professional competencies:

- Ability to perform matrix and determinant operations based on knowledge of the fundamental areas of mathematics necessary for the specialty; to solve systems of linear algebraic equations using determinants; to calculate the limit of numerical sequences, as well as simple limits of functions at a point and at infinity; to provide examples of functions in mechanics; to find derivatives of functions; to compute indefinite and definite integrals of basic functions; to solve systems of ordinary differential equations; to apply certain laws of probability theory; and to process data obtained from research using mathematical and statistical methods.

- - Ability to explain the essence of physical processes and laws and apply them to ensure safety in laboratory environments; to explain the laws of thermodynamics and their characteristics in mechanical processes; to describe the kinetic characteristics of physicochemical processes occurring in technological operations, and to explain the structure and operating principles of devices used to identify initial substances and resulting products; to interpret theoretical knowledge about the states of matter and their phase transitions, and the underlying physical processes; to demonstrate theoretical knowledge of the application of various types of radiation

in mechanical processes based on their properties; and to apply knowledge of the essence of physical methods necessary for the investigation of objects.

- Ability to demonstrate theoretical knowledge about the main directions and trends of "chemicalization" occurring in the modern world; to understand the problems of modern energy production, including the main directions for obtaining and utilizing both conventional fuels and alternative energy sources; to interpret theoretical knowledge regarding the development of materials with important properties, and to apply this knowledge in practice.

- Ability to collect and analyze the initial information base for the design of a mechanical engineering product.

- Ability to design and calculate machine structures, their assemblies, and components in accordance with technical specifications using standard automated design tools.

- Ability to apply general engineering knowledge related to the design and construction of machines and equipment, as well as methods of mathematical analysis and modeling in engineering activities.

- Ability to participate in the development of a set of design, engineering, and technological documentation in accordance with modern standards and requirements.

- Ability to participate in defining the objectives of a project, formulating its tasks, objective functions, and constraints based on given criteria, and in developing the structure of their interrelations; to determine priorities for solving tasks while considering the legal and ethical aspects of professional activity.

- Ability to develop plans, programs, methodologies, and other testing documents included in design, technological, and operational documentation; to monitor compliance with technological discipline and the environmental safety of mechanical engineering production.

- Ability to enhance knowledge through scientific and technical information from local and international experiences in research directions related to the development, automation, operation, and reconstruction of oil and gas, chemical, machine-building, and other industrial sectors.

- Ability to perform modeling tasks of machine-building production products and objects using standard packages and automated design tools, as well as to apply algorithmic and software support for machine-building production systems and facilities.

- Ability to conduct experiments according to established methodologies, process and analyze results, describe the execution of scientific research work, and prepare data for scientific reviews and publications.

- Ability to engage in professional activities in job fields related to the specialty in accordance with the fundamental and professional training of the bachelor's degree, as well as the capability to pursue graduate studies (master's degree) in the specialty.

- Ability to work in various educational institutions (excluding scientific and scientific-pedagogical fields in higher education institutions) in compliance with existing regulations.

- Ability to organize continuous education and training for employees of machine-building industry departments.

3. Structure of the Educational Program

3.1. The Educational Program in the specialty '050628 – "Mechanical Engineering" consists of 240 ECTS credits (4 years). The credits are allocated as follows:

Course №	Course Category	ECTS credits
	General Education Courses	
1	**Azerbaijani History** This course examines the emergence, stages, formation, and development of modern statehood traditions in Azerbaijan. It analyzes and studies the political, ideological, economic, and cultural factors that have contributed to the strengthening of contemporary Azerbaijani statehood. To foster patriotism among students, the political history of states established at	5

	various historical stages and examples of heroism by notable individuals are interpreted based on historical facts. The course provides a systematic analysis of Azerbaijan's position and role in the modern world. The primary objective is to develop students' broad worldview, love of homeland, ability to analytically evaluate historical events, and capacity to draw accurate conclusions from events and political processes**.**	
2	**Business and Academic Communication in Azerbaijani Language** This course focuses on developing students' skills in delivering presentations, public speaking, as well as academic and professional writing in the Azerbaijani language. Special emphasis is placed on enhancing effective communication competencies necessary for both academic and business environments.	15
3	**Business and Academic Communication in a Foreign Language** This course emphasizes developing students' skills in delivering presentations, public speaking, academic and professional writing, as well as oral and written communication in one of the foreign languages relevant to their specialty.	4
4	Elective Courses Elective courses are determined by the higher education institution. Depending on the specifics of the specialty, additional elective courses may be included	3
	Philosophy	
	Sociology	
	Logic	
	Ethics	
	Introduction to Multiculturalism	
5	Information Technologies (Specialty-specific)	3
	Information Management 3	
	Fundamentals of Entrepreneurship and Introduction to Business	
	Political Science	

Core (Compulsory) Specialty Courses		
6	**Linear Algebra and Analytic Geometry** The candidate must possess knowledge of complex numbers, matrices and determinants, linear vector spaces and their bases, systems of linear algebraic equations and their methods of solution, linear transformations and quadratic forms, the Cartesian coordinate system in the plane and space, basic problems of analytic geometry, elements of vector algebra, equations of lines and planes, as well as conic sections and quadric surfaces.	4
7	**Mathematical Analysis** The candidate must have knowledge of elements of set theory, the concept of the limit of a sequence, the limit and fundamental properties of single-variable functions, continuity of single-variable functions at a point and on a set, uniformly continuous single-variable functions on a set, differential and integral calculus of single-variable functions, numerical and functional sequences, multi-dimensional Euclidean space, the limit, continuity, and uniform continuity of multivariable functions, as well as the differential and integral calculus of multivariable functions.	8
8	**Applied Mathematics** The candidate must have knowledge of methods for constructing solutions of ordinary differential equations, the application of differential equations to the mathematical modeling of various processes in natural sciences, the classification of partial differential equations, the formulation and investigation of well-posedness of Cauchy and boundary value problems for mathematical physics equations, elements of complex analysis, events and operations on them, various definitions of probability and methods for its	4

	calculation, distribution laws of discrete and random variables and their numerical characteristics, fundamental elements of mathematical statistics, statistical estimation for parameter selection of distributions, and laws related to the normal distribution.	
9	**Chemistry** This program encompasses fundamental chemical systems and processes, the reactivity of substances, classifications of inorganic compounds, and the structure of atomic and molecular theory. It also develops skills in substance identification and chemical analysis techniques. The course aims to impart foundational concepts and principles of chemistry; to integrate theoretical knowledge with practical application; to strengthen problem-solving abilities and critical decision-making skills; to cultivate an appreciation of chemistry's relevance in everyday life; and to support students in understanding natural laws and fostering logical reasoning.	5
10	**Physics** The program covers the universe as a physical object and its evolution, the concepts of continuity and discreteness in nature, regularities, the hierarchical structure of objects, probability theories characterizing natural systems objectively, fundamental constants in natural sciences, as well as the principles of symmetry and conservation of energy. It examines the methods of theoretical and experimental research in physics and their applications, the natural state and its temporal changes, and develops skills related to the individual and collective motions of objects in nature.	8

11	**Introduction to the Specialty** This course defines the areas of study related to mechanical engineers' ability to design and improve products; to assess the technical condition and residual life of technological equipment; to develop operation manuals and testing programs for equipment; to carry out installation, testing, and commissioning of new product models; to prepare technical documentation; and to compile scientific reports on the application of new research findings and developments in the field of mechanical engineering.	4
12	**Descriptive Geometry and Engineering Graphics** This course teaches how to represent the spatial graphical depiction of any object; how to prepare and interpret design graphical documents of equipment; the principles of drafting technical diagrams and drawings; and how to create and read technical graphics.	5
13	**Computer Graphics** This course develops skills in measurement within drawings to acquire proficiency in 2D computer-aided drafting; the ability to create and design models of parts; the capability to print and present 2D and 3D representations; to produce assembly drawings using given components; and to print standard depictions of technical drawings and 3D models.	3
14	**Materials Science** This course provides essential knowledge of fundamental physical and chemical sciences relevant to materials science; explores the significance of materials science in engineering applications; covers the properties, structure,	4

	and manufacturing processes of materials; teaches the collection of information regarding material selection and design using materials science principles; and studies geomaterials, their characteristics, and areas of application.	
15	**Theoretical Mechanics** This course covers the general laws governing the motion and interaction of material bodies, the application of these laws in various industrial fields, and the ability to understand mechanical processes occurring in numerous natural phenomena. It also teaches the principles of dynamics and their practical application to specific machines and equipment.	6
16	**Strength of Materials** This course provides fundamental concepts and principles of material strength; studies the types of loading conditions under force application; teaches the calculation of stress and strain in bodies; and develops the ability to apply knowledge of material strength to solve engineering applications and design problems.	6
17	**Theory of Machines and Mechanisms** Students who complete this course will be able to identify kinematic chains and degrees of freedom, perform kinematic analysis of given mechanisms, apply the fundamental principles of statics and dynamics to machines, understand common dynamic problems that machines may encounter, and acquire skills to prevent such issues.	7

18	**Materials Technology** This course covers technological methods for obtaining materials and the formation of products, parts, and components from them; the ability to justify and select appropriate materials in structural design; the study of technology involved in product manufacturing and the impact of technological process parameters on the quality of material production and processing methods. It includes fundamentals of metallurgical production, casting and welding technologies, metal deformation processing, machining of structural materials, production technology of products using powder metallurgy, and manufacturing technologies for products and parts from non-metallic materials. Additionally, the course develops understanding of basic calculations involved in production processes.	4
19	**Fundamentals of Electrical Engineering and Electronics** By studying this course, students will acquire knowledge of basic electrical quantities, fundamental circuit components, electrical circuits, electronic schematics, analog and digital electronics, components and circuits of power electronics, and electrical machines including transformers, asynchronous machines, synchronous machines, direct current machines, and special-purpose electrical machines.	4
20	**Machine Manufacturing Technology** This course provides students with knowledge about casting, welding, forming material processing, machining, and powder metallurgy fields, including the tools and machines used. It introduces the principles of fundamental material processes and the application areas of various manufacturing processes. Additionally, it develops an understanding of basic	7

	calculations involved in production processes.	
21	**Fundamentals of Automation** This course covers the mechanization and automation principles of technological processes and aims to develop skills in selecting optimal options and making informed decisions.	4
22	**Machine Design** This course covers the calculation and design of welded, soldered, adhesive, threaded, and riveted joints; introduces the analysis phase in mechanical design and machine elements; teaches functional analysis of machine components and the development of mathematical models for stress calculation using engineering sciences; instructs on determining input and output values of machine system elements through existing experimental models; emphasizes the use of standards and design criteria; and aims to foster creativity and intuition.	7
23	**Fundamentals of Programming** This course introduces students to the basic concepts of scientific computing; develops problem-solving and algorithm design skills; teaches how to use software tools for solving problems in scientific and engineering computations; and trains students to analyze results and prepare written reports.	5

24	**Thermodynamics** This course covers thermal processes occurring under real operating conditions of machines and structures, the laws of heat conduction and heat transfer, and teaches methods for the efficient management and utilization of heat.	4
25	**Civil Defense** By studying this course, students will acquire knowledge of the types of emergencies that arise during peacetime and wartime; the organization, main forces, and duties of civil defense authorities; individual and collective protection measures against weapons of mass destruction; rescue operations and other urgent tasks; and the skills to neutralize radioactive and chemical contamination of people and equipment.	3
26	**Safety of Life Activities** This course covers the theoretical and practical principles of protection from hazardous and harmful factors in all areas of activity; ensuring safety and health in the living environment; investigation of sources of natural adverse effects; adherence to safe work practices and life activities; and scientific evaluation of the hazards of technical systems and technologies.	4
27	**Metrology, Standardization, and Certification** This course provides knowledge of instruments used for testing and inspection of materials and equipment; develops proficiency in measurement techniques; cultivates the ability to apply standards; and fosters skills in certification procedures.	5

28	**Fluid Mechanics** This course covers the general laws of equilibrium and motion of liquids and gases, and develops an understanding of the methods applied for solving technical problems related to the specialty based on these laws.	5
29	**Engineering Economics** This course teaches students the fundamental principles of microeconomics and the functioning of macroeconomics related to economic policy formulation; develops an understanding of key economic issues; introduces economic analysis tools; explains the micro-level decision-making process; covers concepts such as cost minimization, profit maximization, production functions, productivity, and cost; provides insight into market operations and various market structures; explores the relationship between real and financial sectors; evaluates government economic policies; and examines challenges faced by open economies.	4
	Courses Determined by Higher Education Institutions The courses listed here are individually determined by each higher education institution and are included in the curriculum of the respective academic program.	60
	Internship and Final Thesis To strengthen and deepen the theoretical knowledge acquired in the specialty and ensure its use in future professional activities; depending on the profile and specifics of the specialty, to become familiar with new technologies, work methods, scientific research, and other relevant issues; to develop business, organizational, and communication skills; to improve students' knowledge in computer and communication technologies; to strengthen interest and inclination toward the specialty and develop the ability to creatively	30

	implement innovative projects; to describe practical problems in a way that allows their solution through formal methods; to apply the theoretical knowledge gained during the educational process to solving practical problems; and to master the procedures for documenting completed work and analysis results.	
Total:		240

These courses are offered by the higher education institution considering the experience of the faculty staff, research infrastructure, and local and international work opportunities. The courses determined by the higher education institution should be elective for students and should also facilitate their participation in international exchange programs.

Table 2

Specialty	General Education Courses	Core (Compulsory) Specialty Courses (Including Civil Defense.)	Courses Determined by Higher Education Institution	Internship and Final Thesis	Total
050628- Mechanical Engineering	30	120	60	30	240

4. Teaching and Learning

4.1. The teaching and learning environment must be organized in a way that enables students to achieve the intended learning outcomes defined in the academic program.

4.2. Teaching and learning methods must be described in relevant documents (e.g., course syllabi) and made publicly available (e.g., on the university website, in program brochures, etc.).

4.3. Teaching and learning methods should be continuously reviewed and improved in line with innovative educational practices. The regular enhancement of these methods should be an integral part of the institution's internal quality assurance system.

4.4. A variety of teaching methods must be employed during the educational process. These methods should promote a student-centered approach and encourage active student engagement in the learning process. Examples of applicable teaching and learning methods include (but are not limited to):

- Lectures, seminars, and practical assignments;
- Presentations, discussions, and debates;
- Independent study/research (e.g., working with real-life case studies);
- Project-based work;
- Problem-based learning;
- Fieldwork;
- Role-playing exercises;
- Reports;
- Peer assessment;
- Expert method;
- Video and audioconferencing technologies;
- Video and audio lectures;
- Distance learning;
- Simulations;

- Etc.

4.5. A balance between theoretical knowledge and practical training must be maintained in the educational process. Particular emphasis should be placed on strengthening practical skills in line with the evolving demands of the labor market.

4.6. The academic program should support student autonomy and foster the concept of lifelong learning. By the end of the educational process, students should be capable of working independently in their field and continuing their education throughout their lives.

5. Assessment

5.1. Assessment should be organized in a way that effectively measures the extent to which students have achieved the intended learning outcomes. It should support the monitoring of student progress, evaluation of program effectiveness, facilitate constructive feedback to students, and contribute to the continuous improvement of academic programs.

5.2. Assessment methods must be clearly described in relevant documents (e.g., course syllabi, subject descriptions) and be publicly accessible (e.g., university website, program brochures).

5.3. Assessment methods should be regularly reviewed and improved in light of innovative teaching practices. The continuous enhancement of assessment practices must be an integral part of the institution’s internal quality assurance system.

5.4. A variety of assessment methods should be employed to promote student-centered learning and encourage active student participation in the educational process. Examples of such methods include:

- written assignments;

- knowledge and skills tests, computer-based testing;
- oral presentations;
- questionnaires;
- open discussions;
- internship and fieldwork reports;
- performance-based assessment through direct observation in practice or laboratory
- settings;
- project-based reports;
- portfolio assessment;
- oral questioning;
- group and self-assessment;

5.5. The methods used for assessing learning outcomes must be based on clearly defined criteria and allow for accurate and reliable evaluation of the knowledge, skills, and competencies acquired by students throughout their studies. In assessing learning outcomes, instructors must adhere to principles of transparency, impartiality, mutual respect, and academic integrity.

5.6. Students must be given the opportunity to discuss all aspects of their education, including the assessment process, with instructors and evaluators. Higher education institutions should establish clear procedures for appeals related to the assessment process and grading, in accordance with institutional regulations.

5.7. Academic ethics is a vital part of the educational process. Students must be educated on the importance of academic honesty and the consequences of plagiarism. They should also be made aware of intellectual property rights and the ethical use of academic and intellectual work.

6. Learning Outcomes of the Programme and Its Individual Courses

6.1. The definition of the programme learning outcomes, as well as the learning outcomes of individual courses and the development of course syllabi, fall under the authority of the higher education institution and its academic staff.

6.2. Learning outcomes shall be determined by each higher education institution in accordance with the template provided in Annex 1. The learning outcomes matrix (Annex 2) must

demonstrate the alignment between individual courses and the programme-level learning outcomes.

6.3. In order to ensure that the educational programme offers theoretical and practical content that meets the evolving needs of society and the labor market, course syllabi must be reviewed and updated on a regular basis.

7. Infrastructure and Human Resources Capacity

7.1. The educational program for the "050628 Mechanical Engineering" major must have a material and

technical base equipped with appropriately furnished classrooms and laboratories, computer rooms, workshops, etc., fitted with relevant ICT tools to conduct lectures, practical sessions, and scientific research activities for the courses outlined in the curriculum. Students should be provided access to the university's local network, the internet, databases, electronic libraries, and search systems.

7.2. The academic staff of higher education institutions are generally required to hold academic degrees. Additionally, highly qualified specialists from other public or private institutions and/or relevant organizations, as well as individuals with at least a master's degree in the relevant specialty group, may also be involved in teaching.

8. Internship

8.1. Practical training is important for the application of theoretical knowledge in practice and for strengthening professional skills. The organization of practical training may be determined by the higher education institution depending on the specifics of the specialty.

8.2. Practical training can be arranged in private companies, public institutions, research laboratories, as well as in universities, the Azerbaijan National Academy of Sciences (ANAS), local or international private organizations and companies, etc.

8.3. Before the internship, a contract must be signed between the higher education institution and the company/enterprise/laboratory where the internship will take place. At the same time, based on the student's individual request, permission may be granted for the student to complete an internship at another company/enterprise/laboratory relevant to their specialty, including abroad. The contract outlines the conditions, students' rights and obligations, and other necessary details.

8.4. Evaluation of the internship: During the internship, the student must write a report on the results of the internship project conducted at the production enterprise or company and defend it before a commission consisting of academic staff from the university and representatives of the internship site. The outcomes of the internship program are assessed in a format determined by the educational institution.

9. Final Thesis

9.1. The education program is completed with a Final Thesis.

9.2. If a Final Thesis is not provided for in the education program, its credits are added to the internship credits.

9.3. Evaluation of the Final Thesis: The defense of final theses is organized by a commission established in accordance with the "Regulations on the State Attestation of Bachelor's Degree Students of Higher Education Institutions of the Republic of Azerbaijan." The final thesis is evaluated by the members of the State Attestation Commission (SAC) through voting.

10. Employment and Lifelong Learning

10.1. Main professional activity directions for graduates of the Education Program:

- Production-technological;

- Scientific-research;

- Organizational-administrative.

In the production-technological field:

- To know and manage technological processes at industry enterprises;

- To use modern computing technology and software;

- To use modern technical diagnostic methods.

Scientific-research activities:

- To know and manage technological processes at oil, gas, and mining equipment enterprises;

- To use modern computing technology and software;

- To apply modern mechanical methods;

- To analyze and summarize scientific research results in the basic subjects of mechanical engineering, utilizing achievements of science and technology as well as advanced practices from Azerbaijan and abroad.

Organizational and administrative activities:

- Organize production operations;

- Analyze activity results;

- Use modern methods for automatic collection and processing of information in the field of mechanical engineering;

- Solve scientific, technical, and management problems using modern mathematical and mechanical methods.

10.2. The higher education institution must regularly conduct surveys regarding the employment status of the graduates of the Education Program and publish information about job vacancies on its official website.

10.3. Graduates of the bachelor's program may continue their studies in relevant fields through master's programs.

10.4. The knowledge, skills, and approaches acquired during the course of education are among

Razılaşdırılmışdır:

Azərbaycan Respublikası Təhsil Nazirliyinin Aparat rəhbərinin müavini, Elm, ali və orta ixtisas təhsil şöbəsinin müdiri

Yaqub Piriyev

"17" 07 2020-ci il

Texniki və texnoloji ixtisaslar üzrə Dövlət Təhsil Proqramlarını hazırlayan işçi qrupun sədri, prof.

Mustafa Babanlı

"16" 07 2020-ci il

AZƏRBAYCAN RESPUBLİKASI TƏHSİL NAZİRLİYİ • AZƏRBAYCAN DÖVLƏT NEFT VƏ SƏNAYE UNİVERSİTETİ •

the key prerequisites for graduates to pursue lifelong learning independently.

Əlavə 1

Educational Program and Learning Outcomes by Courses

Higher education institutions must define the Educational Program and expected learning outcomes for each course. The tables below should list at least six learning outcomes (separately for the Educational Program and for each course).

Learning Outcomes of the Educational Program (LOEP)
LOEP-1. Proficiency in oral and written communication in Azerbaijani within the field of specialization; Communication skills in at least one foreign language related to the specialization

(English is preferred).
LOEP-2. Possessing systematic and comprehensive knowledge of Azerbaijani history, legal, political, cultural, and ideological foundations, as well as its position and role in the modern world; demonstrating the ability to forecast the prospective development of our national state; and having the skills to identify the threats and challenges faced by our national state.
LOEP-3. Ability to utilize information technologies in the workplace; proficiency in applying fundamental laws of natural sciences, mathematical methods, and modeling in research and testing activities within professional practice.
LOEP-4. Ability to utilize information technologies in the development of new mechanical engineering design models; proficiency in analytical, algorithmic, and applied methods for solving typical problems in the field of information technologies; application of software such as Microsoft Excel, SMATH Studio Desktop, and others for engineering calculations; understanding of fundamental terminology in industrial automation; skills in using computer graphics for drafting drawings and parts as well as 3D modeling; proficiency in working with CAD/CAM systems; and the ability to read and interpret documentation generated through CAD/CAM systems.
LOEP 5. Ability to participate in the technological modernization of structures, energy and functional equipment, technical systems, and infrastructure facilities; proficiency in using technical instruments to measure the properties of materials and semi-finished products, as well as key parameters of technological processes; ability to apply elements of economic analysis, certification, standardization, and quality normative documents related to technical structures in practical activities; competence in justifying technical solutions adopted during the development of technological processes; capacity to select technologies and technical tools while considering environmental impacts; ability to apply technical safety regulations, industrial hygiene, fire safety, and labor protection standards; skills in measuring and evaluating production microclimate parameters, determining levels of gas contamination and pollution, noise and vibration, and workplace lighting; and the capability to analyze the technological process as a management object.
LOEP-6. Ability to participate in the operation of technical equipment, energy systems, and various specialized devices while considering technical-operational, ergonomic, technological, economic, and environmental requirements; competence in organizing the work of executors,

making management decisions in labor organization and standardization; skills in generalizing and systematizing data related to the formation and utilization of industrial resources; capability to apply modern methodologies in studying the operational performance and technical characteristics of machines and equipment; proficiency in maintenance, technical service, repair, and renovation, as well as participation in the development of mechanical structures, energy systems, functional equipment, and technological processes; and ability to assess the technical condition and residual life of equipment.

Learning Outcomes for the Courses (LOA)
LOA-1. **"History of Azerbaijan"** This course examines the emergence, formation, and development of modern statehood traditions in Azerbaijan. It analyzes and studies the role of political, ideological, economic, and cultural factors in the formation of contemporary Azerbaijani statehood. The position and role of the Azerbaijani state in the modern world are systematically analyzed.
LOA-2. **"Business and Academic Communication in Azerbaijani Language"** Within the scope of this course, particular emphasis is placed on developing students' abilities to deliver presentations in Azerbaijani, as well as cultivating their oratory skills and proficiency in academic and business writing.
LOA-3. **"Business and Academic Communication in a Foreign Language"**. Within the scope of this course, special emphasis is placed on developing students' abilities to deliver presentations in English related to their specialty, as well as enhancing their oral and written skills in academic and business communication. The course focuses primarily on improving students' overall English proficiency; advancing communicative language skills across the four core areas of language acquisition—listening, speaking, reading, and writing; enriching their lexical base with terminology specific to the maritime field; cultivating academic vocabulary and pronunciation skills; fostering oral and written communication competencies essential for academic and social activities; acquiring and developing basic professional terminology relevant to their specialization; and forming the ability to read and interpret adapted scientific and technical texts.
LOA-4. "**Mathematics".** Upon mastering this subject, the student should possess knowledge of

the fundamental concepts, definitions, and tools of higher mathematics and their applications in the development of modern society; the theoretical foundations of differential equations, probability theory, and mathematical statistics. The student should be capable of logical reasoning, proving fundamental statements, establishing logical connections between concepts, making independent decisions, and solving classical problems of higher mathematics. They should be able to solve differential equations, and problems in probability theory and mathematical statistics using various methods. The student should acquire proficiency in methods for solving typical problems in higher mathematics; mathematical tools for differential equations; and apply probability theory and mathematical statistics to solve theoretical and practical problems.

LOA-5. "**Physics".** Upon mastering this subject, the student should know the fundamental physical laws that explain phenomena in the surrounding world; be familiar with the mathematical tools, modeling methods, theoretical and experimental research used to describe these phenomena. The student should be able to formulate, understand, and explain the basic laws and equations of physics; apply the knowledge gained in more specialized subjects and professional activities; use modeling, theoretical, and experimental research methods acquired during the physics course; assemble and configure basic experimental setups; utilize modern measuring instruments both independently and in group laboratory work; describe investigations and interpret and analyze results.

The student should acquire knowledge of the fundamental laws of physics; develop the ability to establish essential relationships between physical quantities; apply basic physical laws to solve physical problems; work with laboratory experimental methods and measurement tools; analyze experimental data and perform mathematical processing and numerical calculations; understand error analysis methods during experiments and assess result accuracy; and cultivate scientific thinking, as well as skills in summarizing and analyzing information.

LOA-6. **Fundamentals of Automation.** Upon mastering the course, the student should be able to:

- Understand the basic concepts, definitions, and tools in the field of information technologies and their application in the development of modern information society;

- Operate software with features similar to Microsoft Excel and SMATH Studio Desktop;
- Think logically, conduct research on key aspects, establish logical connections between components, and independently solve general problems in the field of information technologies;
- Utilize software such as Microsoft Excel, SMATH Studio Desktop, and similar programs to perform various calculations necessary for the development and advancement of new technologies.

The student should acquire:

- Knowledge of analytical, algorithmic, and applied methods for solving typical problems in the field of information technologies;
- Skills in the application of software such as Microsoft Excel, SMATH Studio Desktop, and similar tools for engineering calculations.

Matrix of Course and Educational Program Learning Outcomes

The Higher Education Institution shall utilize the following table to determine how the courses contribute to the achievement of the learning outcomes of the specialization's Educational Program.

		Learning Outcomes of the Program					
Block name	**Course Title**	**LOEP-1**	**LOEP-2**	**LOEP-3**	**LOEP-4**	**LOEP-5**	**LOEP-6**
General Education	"Business and Academic Communication in	x					

		Learning Outcomes of the Program					
Block name	**Course Title**	**LOEP-1**	**LOEP-2**	**LOEP-3**	**LOEP-4**	**LOEP-5**	**LOEP-6**
Courses	Azerbaijani Language"						
	“ History of Azerbaijan”		x				
	“Business and Academic Communication in a Foreign Language”	x					
	Linear Algebra and Analytic Geometry			x			
	Mathematical Analysis			X			
	Applied Mathematics			X			
	Chemistry			X			
	Physics			x			
	Introducion to the Speciality					x	
Core (Compulsory) Specialty Courses	Descriptive Geometry and Engineering Graphics				x		
	Computer Graphics				x		
	Materials Science					X	

		Learning Outcomes of the Program					
Block name	**Course Title**	**LOEP-1**	**LOEP-2**	**LOEP-3**	**LOEP-4**	**LOEP-5**	**LOEP-6**
	Theoretical Mechanics					X	
	Strength of Materials					X	
	Theory of Machines and Mechanisms					X	
	Fundamentals of Electrical Engineering and Electronics					X	
	Machine Manufacturing Technology					X	
	Fundamentals of Automation			x	x		
	Machine Design					x	
	Fundamentals of Programming			x	x		
	Thermodynamics					X	
	Civil defence					X	
	Safety of Life Activities					X	
	Metrology, Standardization, and Certification			x	x	X	

		Learning Outcomes of the Program					
Block name	**Course Title**	**LOEP-1**	**LOEP-2**	**LOEP-3**	**LOEP-4**	**LOEP-5**	**LOEP-6**
	Fluid Mechanics			x		X	
	Engineering Economics			x		x	