MINISTRY OF EDUCATION OF THE REPUBLIC OF AZERBAIJAN

Approved by the decision No.

____ dated ___ ___, 2020 of the

Ministry of Education of the

Republic of Azerbaijan.

BACHELOR'S DEGREE (BASIC HIGHER EDUCATION)
IN THE FIELD OF SPECIALIZATION
EDUCATIONAL PROGRAM

Code and name of the specialization (program): 050708 – Aquatic Bioresources and Aquaculture

BAKU – 2020

EDUCATIONAL PROGRAM FOR THE BACHELOR'S DEGREE
IN THE SPECIALIZATION "050708 – AQUATIC BIORESOURCES AND AQUACULTURE"

1. General Provisions

1.1. The Educational Program for the Bachelor's Degree in the specialization "050708 – Aquatic Bioresources and Aquaculture" (hereinafter referred to as the Educational Program for the specialization) for basic higher education level has been developed in accordance with the Law of the Republic of Azerbaijan "On Education", relevant decisions of the Cabinet of Ministers of the Republic of Azerbaijan, as well as the "Classification of Specializations (Programs) for Bachelor's Basic Higher Education Level".

1.2. The objectives of the Educational Program are as follows:

- To define the competencies of graduates in the specialization, the scope of the specialization, teaching and learning methods by subjects, assessment methods, learning outcomes, requirements for infrastructure and human resources for staff training, as well as opportunities for students' internships, employment, and further education;
- To inform students and employers about the knowledge and skills acquired by graduates, as well as the learning outcomes;
- To provide information to experts involved in evaluating the compliance of staff training with this Educational Program.

1.3. The Educational Program is mandatory for all higher education institutions operating in the Republic of Azerbaijan that provide basic (foundation) bachelor-level education in the specialization "050708 – Aquatic Bioresources and Aquaculture", regardless of their subordination, ownership type, or organizational-legal form.

1.4. The weekly total workload for students in a five-day workweek, including classroom and extracurricular activities, is 45 hours (except for specially designated higher education institutions). The volume of weekly classroom hours should not exceed 50% of the total weekly workload. The workload may vary depending on the specifics of the specialization.

2. Graduate Competencies

2.1. Upon completion of the Educational Program, the graduate shall acquire the following general competencies:

- Oral and written communication skills in Azerbaijani language related to the specialization;
- Communication skills in at least one foreign language related to the specialization;
- Systematic and comprehensive knowledge of the historical, legal, political, cultural, ideological foundations of the Azerbaijani statehood, its place and role in the modern world, and the ability to forecast the prospective development of the national state;

- Ability to identify the threats and challenges faced by the national state;
- Ability to use information technologies in the workplace;
- Ability to work in a team and achieve a common approach to problem-solving;
- Ability to adapt to new conditions, take initiative, and demonstrate determination 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 future education and existing skills, manage time effectively, and complete tasks on time;
- Ability to prioritize social and environmental responsibility, civic awareness and ethical approach, as well as quality in professional activities;
- Ability to reassess situations and oneself, and to exercise self-criticism for the purpose of knowledge and skills development;
- Competence in systems thinking: analyze complex systems, identify and understand interrelations, comprehend principles of connections between systems in various fields and levels, and operate under uncertainty;
- Prognostic competence: ability to understand and evaluate different future scenarios (possible, probable, and desired), form a clear idea about the future, assess potential consequences of activities, consider risks and ongoing changes;
- Strategic vision competence: ability to collectively develop and implement innovative decisions aimed at ensuring and enhancing sustainability at local and higher levels;
- Teamwork competence: ability to learn from others, understand their needs, opinions, and actions (empathy), resolve group conflicts, and participate in collective and multilateral cooperation aimed at problem-solving;
- Critical thinking competence: ability to analyze accepted norms, approaches and opinions, critically evaluate own views and actions, and defend one's position in discussions related to sustainable development;
- Self-awareness competence: ability to critically evaluate one's role in society;
- Competence in complex problem solving: ability to use different problem-oriented approaches and make complex and fair decisions based on the listed competencies;

- Multicultural competence and openness: ability to understand and comprehensively analyze different views and approaches, broadly integrate and generalize perspectives related to growing global diversity;

- Interdisciplinary communication competence: ability to form interdisciplinary approaches and make decisions.

2.2. Upon completion of the Educational Program, the graduate shall acquire the following competencies in the specialization:

- Based on knowledge of the fundamental branches of mathematics necessary for the specialization, perform matrix and determinant operations, solve systems of linear algebraic equations using determinants, calculate limits of numerical sequences, compute simple limits of functions at points and at infinity, provide examples of functions in biology, find derivatives of functions, calculate indefinite and definite integrals of simple functions, solve systems of ordinary differential equations, apply laws of probability theory, and have the ability to mathematically and statistically process research data;

- Explain the essence of physical processes and laws, interpret phenomena occurring inside or involving physical bodies from a physical perspective, describe the structure and properties of the material world surrounding us from a physical standpoint, explain laws governing natural phenomena, interpret phenomena based on knowledge of properties of various rays, and apply physical methods necessary for biological research based on understanding their essence;

- Explain the basic principles and concepts of general chemistry, prepare solutions of various concentrations, determine the composition, structure, and properties of chemical substances, define the nature, composition, and properties of solutions, explain the influence of various factors on chemical transformations, and apply chemical methods essential for biological research based on understanding their essence;

- Possess knowledge about the structure of plants from cellular to the whole organism level, identify plant tissues and organs and their metamorphoses, understand forms of plant reproduction, alternation of generations, and autoecology;

- Compare the structure of prokaryotic and eukaryotic cells, morphology and functions of different tissues, interpret microscopic structure of cells, tissues, and organs during ontogenesis, understand basic concepts of genetics, laws of linked and unlinked inheritance, principles of heredity, structure and organization of prokaryotic and eukaryotic genomes, distinguish types of variability, analyze causes and mechanisms of variability, evaluate their significance in selection and evolution, apply genetic research methods, use modern molecular genetic technologies, and understand evolution of species, populations, and ecosystems;

- Possess knowledge of morphological and anatomical features and biology of invertebrate and vertebrate animals, explain effects of environmental factors on internal and external structure and behavior of animals, analyze geographic distribution of various systematic groups, identify species

using both natural and scientific collection materials, understand the use of animals in scientific research and their economic and agricultural significance, predict outcomes, apply methods of collecting research material, study zoological material in laboratory conditions, determine biological characteristics, perform data processing, and prepare drawings and diagrams based on fragmented and researched material.

- Describe the structural and functional characteristics of the chemical components of living organisms (amino acids, proteins, nucleic acids, carbohydrates, lipids, etc.), explain the metabolic pathways of bioorganic substances constituting living organisms based on theoretical knowledge, elucidate the interactions and regulation of metabolic processes in the organism, identify the presence of major groups of bioorganic substances in solutions (proteins, lipids, carbohydrates, nucleic acids, monomers forming polymers, certain vitamins and hormones, free energy carriers, etc.), possess knowledge of the chemical nature, properties, and characteristics of biologically active substances, and apply biochemical research methods based on understanding their essence;
- Possess knowledge of the diversity and classification principles of microorganisms, general laws of their life activities, effects of various environmental factors on microorganisms; apply methods for isolating pure cultures of fungi and bacteria from nature, their preservation, use methods for studying cultural, physiological, and biochemical properties; propose industrial applications of microorganisms based on their biosynthetic properties; explain the role of microorganisms in metabolism and elemental cycles; analyze physiological and biochemical characteristics of microorganisms comparatively;
- Possess knowledge of the basics of civil defense, its forces and means, characteristics of emergencies; knowledge of population protection during emergencies, public education on civil defense; ability to use individual and collective protective equipment; ability to assess and ensure the sustainability of industrial facilities during emergencies; knowledge of organization and implementation of emergency consequences elimination;
- General knowledge of aquatic bioresources, their taxonomic groups, distribution patterns in water bodies and basins; knowledge of aquaculture, its history, forms, and main directions; biological foundations of aquaculture; general knowledge of the biology and ecology of economically important aquatic organisms (fish, crustaceans, mollusks, algae, etc.) cultivated in natural and artificial water bodies; knowledge of fish breeding water bodies, technical installations and equipment, artificial and live feeds; knowledge of modern methods and equipment used in aquaculture;
- General knowledge of meteorology and climatology; ability to discuss materials and visual aids used in the educational process and apply such information in forecasting production processes;
- Knowledge of obtaining, measuring, storing, and processing biological information; skills in using widely applied software programs and information security and its implementation rules; internet skills; ability to apply informatics methods in the specialization field and use computer technologies to solve various problems of the specialization.
- Ability to identify taxonomic groups (classes, orders, families, species) of aquatic plants; knowledge of the effects of abiotic factors (light, temperature, pressure) on plants living in aquatic environments; understanding of the laws governing their development and

reproduction in natural and artificial conditions; general knowledge of the chemical composition and adaptation features of freshwater and marine plants;

- Ability to describe the body structure of fish and their adaptations to aquatic environments; general knowledge of fish lifestyle, effects of abiotic and biotic factors on them, feeding and growth patterns; ability to determine fish age; broad knowledge of roe productivity and its calculation methods; methods for assessing fish resources in natural water bodies and marking techniques; understanding of fisheries based on fish resources, fishing gear and regulations; general knowledge of physiology of fish from different taxonomic groups (circulatory, respiratory, reproductive, endocrine, excretory, and nervous systems);
- General knowledge of ecosystems and food chains in agro-ecological areas of plant and animal production; understanding of laws and theories governing ecosystems (habitats and biotopes); principles of ecological balance conservation in sustainable agriculture; comparative analysis of differences between natural ecosystems and agro-ecosystems; detailed knowledge of environmental factors (climate, biological, topographic) affecting agriculture and environmental pollutants (heavy metals, radiobiology, etc.);
- General knowledge of biological characteristics, distribution in nature, environmental factor relations, reproduction, growth, development, productivity, and chemical composition of various aquatic plant species; ability to maintain living collections; ability to cultivate microalgae such as Spirulina, Chlorella, Dunaliella, etc., and marine algae; knowledge of extensive and intensive mariculture; ability to cultivate algae by industrial methods;
- Ability to identify economically important fish species distributed in Azerbaijan's water bodies and knowledge of their breeding technologies, including collection, transportation, and reservation of broodstock; ability to rapidly determine fish sex and maturity stages in aquaculture; skills in obtaining sex products, fertilizing roe, and managing incubation; ability to rear fish fry using various methods; knowledge of principles for increasing production efficiency and overall principles of effective fish farming; knowledge of quality phenotype management and genetics of fish in aquaculture; principles of formation of breeding and reproducing broodstocks; ability to use intraspecific, interspecific, and intergeneric hybridization, chromosome manipulation, and genetic engineering methods in fisheries;
- General knowledge of main live and compound feeds used in aquaculture, their chemical composition, feed conversion ratio, and value; ability to use feed based on biological characteristics of aquatic organisms; knowledge of determining required feed amounts and forming live feed bases; skills in using compound feeds and knowledge of organic and inorganic mixtures; knowledge of storage rules for compound feeds and fish feeding methods;
- Skills in physical-chemical analysis methods of water in aquaculture; ability to assess growth rates of aquaculture objects; ability to fix samples taken and analyze them by various methods; skills in hydrobiological research, including sampling from water bodies and calculations using various methods; ability to perform continuous water monitoring in aquaculture, analyze and study monitoring results; ability to determine quantities of aquatic bioresources and forecast their harvest.

3. Structure of the Educational Program

3.1. The Educational Program shall consist of a minimum of 240 ECTS credits (full-time education – 4 years). The credits are distributed as follows:

Number of Courses	Course Title	ECTS Credit
	General Courses	
1	**History of Azerbaijan** This course systematically studies the emergence, formation, and development of Azerbaijan's statehood traditions in chronological order, analyzing and researching the political, ideological, economic, and cultural factors in the formation of the modern Azerbaijani state. It provides a systematic analysis of the place and role of Azerbaijan in the contemporary world.	5
2	**Business and Academic Communication in Azerbaijani** Within the framework of this course, special attention is given to developing students' skills in presentations, oratory, academic, and business writing in the Azerbaijani language.	4
3	**Business and Academic Communication in a Foreign Language** Within this course, students focus on developing presentation, oratory, academic, and business writing skills, both oral and written, in one of the foreign languages relevant to their specialization.	15
	Elective Courses – 6 ECTS	
4	Philosophy Sociology Constitution of the Republic of Azerbaijan and Fundamentals of Law Ethics and Aesthetics Introduction to Multiculturalism Fundamentals of Entrepreneurship and Introduction to Business	3
5	Information Technologies in the Agricultural Sector (specialization-specific) Information Management in Agriculture (specialization-specific) Logic Political Science	3
	Total	**30**

	Specialization Courses	
6	General Chemistry Basic chemical concepts and symbols, formulas, chemical reactions, atomic structure, periodic table and its properties. Chemical formulas and equations. Gases, solids, liquids, and solutions. Concepts of acids and bases. Chemical bonding. Elements (Hydrogen, Oxygen, Nitrogen), alkali metals, heavy metals, nuclear chemistry, environmental chemistry.	8

7	Functions: Concept of a function, types of functions, logarithmic functions, trigonometric functions, limit, limit of a function, discontinuous and continuous functions, derivative and continuity, derivatives and differentiation rules, derivatives of trigonometric functions, logarithmic and exponential derivatives, geometric interpretation of the derivative, indefinite and definite integrals.	8
8	Physics Vector quantities, kinematics and dynamics of a material point. Newton's laws, work, power, energy. Conservation laws, acceleration, collisions of bodies, non-inertial reference frames, inertial force, centrifugal and Coriolis forces. Mechanics of fluids. Laws of thermodynamics.	5
9	Botany Plant morphology and anatomy. Structure, composition, and organelles of plant cells. Plant tissues. Structure of vegetative organs (root, stem, and leaf). Metamorphoses. Forms of reproduction in plants, alternation of generations. Autoecology.	7
10	General Biology Concept of life, origin of life on Earth and its molecular basis. Cell morphology, M. Schleiden and T. Schwann's cell theory. Biological membranes, ribosomes, Golgi complex, lysosomes, cell differentiation. Tissues: epithelial, connective, blood, nervous, bone, muscle, striated muscle tissues. Blood and lymph, histogenesis. Ontogenesis. Embryonic development of animals, types of ontogenesis, postembryonic development, organ formation from embryonic leaf. Direct and indirect development, blastulation and gastrulation. Organogenesis and postembryonic development. Indirect development of insects. Stages of vertebrate embryo development. Fundamentals of genetics, concept of GMOs, mutations, population and its forms, adaptations. Food chain. Struggle for existence and its forms. Biosphere and its structure. Ecosystems. Theory of evolution.	6
11	Microbiology Diversity and classification principles of microorganisms, general laws of their life activities. Effects of various environmental factors on microorganisms. Methods for isolating and maintaining fungal and bacterial cultures from nature as pure cultures. Study of their cultural, physiological, and biochemical properties. Applications of microorganisms in various industrial fields based on their biosynthetic characteristics. Role of microorganisms in metabolism and elemental cycling. Microorganisms considered as sanitary indicators, pathogenic factors of microorganisms, effects of various factors on microorganisms, mechanisms of infection transmission, pathogenesis, and microbiological examination methods.	5
12	Introduction to the Specialty and History of Its Development Aquatic bioresources and basic concepts. Concept of aquaculture, its history and development worldwide and in Azerbaijan, forms and main directions. Biological foundations of aquaculture. Breeding and propagation of aquaculture species (fish, crustaceans, mollusks, algae, etc.) in natural and artificially created water bodies. Fish farming areas and equipment, artificial and live feeds and their production. Modern methods and equipment used in aquaculture. Major economically important fish species in Azerbaijan and their farming characteristics.	3

13	Meteorology and Climatology	5

	General Concepts of Meteorology and Climatology Science. Subject and research methods of agrometeorology. Main indicators of plant radiation regime. Photosynthetically active radiation and photosynthetic activity of plants. Thermal regime of plants. Heat balance of plants and its management. Materials and visual aids used in the educational process. Extreme agrometeorological conditions affecting plant life activities. Cold resistance of plants, unfavorable agrometeorological conditions during winter, and implementation of preventive measures to reduce harmful effects of extreme conditions. Use of meteorological data in forecasting the production process. Content and methodology for compiling agrometeorological information. Principles and methods for developing agrometeorological forecasts.	
14	Informatics Within this course, students learn about information, methods of its measurement, storage, and processing; modern computers, their internal structure, primary and auxiliary devices; functions, modern software and operating systems; algorithmization, programming languages, and their usage; widely used application programs and how to use them; working with graphic editors; databases, their structure, creation, and management principles; computer graphics; local and global computer networks and their operating principles; information security and its provision methods; internet and its usage. Students should master application methods of informatics in their specialty field and be able to apply computer technologies to solve various specialty-related problems.	4
15	Physiology of Aquatic Plants Taxonomic groups of aquatic plants (classes, orders, families, species). Structural features of aquatic plant cells and photosynthetic apparatus. Effects of abiotic factors (light, temperature, pressure) on plants living in aquatic environments. Biochemical and metabolic characteristics of algae. Physiological processes related to depth and temperature; metabolic processes in freshwater and marine plants. Development and reproduction laws of aquatic plants in natural and artificial environments; chemical composition and comparative analysis of freshwater and marine plants. Assimilation of organic substances in algae (respiration, enzymes), biosynthesis and storage of various organic compounds, growth and development issues.	5
16	Fisheries Body structure of fish and adaptations to the aquatic environment. Effects of abiotic and biotic factors on fish. Feeding and growth patterns of fish. Methods for determining fish age. Fatness, fullness, reproduction, and migration of fish. Spawning, fecundity, and calculation methods. Methods for assessing fish resources. Fish tagging methods. Systematics and taxonomic principles of fish. Population dynamics of economically important fish, fishing activities based on fish resources. Fishing gear and their brief characteristics. Fish physiology: cardiovascular system, respiratory system, reproductive system, endocrine system, excretory system, nervous system, physiology of movement and behavior.	6

18	Zoology History and scope of zoology. Morphological and anatomical characteristics of invertebrate and vertebrate animals. Influence of environmental factors on the	6

	internal and external structure and behavior of animals. Systematics of the animal kingdom and taxonomic groups. Geographic distribution of various systematic groups. Organ systems and functions in animals; metabolism, enzymes and vitamins; digestion, respiration, excretion, circulatory, nervous, endocrine, and reproductive systems; taxonomic principles. Application of animals in scientific research and studies, their economic and agricultural significance. Ability to collect research materials, conduct laboratory examination of zoological materials, determine biological characteristics, perform data processing, and create diagrams and illustrations based on analyzed materials.	
19	Ecology Concepts of biosphere, population, biocenosis, agroecosystem. Ecosystem and food chain in agroecological production of plant and animal products; ecological concepts, principles, and theories (habitat and biotope); maintaining ecological balance in sustainable agriculture; comparison between natural ecosystems and agroecosystems; effects of environmental factors (climate, biological, topographic) on crop production, animal husbandry, and fisheries. Environmental pollution, pollutants, heavy metals, radiobiology.	4
20	Biochemistry Structural and functional characteristics of chemical components of living organisms (amino acids, proteins, nucleic acids, carbohydrates, lipids, etc.). Metabolism of bioorganic substances constituting living organisms. Interaction and regulation of metabolic processes in the organism. Methods to identify main groups of bioorganic substances in solutions (proteins, lipids, carbohydrates, nucleic acids, monomers forming polymers, some vitamins and hormones, free energy carriers, etc.).	6
21	Aquatic Plant Aquaculture Biological characteristics, natural distribution, relation with environmental factors, reproduction, growth, development, productivity, and chemical composition of various species of aquatic plants. Nutritional mixtures (mineral compounds) added to water and their use. Isolation and purification methods of algae cultures, maintaining collections alive. Cultivation methods of microalgae. Biotechnological processes of individual algae samples. Representatives of microalgae: Spirulina, Chlorella, Dunaliella, etc. Characteristics of marine algae cultivation. Extensive and intensive mariculture, cultivation features of different macroalgae. Features of mariculture on specific representatives such as Sargassum, Porphyra, etc. Industrial cultivation of algae. Cultivation of red, brown, green, and microalgae.	5
22	Planktonology Concept of planktonology, taxonomic classification and characteristics of phyto- and zooplankton. Structure of plankton populations, periodic (temporary and surface) changes in plankton populations, feeding and reproduction. Methods for collecting and analyzing plankton samples. Principles of plankton organism conservation. Importance of plankton organisms in nature and aquaculture.	5

23	Fish Aquaculture Technology for breeding commercially important fish species native to Azerbaijan's water bodies. Methods for procuring, transporting, and storing broodstock. Rapid techniques for determining the sex and maturity stages of fish. Collection of gametes, fertilization of eggs, and management of incubation	6

	processes. Incubation equipment. Methods for rearing fish larvae. Polyculture practices. Acclimatization of aquatic organisms and its significance in aquaculture: fundamental concepts and efficiency of introduction. Management and genetics of fish quality phenotypes in aquaculture. Breeding of broodstock fish and formation of reproductive stocks. Intraspecific, interspecific, and intergeneric hybridization in fish farming, chromosome manipulation, and genetic engineering methods.	
24	Fish Feeding Main live and compound feeds used in aquaculture, their chemical composition, and feed conversion ratios. Utilization of feeds depending on the developmental characteristics of aquatic organisms. Determination of required feed amounts and formation of live feed bases. General knowledge of compound feeds, their usage, organic and inorganic mixtures, storage rules for compound feeds, and methods of fish feeding.	5
25	Monitoring and Research Methodology in Aquaculture Primary research methods in aquaculture. Methods for physical-chemical analysis of water. Sampling, fixation, and analysis methods of cultured aquaculture objects. Procedures for conducting hydrobiological studies, sampling and counting methods from water bodies. Continuous monitoring of water in aquaculture, analysis, and interpretation of monitoring results. Methodologies for assessing the quantity of water bioresources and forecasting fish catches.	7
26	Statistics Subject and methods of statistics. Statistical observation and classification of statistical data. Statistical tables and graphs. Absolute, relative, and average values. Variation indicators, time series dynamics, indices, sampling methods. Study of correlations using statistical methods.	4
27	Aquaculture of Aquatic Invertebrates Biological characteristics of cultured aquatic invertebrates, their natural distribution, relationship with environmental factors, reproduction, growth, development, nutrition, productivity, and production characteristics, chemical composition of their bodies. Main biotechnical and regulatory characteristics (density, maintenance of optimal conditions, care, feeding regime) and standards in cultivation methods. Technology of cultivating Protozoa, Rotifers, Daphnia, Streptocephalus, and Artemia crustaceans. Cultivation of cladocerans and freshwater shrimps. Cultivation of mollusks. Technology for cultivating medicinal (leeches) and decorative aquatic invertebrates.	5
28	Occupational Safety Occupational safety rules and legal framework. Workplaces and production areas requiring special occupational safety regimes. Regular training of employees on occupational safety rules with documentation in special journals. Organization of workplaces and provision with necessary inventory. Provision of employees with special protective uniforms and safety helmets. Occupational safety rules when working with chemical preparations and pesticides.	4

29	Economics, Marketing, and Management of the Field The economics of production and its specific features (enterprise, association); mastering economic theory. Ways to increase the economic efficiency of aquaculture production under market relations. Increasing product output	4

	through the effective use of scientific and technological progress and economic resources. The concept of production organization, economic systems, elements of crop production systems, and elements of livestock systems. Specialization and intensification of production. Planning in aquaculture. Marketing as the philosophy of business, marketing as a system, market in the marketing system, marketing mix; goods and main tools of product policy; stages of product processing and product life cycle; price formation in the marketing system; sales activities; communication activities; the system of managing the marketing activities of the enterprise; marketing activities of trade enterprises. Management: content and characteristic features, strategic planning methods in management, decision-making, and communication rules.	
30	Civil Defense Within the framework of this course, students will learn to ensure safety in industrial environments, identify hazardous factors threatening human life in production areas, and understand safety measures and training in workplaces. They will study emergencies, their causes, types and means of emergency alerts, and methods of communicating behavior rules to the population. The principles and methods of civil protection during emergencies, measures for eliminating the consequences of emergencies, rescue operations and other urgent actions at accident sites, and ways to maintain the operational stability of economic facilities during emergencies will be covered. Students will also learn to provide first aid to injured persons. Special attention will be given to training students in investigating industrial accidents and preparing official reports, implementing measures to eliminate hazards for workers in industrial settings, forecasting industrial accidents and natural disasters, organizing public warnings about potential dangers, preparing the population for emergency response and protection, organizing the sequence of actions to mitigate the consequences of emergencies, and developing skills in providing first medical aid to injured individuals.	3
	Total	120
	Courses Determined by Higher Education Institutions **60 ECTS** The courses listed here are individually determined by each higher education institution and are reflected in the curriculum of the respective specialty.	60
INTERNSHIPS AND FINAL STATE CERTIFICATION — 30 ECTS		
	Teaching Practice	**4.5**
1	Botany	**1.5**
2	Zoology	**1.5**
3	General Introduction to Water Basins	**1.5**
	Industrial Practice	**16.5**
	Final State Graduation Examination	**9**
	TOTAL	**30**
	FINAL	**240**

These courses are offered by the higher education institution taking into account the experience of the faculty members, research infrastructure, and local and international employment opportunities. The courses determined by the higher education institution should be elective for students and also provide opportunities for students to participate in foreign exchange programs.

4. Teaching and Learning

4.1. The teaching and learning environment should be organized in such a way that students can achieve the learning outcomes set out in the educational program.

4.2. Teaching and learning methods must be described in relevant documents (for example, in the instructor's syllabus, etc.) and made accessible to the public (for example, on the university's website, program brochures, etc.).

4.3. Teaching and learning methods should be continuously reviewed and improved, taking into account innovative educational practices. The regular enhancement of these methods should be an integral part of the university's quality assurance system.

4.4. Different teaching methods should be employed during the educational process. These methods should encourage a student-centered approach and active participation of students in the learning process. Examples of teaching and learning methods that can be used include, but are not limited to:

- lectures, seminars, practical assignments;
- presentations and discussions, debates;
- independent work/research (e.g., working with practical examples);
- projects;
- problem-based learning;
- fieldwork;
- role-playing;
- reports;
- group assessment;
- expert method;
- video and audio conferencing technologies;
- video and audio lectures;
- flipped classroom;
- simulations, etc.

Note: The listed methods may be selected and/or modified depending on the specifics of the field of study.

4.5. A balance between theory and practical training should be maintained in education. The main focus should be on strengthening practical skills in line with the changing needs of the labor market.

4.6. The educational program should support students' independence and promote the concept of lifelong learning. By the end of the educational process, students should be able to work independently in any direction and be capable of continuing their education throughout their lives.

5. Assessment

5.1. Assessment should be organized in such a way that the expected learning outcomes of students can be effectively measured. It should help monitor the progress made, evaluate the extent to which the

educational program's outcomes have been achieved, facilitate feedback exchange with students, and contribute to the initial conditions for improving educational programs.

5.2. Assessment methods must be described in relevant documents (for example, course syllabus, curriculum, etc.) and be accessible to everyone (for example, on the university's website, program brochures, etc.).

5.3. Assessment methods should be continuously reviewed and improved, taking into account innovative teaching practices. Regular updating of assessment methods should be part of the higher education institution's quality assurance system.

5.4. Different assessment methods should be used during the teaching process. These methods should promote a student-centered approach and encourage active participation of students in the learning process. Examples of assessment methods that can be used include:

- written assignments;
- tests on knowledge and skills, computer-based tests;
- oral presentations;
- surveys;
- open discussions;
- practical reports, fieldwork reports;
- assessment of skills based on practical and laboratory observations;
- project reports;
- portfolio assessment;
- oral questioning;
- group and self-assessment, etc.

5.5. Methods used to assess learning achievements should be based on clearly defined criteria and enable an accurate and reliable determination of the knowledge, skills, and competencies acquired by the student throughout the educational process. In evaluating learning outcomes, instructors must adhere to the principles of transparency, impartiality, mutual respect, and humanism.

5.6. Students should be given the opportunity to discuss all aspects of their education with instructors and assessors, including the assessment process itself. The higher education institution must establish procedures for appeals related to assessments or grades.

5.7. Academic ethics hold an important place in the educational process. Students are taught to observe academic integrity and to understand the issue of plagiarism. They should be informed about intellectual property rights concerning intellectual work.

6. Learning Outcomes of the Program and Each Course

6.1. The determination of the learning outcomes of the educational program, as well as the learning outcomes of each course and the preparation of each course syllabus, is the responsibility of the higher education institution/academic staff.

6.2. Learning outcomes are defined by each higher education institution in accordance with the form in Appendix 1. The matrix showing the relationship between courses and learning outcomes should be reflected in Appendix 2.

6.3. To ensure that the educational program provides theoretical and practical content that meets the changing needs of society and the labor market, course syllabi must be regularly updated.

7. Infrastructure and Human Resources Potential

7.1. For the "050708-Freshwater Bioresources and Aquaculture" specialty, the educational program must ensure that courses, practical sessions, and research activities are conducted in classrooms equipped with appropriate ICT tools, as well as well-equipped laboratories for biology research methodology, microbiology, plant anatomy and physiology, biotechnology, and aquaculture. The material and technical base should also include an artificial pond and experimental fields. Students must have access to the higher education institution’s local network, the internet, databases, electronic libraries, and search systems.

7.2. Faculty members of higher education institutions are generally expected to hold academic degrees. Specialists from other institutions may also be invited to participate in teaching.

8. Internship

8.1. Internship is important for the practical application of the student's theoretical knowledge as well as strengthening professional skills. Depending on the specifics of the specialty, the organization of the internship may be determined by the higher education institution.

8.2. Internships can be organized at the Department for the Increase and Protection of Biological Resources in Water Basins of the Ministry of Ecology and Natural Resources of the Republic of Azerbaijan (ETSN), Regional Fisheries and Biodiversity Departments operating locally, Specially Protected Areas (including farms on seas, rivers, lakes, and artificial reservoirs, as well as State Nature Reserves), Regional Ecology Departments, research laboratories (including the Azerbaijan National Academy of Sciences, universities, international organizations and companies, etc.).

8.3. The main objectives of the internship are: to reinforce and deepen the theoretical knowledge acquired by the student and ensure its use in future professional activities; depending on the profile and specifics of the specialty, to familiarize students with new technologies, work methods, scientific research, and other

related matters; to develop students' diligence, organizational and communication skills; and to improve students' knowledge in computer technologies, among others.

8.4. Industrial internships are conducted based on bilateral agreements concluded between the educational institution and industrial enterprises. According to these agreements, regardless of ownership or organizational-legal form, industrial enterprises allocate internship positions for students of higher education institutions.

8.5. The higher education institution: signs agreements with enterprises each calendar year, agrees the internship programs and schedules with them; appoints internship supervisors from the academic staff with appropriate profiles and sufficient work experience, taking into account the profile of the internship base; provides the enterprises and students with the relevant programs; monitors the implementation and content of the internship within the specified period; and, if necessary, organizes medical examinations for students sent for internships.

8.6. Industrial enterprises: organize and conduct the students' internship; appoint internship supervisors from among experienced staff; assign internship positions based on the internship program; provide students access to technical documents, literature, computers, and reproduction equipment; provide students with appropriate training on labor protection and safety, as well as internal regulations of the enterprise; assign interns to relevant positions in case of vacancies, except as otherwise provided by law; and bear responsibility for accidents during the internship caused by the enterprise's fault.

8.7. Internship supervisors are appointed from both the educational institution and the industrial enterprise staff. If the internship is a continuation of a teaching practice course, the instructor of that course is appointed as the internship supervisor.

8.8. The supervisor appointed by the educational institution: prepares the work program for the internship together with the industrial supervisor; is responsible for students' compliance with labor protection and safety rules; participates in assigning individual tasks, internship topics, and placement of students; provides methodological assistance in completing individual tasks and helps students collect materials needed for their graduation work; and assists students in preparing internship reports.

8.9. The student defends their internship diary and report before a committee and is evaluated on a 100-point scale.

9. Final State Graduation Attestation

9.1. The educational program concludes with the Final State Graduation Attestation for students. Only those students who have fulfilled all the requirements of the curriculum and earned the required credits for the designated courses and internships are allowed to participate in the Final State Graduation Attestation. The

organization and conduct of the Final State Graduation Attestation are determined by the Ministry of Education of the Republic of Azerbaijan.

10. Employment and Lifelong Learning

10.1. Graduates of the "050708-Freshwater Bioresources and Aquaculture" educational program can work as strategic management specialists, production specialists, and project managers in the Regional Fisheries and Biodiversity Departments operating locally under the Department for the Increase and Protection of Biological Resources in Water Basins of the Ministry of Ecology and Natural Resources (ETSN), in Specially Protected Areas (including farms on seas, rivers, lakes, and artificial reservoirs, as well as State Nature Reserves), Regional Ecology Departments, and other relevant organizations and institutions.

10.2. The higher education institution should conduct regular surveys regarding the employment of graduates of the educational program and publish information about job vacancies on its website.

10.3. Students are informed about relevant job vacancies of the educational program, and this information is posted on the website.

10.4. Graduates of the "050708-Freshwater Bioresources and Aquaculture" program can continue their education at the master's level in the specialization of "Freshwater Bioresources and Aquatic Plants," as well as in relevant specializations within "Fisheries and Fishery Management," "Ecology," "Biology," and "Chemistry."

10.5. The knowledge, skills, and approaches acquired during the educational program serve as the foundational conditions for graduates to pursue independent lifelong learning.

Agreed by:

Deputy Head of Apparatus
Of the Ministry of Education of the
Republic of Azerbaijan, Higher and
Secondary Specialized Education

_____ Yagub Piriyev

"____" _____ 2020 year

Head of the Working Group Preparation the State
Educational Programs for the Agricultural
Specialities Group

_____ İbrahim Jafarov

"____" _____ 2020 year

Appendix 1

Learning Outcomes of the Educational Program and Courses

The higher education institution must define the expected learning outcomes for the Educational Program and for each individual course. The following tables should list at least 6 learning outcomes (separately for the Educational Program and for each course).

Learning Outcomes of the Educational Program (PLO)
PLO 1. Implementation of the State Strategy on the sustainable management of seafood production in aquaculture conditions within the Republic of Azerbaijan.
PLO 2. Enhancement of the production of nutritionally valuable seafood under aquaculture conditions.
PLO 3. Organization of the effective use of the multifunctional potential of aquaculture and strengthening of its production functions.
PLO 4. Planning, designing, and implementing aquaculture and farm management activities.
PLO 5. Ensuring the natural and artificial restoration of ecologically clean and human-relevant algae and fish products, improving their species composition, and cultivating fast-growing and highly productive species in aquatic plantations.
PLO 6. Monitoring and evaluating the outcomes of implemented aquaculture and farm management activities.

Course Learning Outcomes (CLO)
Course Learning Outcomes for "History of Azerbaijan" (CLO)
CLO 1. Be able to identify Azerbaijan as one of the world's oldest settlements and one of the earliest civilization centers.
CLO 2. Analyze the conditions for the formation of statehood in Azerbaijan during ancient, medieval, and modern periods, including political and international factors.
CLO 3. Analyze the role of ideological, economic, and cultural factors in the emergence and formation of the Azerbaijani people.
CLO 4. Be able to analyze the stages of the complex and heroic history of the Azerbaijani people and the distinct features of each period.
CLO 5. Systematically study the place and role of the Azerbaijani state in the modern world.
CLO 6. Be able to draw correct conclusions from the historical experience of the development of Azerbaijan's history.

Course Learning Outcomes for "Business and Academic Communication in Azerbaijani"
CLO 1. Acquire knowledge about the Azerbaijani language in the context of globalization and state support for it. Learn to prepare presentations on decrees and orders regarding the state language, as well as on the topic "Great Leader Heydar Aliyev and the Azerbaijani Language." Understand the goals and objectives of the course "Business and Academic Communication in Azerbaijani." Gain knowledge about the forms and functions of communication and levels of communication.
CLO 2. Master the role of auxiliary parts of speech in the academic communication process. Study oral and written communications, including requirements for speech accuracy, clarity, fluency, purity, conciseness, simplicity, richness, coherence, and other important aspects according to modern standards.
CLO 3. Understand the nature of communication rhetoric, styles of the literary language, and active and passive vocabulary of the Azerbaijani literary language. Master concepts of literary language and communicativity, types of communicativity, communication in communicativity, communicative strategies, and creative technologies.
CLO 4. Learn about listening culture and the essence of listening as a form of communication. Understand listening and attention, types of listening, and the importance of improving listening skills. Acquire knowledge about communication culture, speech ethics, and address etiquette. Understand the specifics of organized speech (lecture, report, speech, spontaneous speech).
CLO 5. Study information and rules regarding the business style of modern Azerbaijani. Enrich knowledge about the role of letters in business communication, electronic and online communications.
CLO 6. Learn about the language of official-business documents. Gain knowledge about types and forms of business communications, including their language and style. Understand the importance of the purity of the Azerbaijani language in business communication, adherence to orthographic rules, and sentence structure. Acquire theoretical and practical skills in business rhetoric.

Course Learning Outcomes for "Business and Academic Communication in a Foreign Language"
CLO 1. Acquire general English listening, speaking, reading, and writing skills at the A2 level; understand and respond informally to daily conversations; engage in dialogues; correctly use complex sentences in appropriate tenses orally; write short paragraphs and informal letters; read and comprehend short texts and answer related questions; build A2-level vocabulary.
CLO 2. At B1 level, understand dialogues in general English; form complex subordinate and non-subordinate sentences using appropriate vocabulary; write essays of about 150 words with effective introductions and conclusions; learn the structure of formal letters; develop skills to write business letters according to this structure; deliver formal presentations.
CLO 3. At B2 level, watch movies, read books, write reviews and analyses in general English; present analyses effectively through presentations.
CLO 4. Acquire agrarian terminology and business English vocabulary; use descriptive writing to orally describe graphs, tables, and pie charts; express opinions in the third person; engage in general academic discussions.
CLO 5. Develop skills for free dialogue, discussion, debate, and argumentation in business settings; build ability to present oneself professionally in English.
CLO 6. Master the correct use of second and third conditional sentences in spoken English; convert reported speech dialogues into direct speech orally; expand academic vocabulary and use it fluently in oral communication; achieve fluency in academic English speaking.

Course Learning Outcomes for "General Chemistry"
CLO 1. Understand the theoretical foundations of chemistry. Master key chemical concepts and fundamental laws of chemistry.

CLO 2. Study the structure of the atom, understand Mendeleev's periodic law and the periodic table of elements.
CLO 3. Know the types of chemical bonds; study intermolecular interactions; understand the states of matter; master energy changes in chemical processes and the feasibility of reactions.
CLO 4. Learn chemical kinetics and chemical equilibrium, including reaction rates and factors affecting them.
CLO 5. Understand the general characteristics of solutions and study relevant theories; master theories of acids and bases.
CLO 6. Study heterogeneous and dispersed systems; know oxidation-reduction reactions; master electrochemical processes; acquire knowledge about metals and alloys.

Course Learning Outcomes for "Mathematics"
CLO 1. Study systems of linear algebraic equations, linear spaces, linear transformations, and other mathematical objects of linear nature.
CLO 2. Understand the study of functions and variables using differential and integral calculus.
CLO 3. Learn to conduct mathematical analysis for solving analytical and experimental research problems based on mathematical knowledge.
CLO 4. Use mathematical methods and establish a theoretical foundation for teaching subjects that require mathematics.
CLO 5. Select effective mathematical solution methods for solving agricultural (crop science) problems.
CLO 6. Learn the fundamentals of mathematical modeling.

Course Learning Outcomes for "Physics"
CLO 1. Understand fundamental concepts and laws, key physical phenomena and ideas, and their applications in science, technology, and industry.
CLO 2. Know the operating principles of physical devices and equipment.
CLO 3. Master methods for solving specific problems in various fields of physics.
CLO 4. Be able to conduct physical experiments using modern devices and equipment.
CLO 5. Analyze and reveal the physical essence in research problems.
CLO 6. Develop a scientific worldview and modern physical thinking.

Course Learning Outcomes for "Botany"
CLO 1. Become familiar with plants, the structure of plant cells, their organelles, and main characteristics; understand cell differentiation.
CLO 2. Understand plant tissues, their features, differentiation, and structural characteristics.
CLO 3. Study vegetative organs, their structural features, and morphophysiological development.
CLO 4. Learn about generative organs, their structure, morphophysiological development; understand the concepts of seeds and fruits.
CLO 5. Know taxonomic units, plant classification, and systematization.
CLO 6. Study plant origins, ecological groups, plant geography, geobotanical elements, distribution patterns, and become familiar with Azerbaijan's flora.

Course Learning Outcomes for "General Biology"
CLO 1. Understand the concept of life, the origin of life on Earth, and its molecular foundations. Identify the role of organisms in the food chain and ecological pyramid.

CLO 2. Learn about mutations and their types, natural and artificial mutagenesis, their role in nature. Understand the concept of GMOs and genetic recombination.
CLO 3. Define populations and adaptations, identify their forms. Understand the struggle for existence and its forms, and determine its impact on organism development.
CLO 4. Study ecosystems, their formation characteristics, and main components. Understand biogeocenosis, its current state, and anthropogenic effects on it.
CLO 5. Understand evolutionary theory and identify its developmental pathways in animals and plants.
CLO 6. Learn about the biosphere and its structure. Know the concepts of bioinformatics technologies and nanotechnology.

Course Learning Outcomes for "Microbiology"
CLO 1. Understand the diversity of microorganisms, principles of their classification, and general laws of their life activities.
CLO 2. Master aseptic techniques, disinfection, and sterilization methods; know how to prepare specimens, stain them, and use immersion systems.
CLO 3. Learn methods for isolating and maintaining pure cultures of fungi and bacteria from nature; understand how to determine microbial sensitivity to antibiotics.
CLO 4. Understand the general morpho-biological characteristics of pathogenic microorganisms affecting plants and animals.
CLO 5. Know the role of microorganisms in metabolism and element cycling; understand applications of microorganisms based on their biosynthetic properties in various industries.
CLO 6. Understand the use of industrial microbiology and methods for its management.

Course Learning Outcomes for "Introduction to the Specialty and History of Its Development"
CLO 1. Know the history and development stages of aquaculture. Understand the forms and main directions of aquaculture in Azerbaijan and worldwide.
CLO 2. Understand the biological foundations of aquaculture.
CLO 3. Know the methods for breeding and increasing aquaculture species in natural and artificial water bodies.
CLO 4. Understand fish farming areas, equipment, and the ecological-biological characteristics of cultivated aquatic organisms.
CLO 5. Have extensive knowledge of modern methods and equipment used in aquaculture.
CLO 6. Know the biology and economic characteristics of the main fish species important to Azerbaijan.

Course Learning Outcomes for "Meteorology and Climatology"
CLO 1. Have general knowledge about the science of meteorology and climatology. Learn the subject and research methods of agro-meteorology.
CLO 2. Know the main indicators of the radiation regime of plants. Acquire knowledge about photosynthetically active radiation and the photosynthetic activity of plants, and be able to implement appropriate measures to increase the efficiency of this activity.
CLO 3. Understand the thermal regime of plants. Know the heat balance of plants and its management.
CLO 4. Be able to engage in discussions based on the teaching materials and visual aids used in the educational process.
CLO 5. Gain knowledge about extreme agrometeorological conditions affecting plant life activities. Understand plant cold resistance, unfavorable agrometeorological conditions during winter for plants, and be able to implement preventive measures to reduce the harmful effects of extreme conditions.

CLO 6. Be able to use meteorological data in forecasting production processes. Master the content and methodology of preparing agrometeorological information.

Learning outcomes for the subject "Informatics" (CLO)
CLO 1. Acquire knowledge of the main methods and tools of information processes; have the ability to use computer hardware and software and apply them as means of information management, as well as handle information in local and global computer networks.
CLO 2. Develop the ability to select hardware and software tools for data processing relevant to the field of specialization, apply them to solve problems, analyze computational results, and justify the obtained outcomes.
CLO 3. Acquire the ability to collect, analyze, and prepare analytical reports based on necessary data related to the specialization using internal and external literature sources and internet resources.
CLO 4. Possess the ability to use modern technical tools and information technologies to solve analytical and research problems.
CLO 5. Have the capability to solve communicative tasks and to search for and select professionally relevant information on the Internet using search engines, reference systems, and information technologies.
CLO 6. Have access to and use ICT tools for participation in training and self-learning processes; understand the essence of electronic agriculture.

Learning outcomes (CLO) for the course "Physiology of Aquatic Plants"
CLO 1. Know the taxonomic groups of aquatic plants (classes, orders, families, species). Recognize aquatic plants and understand their systematic categories.
CLO 2. Understand the structural features of aquatic plant cells and their photosynthetic apparatus. Know the effects of abiotic factors (light, temperature, pressure) on plants living in aquatic environments.
CLO 3. Understand the patterns of development and reproduction of aquatic plants in natural and artificial environments.
CLO 4. Know the chemical structure of freshwater and marine plants. Be familiar with freshwater plants and their main species. Learn the bioecological characteristics of freshwater plants and be able to use this knowledge in their cultivation.
CLO 5. Know the saltwater (marine and ocean) plants and their main species. Learn the bioecological characteristics of saltwater plants and be able to apply this knowledge in their cultivation.
CLO 6. Master the assimilation of organic substances in algae (respiration, enzymes), the biosynthesis and storage of various organic substances, as well as growth and development processes.

Learning outcomes (CLO) for the course "Fisheries"
CLO 1. Know the body structure of fish and their adaptations to the aquatic environment. Understand the effects of abiotic and biotic factors on fish.
CLO 2. Be able to identify fish species, determine their age and stages of maturity.
CLO 3. Be able to assess fish roe productivity, spawning capacity, and calculate these parameters. Know the principles of collection, selection, and reservation of broodstock fish under factory conditions.
CLO 4. Know the methods for estimating fish resources in natural and artificial water bodies.
CLO 5. Know the fishing gear used in fisheries and the rules for their proper use.
CLO 6. Know modern methods for tagging fish.

Learning outcomes (CLO) for the “Zoology”
CLO 1. Possess extensive knowledge of the morphological and anatomical features of invertebrate and vertebrate animals. Understand the system of laws about animals and recognize the characteristics that distinguish animals from other living beings.
CLO 2. Understand the impact of environmental factors on the vital functions of animals, including their internal and external structures as well as behavior.
CLO 3. Know the systematics of the animal kingdom and taxonomic groups. Understand the geographical distribution patterns of various systematic groups.
CLO 4. Understand the organ systems in animals, including digestive, respiratory, excretory, circulatory, nervous, endocrine, and reproductive systems and their functions. Possess general knowledge about the animal kingdom and its conservation.
CLO 5. Have general knowledge about the use of animals in scientific research, their economic and agricultural significance.
CLO 6. Have general knowledge about animals included in Azerbaijan’s "Red Book," their distribution, conservation, and reproduction.

Learning outcomes (CLO) for the "Ecology"
CLO 1. Understand the concepts of biosphere, population, biocenosis, and agroecosystem.
CLO 2. Know the ecosystem and food chain, ecological concepts, principles, and theories related to the production of plant and animal products in the agro-ecological field.
CLO 3. Be able to identify biogenic pollution of water in intensive production conditions. Understand global climate changes and the problems arising from them.
CLO 4. Understand ecological monitoring and learn about the optimization of agricultural landscapes.
CLO 5. Know alternative systems and their ecological significance.
CLO 6. Understand the trends and advantages of producing ecologically clean agricultural products.

Learning outcomes (CLO) for the course "Aquaculture of Aquatic Plants"
CLO 1. Have extensive knowledge of the biological characteristics of various aquatic plant species, their distribution in nature, their interaction with environmental factors, reproduction, growth, development, productivity, production features, and their chemical composition.
CLO 2. Know the methods of isolation and purification of algal cultures and the principles of maintaining live collections. Master the cultivation methods of microalgae.
CLO 3. Understand the cultivation methods of microalgae. Know representatives of microalgae such as *Spirulina*, *Chlorella*, *Dunaliella*, etc., as well as the characteristics of marine algae cultivation.
CLO 4. Understand the characteristics of extensive and intensive mariculture and the cultivation of various macroalgae. Learn the features of mariculture through examples of specific representatives, macroalgae such as *Sargassum*, *Porphyra*, etc., and the technology of industrial cultivation of algae.
CLO 5. Know the methods of industrial cultivation of algae. Master the use of compounds derived from brown, red, diatomaceous, green, and blue-green algae, as well as the cultivation of marine macroalgae.
CLO 6. Develop the field of algae aquaculture based on rational analysis of experimental results and gain practical experience in algae aquaculture.

Learning outcomes (CLO) for the course "Planktonology"

CLO 1. Understand the concept of plankton, methods for collecting, fixing, and preliminary processing of plankton samples (including phytoplankton, zooplankton, bacteria plankton, and ichthyoplankton). Know the role of plankton in the functioning of various types of water bodies.
CLO 2. Master the taxonomic classification and characteristics of phyto- and zooplankton, the structure of plankton populations, and the periodic (temporary and surface) changes in plankton populations.
CLO 3. Understand feeding and reproduction in plankton, the seasonal reproductive dynamics of phyto- and zooplankton species. Master the cultivation technologies of microalgae, Spirulina, protozoa, rotifers, Daphnia, and Artemia.
CLO 4. Understand the biological seasons of plankton. Know seasonal and multi-year successions in plankton senoses and the factors affecting them.
CLO 5. Understand cyclomorphosis in plankton organisms and the factors causing it. Know the effects of polluted environments on plankton organisms. Study eutrophication and water "blooming," adaptation, and plankton variability in water bodies.
CLO 6. Understand the selectivity of feeding in plankton organisms and factors determining it. Know the adaptations of hydrobionts to feeding on plankton.

Learning outcomes (CLO) for the course "Fish Aquaculture"
CLO 1. Know the economically important fish species found in Azerbaijan's water basins and their bioecological characteristics.
CLO 2. Understand the rules for catching, transporting, and reserving broodstock fish intended for aquaculture purposes.
CLO 3. Know the methods for rapid determination of fish sex and maturity stages in aquaculture conditions. Understand the principles of obtaining sex products, fertilizing roe, and the incubation process.
CLO 4. Know the incubation devices and their operating principles. Be familiar with methods for raising fish fry.
CLO 5. Understand the management and genetics of quality phenotypes. Know the principles of breeding broodstock fish individuals and forming reproduction stocks.
CLO 6. Have comprehensive knowledge of the management and genetics of fish quality phenotypes in aquaculture. Be familiar with intraspecific, interspecific, and intergeneric hybridization, chromosome manipulation, and genetic engineering in aquaculture.

Learning outcomes (CLO) for the course "Fish Feeding"
CLO 1. Know the main live and compound feeds used in aquaculture, their chemical composition, and feed conversion ratios.
CLO 2. Be able to determine the required feed quantity for different fish species cultivated in aquaculture and understand the principles of forming live feed bases.
CLO 3. Have general knowledge about compound feeds, their usage, and organic and inorganic mixtures.
CLO 4. Master the composition and preparation technology of feeds of various origins (plankton, zooplankton, plant residues, animal by-products, mineral substances, vitamins, etc.).
CLO 5. Be able to prepare feeds of different forms and varieties, seasonal feeds, and feeds appropriate for developmental stages.
CLO 6. Know the storage methods of compound feeds and the methods of feeding fish.

Learning outcomes (CLO) for the course "Monitoring and Research Methodology in Aquaculture"
CLO 1. To understand how to determine the origin of waters used in aquaculture.

CLO 2. To know the main research methods used for monitoring in aquaculture, including the procedures for collecting and storing various test samples.
CLO 3. To know the methods of physicochemical analysis of water, the procedures for conducting hydrobiological research, and the methods for sampling and calculating from water bodies.
CLO 4.To know the continuous monitoring of water in aquaculture and to be able to analyze the results of the monitoring.
CLO 5. To be able to determine the quantity of aquatic biological resources in water bodies.
CLO 6. To monitor diseases occurring in fish and other aquatic animals raised under aquaculture conditions, to understand their causes, and to master treatment methods.

Learning outcomes (CLO) for the subject "Statistics"
CLO 1. To know the basic statistical concepts and indicators.
CLO 2. To master measures of central tendency and measures of variation in statistics.
CLO 3. To understand the properties of variance and how to calculate it.
CLO 4. To understand the concept of sample observation, the population and sample sets, their summary indicators, as well as the forms, rules, and types of sampling.
CLO 5. To study statistical relationships and be able to perform regression and correlation analysis.
CLO 6. To understand time series dynamics and their analysis, including indices, absolute, and relative indicators.

Learning Outcomes (LO) for the course "Aquaculture of Invertebrates"
CLO 1. To master the general biological characteristics, natural distribution, and species composition of aquatic invertebrates.
CLO 2. To know the theoretical and technical foundations of aquatic invertebrate cultivation.
CLO 3. To understand reproduction, growth, development, nutrition, productivity, environmental factors, and production features of aquatic invertebrates.
CLO 4. To master the main biotechnical and regulatory features (density, maintaining optimal conditions, care, feeding regime) and standards in aquatic invertebrate farming methods.
CLO 5. To know the biotechnological foundations of breeding crayfish, freshwater shrimps, and mollusks.
CLO 6. To be able to manage the cultivation technologies of medicinal (leeches) and decorative aquatic invertebrates.

Learning Outcomes (LO) for the Course "Occupational Safety"
CLO 1. To know occupational safety standards, norms, and regulations, and to facilitate their implementation.
CLO 2. To ensure compliance with safety requirements of buildings, equipment, machinery, and technological processes.
CLO 3. To adapt workplaces to comply with current sanitary-hygienic and occupational safety standards, and to organize necessary sanitary, household, and medical-preventive services for employees.
CLO 4. To provide free therapeutic and preventive meals, milk, and equivalent products to workers engaged in harmful or heavy labor.
CLO 5. To organize training, instruction, and knowledge assessment of employees on occupational safety standards and promote occupational safety awareness.
CLO 6. To prepare reports on occupational safety, working conditions, and the results of measures taken to comply with current standards.

Learning Outcomes (LO) for the Course "Economics, Marketing, and Management of the Field"
CLO 1. To have knowledge of production economics and its specific features, as well as economic theory related to enterprises and associations.
CLO 2. To understand ways to increase the economic efficiency of production under market conditions, the essence of agrarian reform, achievements of scientific and technical progress, efficient use of land, labor, and material resources, and increasing product output.
CLO 3. To possess knowledge of the philosophy of marketing business, the marketing system, the market within the marketing system, and the main tools of commodity policy.
CLO 4. To understand product processing stages and product life cycle, price formation in the marketing system, sales and communication activities, management systems of marketing activities in enterprises, and marketing activities of trade enterprises.
CLO 5. To know the content and characteristic features of management, and strategic planning methods in management.
CLO 6. To understand decision-making processes and communication rules in management.

Learning Outcomes (LO) for the Course "Civil Defense"
CLO 1. To study the classification and full characteristics of emergencies, the history of civil defense, its role and tasks during emergencies; to know Cabinet of Ministers' decisions and relevant laws related to civil defense.
CLO 2. To understand the role and tasks of civil defense in peacetime and wartime; ways to prevent technogenic emergencies; behavior rules of the population under bacteriological, chemical, and radiation conditions; knowledge of quarantine, observation, sanitary cleaning, area disinfection, degassing of chemical poisoning sites, and decontamination methods in radiation conditions.
CLO 3. To know the role and functions of the state system in eliminating emergency consequences; to learn the formation of unarmed civil defense units.
CLO 4. To organize population protection during emergencies; to know collective protection facilities and their usage rules; to know individual protective equipment and its use; to be able to organize and carry out population evacuation and effective protection during emergencies.
CLO 5. To know the organization and conduct of civil defense reconnaissance; to operate radiation and chemical reconnaissance devices; to understand civil defense management, headquarters, and their main duties.
CLO 6. To be able to plan and implement civil defense measures; to know methods for eliminating the consequences of emergencies; to organize and carry out rescue and other urgent operations in disaster sites; to learn the principles of civil defense training for the population; and to provide first aid in disaster areas during emergencies.