MINISTRY OF EDUCATION OF THE REPUBLIC OF AZERBAIJAN

Approved by Order No. 1463 of the Ministry of Education of the Republic of Azerbaijan dated August 31, 2012

STATE STANDARD OF HIGHER EDUCATION LEVEL

MASTER'S LEVEL DEGREE PROGRAM LEVEL IN THE RELEVANT FIELD OF STUDY

Code and Title of the Specialty (Program): 060505 – Biology

BAKU-2012

1. General provisions

1.1. The Master's Degree Program in the specialty **060505 – Biology** has been developed in accordance with the Law of the Republic of Azerbaijan "On Education," the "State Standard and Program of Higher Education Level" approved by the relevant decisions of the Cabinet of Ministers of the Republic of Azerbaijan, the requirements of the "Rules for the Content, Organization of Master's Education and Awarding of the 'Master' Degree," the "Classification of Specialties (Specializations) at the Master's Level of Higher Education," and other legislative acts.

1.2. Regardless of subordination, type of ownership, and organizational-legal form, higher education institutions operating in the Republic of Azerbaijan shall carry out the training of master's degree students in the specialty 060505 – Biology in accordance with this Education Program.

1.3. Symbols Used in the Structure:
UK – General Cultural Competencies
PK – Professional Competencies

2. 060505-Characteristics of the Biology Specialty

2.1. Education of the Program development the standard term granted to graduates of scientific and technical education:

Specialty code and name	Given to the scientific qualification degree	Duration of Education for Full-Time Study	Number of credits
060505-Biology **Specializations:** • Molecular Biology • Biochemistry • Human and Animal Physiology • Plant Physiology • Mycology • Microbiology • Botany • Genetics • Invertebrate Zoology • Vertebrate Zoology • Biophysics • Nanobiotechnology • Entomology • Ecological Biology	Master	2 years (The duration of education in the part-time form is 6 months longer)	120

• Environmental Management and Biological Monitoring • Industrial Microbiology • Plant Genetics and Breeding • Human Genetics • Biotechnology • Ichthyology			

3. Characteristics and Competencies of the Graduate

3.1. Characteristics of the Master's Specialty

A master's graduate must possess a general understanding and extensive knowledge of theoretical principles and research methods, be prepared to conduct scientific research work requiring professional training and pedagogical activities, and be capable of solving unexpected and complex problems within the scope of their professional activity.

3.2. Competency Requirements for Graduates Upon Completion of the Program

3.2.1. The graduate must acquire the following general cultural competencies (UK):

- Ability to work in a team (UK-1);
- Ability to communicate with specialists from other fields (UK-2);
- Active social mobility (UK-3);
- Ability to work in the international arena (UK-4);
- Possession of legal knowledge and ethical standards (UK-5);
- Ability to propose new ideas (UK-6);
- Ability to work independently (UK-7);
- Skills and abilities in organizing scientific research and scientific-production activities, and managing a team (UK-8);
- Being a role model in terms of knowledge, skills, and personal initiative (UK-9);
- Ability to organize and plan work (UK-10);

3.2.2. The graduate must acquire the following professional competencies (PK):

In the field of scientific research:

- Use mathematical new modeling methods based on deep knowledge of fundamental biological and computer sciences (PK-1);
- Use mathematical and biometric methods in the analysis of biological problems (PK-2);
- Conduct scientific research and exploratory work (PK-3);
- Independently analyze the main directions of development in biology (PK-4);
- Analyze own scientific results (PK-5);
- Independently construct a general overview of the field (PK-6);

In the production-technological field:

- Plan and develop biological research using modern information technologies (PK-7);
- Be knowledgeable about the applied aspects of biological research (PK-8);
- Develop and implement biology in modern software packages (PK-9);

In the organizational-administrative field:

- Identify general patterns and regularities in subject groups (PK-10);
- Apply advanced technologies to the analysis of biological problems (PK-11);
- Present biological knowledge and adapt it to work conditions (PK-12);
- Lead scientific research teams (PK-13);
- Express non-biological knowledge (including humanities) clearly and concisely (PK-14);
- Solve unexpected and complex problems within professional activity (PK-15);
- Propose and plan relevant activities and methods, analyze their short- and long-term outcomes (PK-16);
- Creatively identify and address problems related to activity and education fields within limited time and information (PK-17);
- Select and use appropriate technologies and methods in solving problems, assess and/or evaluate potential outcomes (PK-18);
- Critically evaluate personal behavior during problem-solving in activity and education areas (PK-19);
- Present and justify problems related to activity and education fields orally and in writing in Azerbaijani and a foreign language, and participate in relevant discussions with specialists and non-specialists (PK-20);
- Independently operate in complex and unexpected conditions requiring innovative approaches (PK-21);
- Take responsibility for the strategic activities of organizations or groups (PK-22);
- Behave ethically in complex conditions, understand ethical aspects, possibilities, limitations, and social roles of personal behavior, and conduct reasoned evaluations on activity and education issues (PK-23);
- Assess personal and others' needs for continuous learning and professional development, and use effective methods necessary for independent education (PK-24);

In the pedagogical field:

- Teach biology subjects at general education, secondary specialized education institutions, and at the undergraduate level of higher education (PK-25);
- Obtain up-to-date scientific and technical information from electronic libraries and abstract journals (PK-26);
- Transfer own knowledge to others through teaching, training, or other methods (PK-27).

4. Minimum Requirements for the Level of Professional Preparation and the Content of Education

---

4.1. Characteristics of Professional Activity

4.1.1. Main directions of professional activity for master's graduates in the specialty 060505 – Biology:

- Scientific research;
- Pedagogical;
- Production-technological;
- Organizational-administrative, etc.

4.1.2. Requirements for the level of preparation:

In the field of scientific research:

- Apply advanced technologies in solving scientific, organizational, and applied issues in studying real processes and objects in biology;
- Analyze scientific research conducted in biology using achievements in science and technology, and advanced practices from Azerbaijan and foreign countries, and generalize the results;
- Organize and conduct conferences, seminars, and symposiums;
- Prepare and edit scientific publications.

In the pedagogical field:

- Deliver lectures;
- Conduct laboratory and seminar lessons.

In the production-technological field:

- Utilize modern technologies and software in the field of biology;
- Apply fundamental biological knowledge in production;
- Ensure efficient work regimes for the development of modern methods.

In the organizational-administrative field:

- Organize the work of scientific research groups;
- Apply scientific innovations to forecast activity results;
- Evaluate the results of scientific research quantitatively and qualitatively.

4.2. Minimum Requirements for the Content of Education

- Subject sections within the specialty, credits assigned to subjects, expected learning outcomes (in terms of knowledge, skills, and habits), and codes of the competencies to be acquired.

Code of Subject section	Subject Sections and Their Learning Outcomes (in Terms of Knowledge, Skills, and Abilities)	Number of Credits by Subject Sections	Subject code	Number of Credits per Subject	Codes of the Competencies to Be Acquired
kompetensiyaların Education codes, part					
of MHF-B00	• ations to mathematics, computer science, and economics.	**. 14**	**MHF-B01** *Foreign languages*	**6**	**ÜK-1** **ÜK-2** **ÜK-3**
	The graduate should be able to: **In Foreign Languages:** • Read texts related to biology, translate specialty-related texts obtained from the internet, write annotations, abstracts, theses, CVs, etc. **In Higher Education Pedagogy:** • Prepare lecture texts, deliver lectures, plan and conduct seminar sessions, carry out scientific research in biology, formulate hypotheses, conduct experiments, and apply results. **In Psychology:** • Understand the object, subject, and methods of psychology, main directions, structure of the psyche, the interaction between consciousness and unconsciousness, student psychology, etc. **In Elective Subjects:** • Use computer technologies and international internet networks to conduct scientific research in these areas.		**MHF-B02** *Higher Education Pedagogy* **MHF-B03** *Psychology* **MHF – B04** *elective subject**	**4** **2** **2**	**ÜK-4** **ÜK-5** **ÜK-6** **ÜK-7** **ÜK-8** **ÜK-9** **ÜK-10**

	The graduate must acquire: • Skills in writing and reading in a foreign language with the help of a dictionary; • The ability to conduct teaching and research work at higher education institutions, and pedagogical and psychological approaches to students; • Skills in using modern methods in the fields of economics or philosophy, etc.				
MYTH-B00	**Specialty (Specialization) Subject Section** **The master's graduate should know:** • The integration of biology with other natural sciences; • Correctly assess the specificity of biological objects; • The cellular integration of living systems; • The role of the time factor in living organisms; • The problem of stability in living systems; • The essence of wholeness in living systems; • Regulation and its mechanisms in living systems; • Adaptation, heredity, and synergetic principles in living systems; • Differential or analytical as well as integrative principles in the historical development of biology; • Psychological and biosocial characteristics of humans: evolutionary and social foundations, neural activity, physiological bases, manifestations of higher nervous activity;	**76**	**MYTH – B01** Contemporary Issues in Biology **MYTH – B02** History and Methodology of Biology **MYTH – B03** Subject Determined by the Higher Education Institution **MYTH –B04** Specialization Courses **MYTH – B05** *Elective Subject*	**4** **2** **4** **42** **24**	**PC – 1** **PC – 2** **PC – 3** **PC – 4** **PC – 5** **PC – 6** **PC – 7** **PC – 8** **PC – 9** **PC – 10** **PC – 11** **PC – 12** **PC – 13** **PC – 14** **PC – 15** **PC – 16** **PC – 17** **PC – 18** **PC – 19** **PC – 20** **PC – 21** **PC – 22** **PC – 23** **PC – 24** **PC – 25** **PC – 26** **PC – 27**

	• Motivation, emotion, psyche, and speech pathology; • Characteristics of biochemical processes in the organism; • The structure and functions at the cellular, organ, tissue, organ system, and whole organism levels of humans and animals, including the neuroendocrine regulation mechanisms; • Systematics, flora, and vegetation; • Characteristic features of fungi; • Physical-chemical mechanisms of processes occurring at molecular and atomic levels beyond molecular cell level; • Morphological-anatomical structure, ecology, and origin of animals; • Main physiological groups of microorganisms, metabolism features, and importance of biotechnological processes; • Laws of heredity and variability in organisms; • General laws of plant organism's vital activity; • Structure and functional characteristics of reproductive organs in animals belonging to different taxonomic categories; • Research methods of molecular biology and computer programs; • Principles of constructing an adequate model for a biological process or system.				
	The graduate should be able to: • Provide first aid to people in stressful or difficult situations; • Formulate mathematical equations describing biological processes; • Compare characteristics appearing during both embryonic and post-embryonic development of organisms; • Identify fungal species composition;				

	• Conduct research using modern physical-chemical methods; • Collect and process zoological materials; • Obtain and preserve pure cultures of microbes; • Determine the systematic position of plants in flora using identification keys; • Investigate laws of heredity and variability in organisms.				
	The graduate must acquire skills in: • Mathematical modeling methods in biology; • Studying biochemical, physiological, biophysical, and other processes in biological organisms using computer programs; • Investigating important biological processes in organisms with modern methods and devices; • Collecting, analyzing, and researching scientific data.				
MET – B00	**Scientific Research Work** By conducting scientific research work, the master's student should know and be able to: • Plan scientific research activities; • Select a research topic; • Compile a bibliography; • Conduct scientific research; • Analyze the results of the scientific research and compare them with those of other authors; • Determine the practical significance of the obtained results and their possible applications; • Identify possibilities for further continuation of the research work; • Defend the completed research work; • Prepare the research results for publication;	**30**	**Scientific Research Internship** **Scientific-Pedagogical Internship** **Preparation and Defense of the Master's Thesis**	**6** **6** **18**	**ÜK-8** **PK-3** **PK-4** **PK-5** **PK-7** **PK-8** **PK-13**

	• Participate in scientific research and scientific-pedagogical practices, summarize their results, and utilize them in the master's thesis, among other related tasks.				
	Total Number of Credits	**120**		**120**	

*Elective courses in all sections are determined by higher education institutions in accordance with the relevant competencies.
**Competencies and corresponding courses by specializations are determined by higher education institutions.*

4.3. Duration of Implementation of the Master's Degree Program by Specialty:

- Total number of weeks – 94, including:
  - Theoretical training – 45 weeks
  - Internships (scientific research and scientific-pedagogical) – 8 weeks
  - Examination sessions – 15 weeks
  - Preparation and defense of the master's thesis – 12 weeks
  - Holidays – 14 weeks

---

5. Material-Technical, Educational Base, and Personnel Potential

5.1. The higher education institution must have a material and technical base equipped with appropriate ICT facilities such as classrooms, laboratories, computer labs, workshops, etc., for conducting lessons, internships, and scientific research activities according to the curriculum of the 060505 – Biology specialty. Students must be provided with access to the institution's local network, internet, databases, electronic libraries, and search systems.

5.2. Teaching is generally conducted by the academic staff of the higher education institution holding scientific degrees or titles. Personnel from other institutions or organizations meeting these qualifications may also be involved.

5.3. Scientific supervision of master's theses is generally carried out by professors or academic staff holding scientific titles or degrees employed by the institution or by qualified personnel from other institutions or organizations.

---

6. Forms and Methods of the Educational Process

6.1. Theoretical training and pedagogical preparation of the master's student are conducted through lectures, exercises, seminars, consultations, independent work, pedagogical practice, and other forms.

6.2. Teaching methods in the master's program may include oral explanations, interviews, interactive training, independent work, discussions, round tables, illustrations, research activities, laboratory and practical work, and others.

6.3. Scientific research and scientific-pedagogical internships are envisaged in the master's training for specialty **060505 – Biology** (the goals and objectives of the internships are determined depending on the specialty). Internships can be held at relevant organizations or at departments and laboratories of the higher education institution, depending on the type of internship.

---

7. Requirements and Assessment for the Final State Attestation

7.1. The final state attestation consists of the defense of the master's thesis. Requirements regarding the content, volume, structure, and defense procedures of the thesis are determined by the Ministry of Education of the Republic of Azerbaijan.

7.2. The assessment of students' knowledge is conducted based on rules approved by the Cabinet of Ministers of the Republic of Azerbaijan.

7.3. Upon successful completion of the Final State Attestation, graduates are awarded the master's degree and a state-standard diploma.

Agreed:

Education of the Republic of Azerbaijan
Problems of the Institute
Special Education
Director

_____A. Mehrabov

"____" _____ 2012

of the Republic of Azerbaijan, Education
of the Ministry of Higher and Secondary

Head of the Education Department,

_____I. Mustafayev

"____"_____2012

Education group of educational specialties
according to the State Educational Standards
Scientific and Methodological Council
for the preparation of the working group, Chairman

_____Babazade V.

"___" _____ 2012

of the Republic of Azerbaijan
of the Ministry of
"Biology" Chairman
of the Department

_____ M. Babayev

"___" _____ 2012