

Navoi State University – Methodology of Teaching Natural and Exact Sciences (Biology)

Program Duration: 2 years

Mode of Study: Full-time

Program Code: 70510105

Total Workload: 120 ECTS credits

ECTS credits per semester: 30

Overview

The Master's degree program in Methodology of Teaching Natural and Exact Sciences (Biology) (Program Code: 70510105) at Navoi State University is a two-year, full-time academic program comprising a total workload of 120 ECTS credits (30 ECTS per semester). Established in 2015, the program is designed to prepare highly qualified specialists with advanced knowledge in biology and modern pedagogical methodologies for teaching natural and exact sciences.

The curriculum integrates theoretical instruction, research training, and practical teaching experience, enabling graduates to design, implement, and evaluate innovative teaching strategies in secondary and higher education. The program emphasizes contemporary biological sciences, educational psychology, curriculum development, and the integration of ICT in teaching. Students engage in research projects, academic writing, and scientific communication, contributing to the development of their professional and academic competencies.

Graduates of this program are equipped to pursue careers as biology educators, curriculum developers, educational researchers, and academic staff in universities and colleges, as well as to continue their studies at the doctoral level.

Assessment

A comprehensive and balanced assessment system is applied in the Methodology of Teaching Natural and Exact Sciences (Biology) Master's program to ensure continuous learning and professional development. The assessment structure reflects the program's curriculum, combining subject-specific, research, and practical components.

1. Course-based assessment

Presentations and seminars – assess students' ability to discuss and defend biological concepts, research findings, and pedagogical innovations in a public setting.

Mini-tests, quizzes, and oral questioning – monitor students' understanding of compulsory and elective subjects, including advanced biology topics, pedagogical theory, and ICT applications in teaching.

Midterm and final examinations – evaluate in-depth knowledge of theoretical and practical course materials, both in written and oral formats.

Portfolio assignments – compile students’ written works, methodological projects, and research outputs, showing progression in academic and teaching competencies.

Independent assignments – provide opportunities to apply knowledge in research, pedagogical planning, curriculum design, and project-based learning.

2. Research-based assessment

Scientific Research Work (ITI) – evaluated through research proposals, progress reports, and final defense of research findings.

Scientific and Pedagogical Work (IPI) – assessed by teaching observations, methodological material development, and reflective reports.

Master’s Thesis (MD/M) – assessed through thesis submission, preliminary reviews, and public defense before the State Attestation Commission.

3. Practice-based assessment

Pedagogical internships – evaluated based on performance in real teaching environments, lesson observations, and internship reports.

Pre-graduation practice – assessed through the preparation of methodological packages, teaching materials, and integration of research results into practice.

4. Work-integrated learning

ICT-based projects – assessed on innovation, integration of digital tools, and alignment with curriculum requirements.

This multi-component assessment system ensures that graduates meet the knowledge, skills, and competency outcomes defined by the program and are prepared for both professional teaching and research careers.

Academic Requirements

Admission Requirements: Applicants to the *Master’s degree program in Methodology of Teaching Natural and Exact Sciences (Biology)* (Code: 70510105) must meet the following criteria:

1. **Educational background** – A Bachelor’s degree or equivalent qualification in biology, natural sciences, or a related field from a recognized higher education institution.
2. **Academic excellence** – Graduates with an *honours diploma (imtiyozli diplom)* are eligible for preferential admission in accordance with the regulations of the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan.
3. **Language proficiency** – Submission of a valid B2-level foreign language proficiency certificate (CEFR) in English, Russian, or another foreign language recognized by the State Testing Center of Uzbekistan or equivalent international exams (IELTS, TOEFL, etc.).

Graduation Requirements

To be awarded the degree of **Master of Science in Methodology of Teaching Natural and Exact Sciences (Biology)**, students must:

1. Successfully complete all compulsory and elective modules specified in the curriculum, earning a total of **120 ECTS credits** (30 ECTS per semester).
2. Maintain a cumulative GPA in accordance with Navoi State University's academic regulations (minimum pass mark for each subject must be achieved).
3. Complete all forms of **practical training** and internships (pedagogical, industrial, and pre-graduation practice) with positive evaluations from supervisors.
4. Fulfil all research components, including *Scientific Research Work (ITI)* and *Scientific and Pedagogical Work (IPI)*, as outlined in the program.
5. Prepare, submit, and successfully defend a **Master's Thesis** before the State Attestation Commission, demonstrating the ability to conduct independent research and present findings at an academic level.
6. Pass all **state attestation requirements**, including comprehensive examinations (if applicable) and thesis defense.

Courses Offered:

Year 1
Compulsory Research Methodology Reforms in the Education System under the Development Strategy of New Uzbekistan Methodology of Teaching Specialized Subjects in Higher Education Elective: Immuno-genetics Fundamentals of Biotechnology Regulatory Documents in Higher Education Issues in the Conservation of Natural Resources
Year 2
Evolution of the Organic World and Anthropology Enzymology Conceptual Foundations of Biology Elective: Interdisciplinary Integration in Biology International Assessment in Teaching Biology Innovative Technologies in Biology Education Professional Morality Cytology Evolution of Plants and Animals Bio ecology of Uzbekistan's Soils Ichthyology and Fundamentals of Fisheries Cell and Genetic Engineering

Career Opportunities

Graduates of the Master's program in Methodology of Teaching Natural and Exact Sciences (Biology) are equipped with advanced knowledge in biological sciences, modern pedagogical methodologies, and research skills, enabling them to work in diverse professional settings. Potential career paths include:

- Specialist or researcher at the Academy of Sciences of the Republic of Uzbekistan and its branch research institutes.
- Biology and Natural Sciences teacher in general secondary schools, vocational colleges, and professional education institutions, applying innovative pedagogical approaches and information technologies.
- Inspector or officer in governmental and non-governmental organizations engaged in environmental protection and natural resource management.
- Specialist in institutions under the Forestry Department of the Ministry of Forestry.
- Instructor within agencies under the Ministry of Agriculture and Water Resources, contributing to the development of solutions for complex biological and environmental challenges.
- Laboratory technician or biological analyst in laboratories affiliated with the Ministry of Health.
- Specialist in manufacturing enterprises, research centers, and government agencies addressing sector-specific problems in biology and environmental sciences.
- Consultant or service provider offering specialized expertise and paid services in the biological sciences and education sectors.
- Interdisciplinary problem-solver in public or private institutions of general, secondary, and vocational education, as well as in related research and industrial sectors.

Tuition Fees

- **For local students:** Approximate annual tuition – 9,700,000 UZS.
- **For international students:** Approximate annual tuition – 774.28 USD.
- **Note:** Tuition fees are subject to change annually based on university policy and currency exchange rates.

Learning Outcomes

Master's Degree in Teaching Methods of Exact and Natural Sciences (Biology)

Upon successful completion of the program, graduates will be able to:

1. *Knowledge*

- 1.1. Demonstrate in-depth knowledge of modern biology, its theoretical foundations, and its teaching methodology across general secondary, vocational, and higher education levels.
- 1.2. Explain fundamental principles of pedagogy, psychology, and didactics in the context of biology education.
- 1.3. Apply the principles and methods of scientific research, including experimental design, data analysis, and interpretation, to biological and pedagogical studies.
- 1.4. Understand national and international standards in biology education, as well as relevant normative and legal documents.
- 1.5. Recognize the socio-cultural, ethical, and philosophical dimensions of teaching biology in multicultural and inclusive educational environments.
- 1.6. Identify current trends, innovations, and technological developments in biology and related sciences.

2. *Skills*

- 2.1. Design, adapt, and implement curricula, syllabi, and lesson plans in biology that meet state educational standards (DTS) and learning needs of students.
- 2.2. Select and apply effective teaching methods, laboratory practices, and ICT tools (including HEMIS) for enhancing biology learning outcomes.
- 2.3. Conduct lectures, laboratory, and fieldwork activities integrating modern educational technologies and interactive teaching methods.
- 2.4. Develop and use assessment tools to evaluate students' knowledge, skills, and competencies in biology, and provide constructive feedback.
- 2.5. Organize and lead educational, extracurricular, and research activities that promote students' scientific thinking, environmental awareness, and problem-solving skills.
- 2.6. Plan, execute, and present original research in biology or biology education, producing publishable results.
- 2.7. Use statistical, bioinformatics, and data visualization tools for processing research data.
- 2.8. Apply project management skills for organizing scientific, educational, or community-based biology initiatives.
- 2.9. Communicate effectively in academic and professional contexts in both Uzbek and at least one foreign language.

3. Competences

- 3.1. Pedagogical Competence – Independently plan, deliver, and evaluate biology education in accordance with learners’ needs, educational standards, and institutional goals.
- 3.2. Research Competence – Carry out independent and collaborative scientific research in biology or biology teaching methodology, integrating theoretical and practical knowledge.
- 3.3. Methodological Competence – Adapt modern teaching methods and resources for various educational levels, including inclusive and distance learning.
- 3.4. Organizational and Leadership Competence – Manage educational institutions or departments, ensuring quality assurance and fostering a positive learning environment.
- 3.5. Ethical and Civic Competence – Promote academic integrity, environmental responsibility, and sustainable development principles in educational and research activities.
- 3.6. Lifelong Learning Competence – Engage in continuous professional development through conferences, workshops, advanced training, and self-directed learning.
- 3.7. Socio-cultural Competence – Integrate national values and universal human principles into the teaching process, fostering tolerance, respect, and intercultural communication.