

Navoi State University – Mathematics (Master’s Program)

Program Duration: 2 years

Mode of Study: Full-time

Program Code: 70540101

Total Workload: 120 ECTS credits

ECTS credits per semester: 30

Overview

The Master’s degree program in Mathematics (Program Code: 70540101) 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 2022, the program is designed to train highly qualified specialists with advanced theoretical knowledge and research skills in modern mathematics and its teaching methodology.

The curriculum combines compulsory and elective courses in mathematical analysis, operator theory, mathematical physics, topology, probability theory, and modern methods of applied mathematics. In addition, students study research methodology, pedagogical approaches to teaching specialized subjects, and professional ethics. Considerable emphasis is placed on scientific research work, academic writing, and the preparation and defense of a Master’s dissertation.

Students engage in theoretical instruction, independent study, and research training, along with practical experience in higher education institutions, research organizations, and partner enterprises. The program structure allocates time for scientific research work (SRW) and scientific-pedagogical activities, ensuring that graduates develop both subject-matter expertise and pedagogical competencies.

Graduates of the program are prepared to pursue careers as university lecturers, researchers, curriculum developers, and specialists in academic and research institutions. They are also well-positioned to continue their studies at the doctoral level, contributing to the advancement of mathematics and mathematics education.

Assessment

A comprehensive and balanced assessment system is applied in the Master’s program in Mathematics (70540101) to ensure continuous learning, research development, and pedagogical competence. The assessment structure reflects the program’s curriculum, combining subject-specific, research, and practice-oriented components.

1. Course-based assessment

Presentations and seminars – assess students' ability to present and defend mathematical concepts, proofs, and pedagogical approaches in an academic setting.

Mini-tests, quizzes, and oral questioning – monitor students' understanding of compulsory and elective subjects, including mathematical analysis, operator theory, modern methods of mathematical physics, and professional ethics.

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

Portfolio assignments – compile students' problem-solving works, methodological projects, and mathematical research outputs, showing progression in academic and teaching competencies.

Independent assignments – provide opportunities to apply knowledge in advanced problem-solving, curriculum design, and project-based learning.

2. Research-based assessment

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

Scientific and Pedagogical Work (IPI) – assessed by teaching observations, development of teaching materials in mathematics, and reflective reports.

Master's Thesis (MD) – 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 in mathematics education.

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

4. Work-integrated learning

ICT-based projects – assessed on innovation, use of digital tools in mathematics teaching, and alignment with curriculum requirements.

This multi-component assessment system ensures that graduates meet the program's expected learning outcomes in knowledge, skills, and competencies, and are fully prepared for careers in both mathematics education and advanced research.

Academic Requirements

Admission Requirements: Applicants to the Master's degree program in Mathematics (Code: 70540101) must meet the following criteria:

Educational background – A Bachelor's degree or equivalent qualification in mathematics, applied mathematics, or a closely related field from a recognized higher education institution.

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.

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 Mathematics, students must:

Successfully complete all compulsory and elective modules specified in the curriculum, earning a total of 120 ECTS credits (30 ECTS per semester).

Maintain a cumulative GPA in accordance with Navoi State University's academic regulations (meeting the minimum pass mark for each subject).

Complete all forms of practical training and internships (pedagogical, research, and pre-graduation practice) with positive evaluations from supervisors.

Fulfil all research components, including Scientific Research Work (ITI) and Scientific and Pedagogical Work (IPI), as outlined in the program.

Prepare, submit, and successfully defend a Master's Thesis (MD) before the State Attestation Commission, demonstrating the ability to conduct independent mathematical research and present findings at an academic level.

Pass all state attestation requirements, including comprehensive examinations (if applicable) and thesis defense.

Courses Offered:

Year 1
Compulsory Research Methodology Methodology of Teaching Specialized Subjects Theory of Operators in Banach Spaces Measure and Integration Theory Modern Methods of Mathematical Physics Introduction to Homology Theory Elective: Analytic Continuation of Functions of Several Complex Variables Markov Chains and Branching Processes
Year 2
Elective: Applied Complex Analysis Theory of Several Complex Variables Vector Analysis Analysis on Manifolds Methodology for Solving Non-Standard Problems in Mathematical Analysis Mathematical and Statistical Methods Methods of Solving Non-Standard Problems in Algebra Professional Morality Methodological Foundations of Mathematics Education Methods of Solving Non-Standard Problems in Mathematics

Career Opportunities

Graduates of the Master's program in Mathematics (70540101) are equipped with advanced knowledge in pure and applied mathematics, pedagogical methodologies, and research skills, enabling them to work in diverse professional and academic settings. Potential career paths include:

- Researcher or specialist at the Academy of Sciences of the Republic of Uzbekistan and its affiliated research institutes in mathematics and related fields.
- University or college lecturer in mathematics, applied mathematics, and methodological subjects, applying innovative teaching strategies and modern digital technologies.
- Secondary school or vocational college teacher of mathematics, contributing to curriculum innovation and advanced problem-solving approaches.
- Analyst or consultant in governmental and non-governmental organizations that require expertise in mathematical modeling, data analysis, and decision-making.
- Specialist in IT and financial sectors, applying advanced mathematical and statistical methods to solve practical problems in economics, banking, and technology.
- Expert in research centers and enterprises requiring mathematical modeling, optimization, and quantitative analysis.
- Curriculum developer or methodological consultant in education-related institutions, designing teaching materials and assessment systems in mathematics.
- Independent consultant or service provider offering expertise in mathematics education, applied research, and training programs.

- Doctoral researcher prepared to pursue PhD studies in mathematics, pedagogy of mathematics, or interdisciplinary fields combining mathematics with computer science, physics, or economics.

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 Mathematics (70540101)

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

1. Knowledge

- 1.1. Demonstrate in-depth knowledge of advanced mathematical theories, including analysis, algebra, topology, mathematical physics, and applied mathematics.
- 1.2. Explain the fundamental principles of pedagogy, psychology, and didactics in the context of teaching mathematics at different educational levels.
- 1.3. Apply principles and methods of scientific research, including mathematical modeling, problem formulation, data analysis, and logical proof construction.
- 1.4. Understand national and international standards in mathematics education, as well as relevant normative and legal documents.
- 1.5. Recognize the socio-cultural, ethical, and philosophical dimensions of mathematics education in multicultural and inclusive learning environments.
- 1.6. Identify current trends, innovations, and technological developments in mathematics and its applications.

2. Skills

- 2.1. Design, adapt, and implement curricula, syllabi, and lesson plans in mathematics that meet state educational standards (DTS) and learners' needs.
- 2.2. Select and apply effective teaching methods, problem-solving strategies, and ICT tools (including HEMIS and mathematical software) for enhancing mathematics learning outcomes.
- 2.3. Conduct lectures, seminars, and practical sessions integrating modern educational technologies and interactive teaching approaches.
- 2.4. Develop and use assessment tools to evaluate students' knowledge, problem-solving skills, and mathematical competencies, and provide constructive feedback.

2.5. Organize and lead educational, extracurricular, and research activities that promote students' logical thinking, analytical reasoning, and creativity.

2.6. Plan, execute, and present original research in mathematics or mathematics education, producing results suitable for publication.

2.7. Use mathematical software, statistical tools, and data visualization techniques for processing and presenting research data.

2.8. Apply project management skills to organize scientific, educational, or community-based mathematics 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 mathematics education in accordance with learners' needs, educational standards, and institutional goals.

3.2. Research Competence – Carry out independent and collaborative scientific research in mathematics or mathematics teaching methodology, integrating theoretical and applied knowledge.

3.3. Methodological Competence – Adapt modern teaching methods and digital resources for various educational levels, including inclusive and distance learning.

3.4. Organizational and Leadership Competence – Manage educational processes or departments, ensure quality assurance, and foster a supportive learning environment.

3.5. Ethical and Civic Competence – Promote academic integrity, professional ethics, and principles of sustainable development in mathematics education and research.

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 mathematics education, fostering tolerance, respect, and intercultural communication.

Comparative Matrix of Learning Outcomes

Master's Program in Mathematics – Navoi State University

Learning Outcomes – Mathematics Master's Program (NSU)	Uzbekistan National Qualifications Framework (UzNQF Level 8)	European Qualifications Framework (EQF Level 7)
Demonstrates advanced knowledge of mathematical theories, methods, and modern research approaches.	Has deep and systematic knowledge in a specific field of study; capable of critical analysis and synthesis.	Highly specialized knowledge, some at the forefront of the field; critical awareness of knowledge issues.
Applies mathematical modeling, computational tools (MATLAB, Maple, Python), and analytical techniques to solve complex theoretical and applied problems.	Ability to apply acquired knowledge and methods in new or interdisciplinary contexts; demonstrates problem-solving in research and practice.	Problem-solving in new or unfamiliar environments within broader (or multidisciplinary) contexts.
Conducts independent scientific research, designs projects, and publishes results in national and international academic platforms.	Carries out independent research and innovative activities; demonstrates responsibility for new knowledge generation.	Manages and transforms work or study contexts; demonstrates innovative problem-solving in research.
Integrates mathematical knowledge with other sciences (physics, computer science, economics) to address interdisciplinary challenges.	Ability to integrate knowledge across disciplines and deal with complexity; demonstrates flexible thinking.	Integrates knowledge, handles complexity, and formulates judgments with incomplete or limited information.
Demonstrates academic communication skills: presents research findings in Uzbek, Russian, and English using appropriate academic and digital tools.	Ability to communicate complex ideas clearly to specialists and non-specialists in academic and professional contexts.	Communicates conclusions, knowledge, and rationale clearly and unambiguously to specialist and non-specialist audiences.
Uses ethical principles, academic integrity, and professional standards in research and teaching practice.	Adheres to ethical norms, promotes social responsibility, and professional integrity in academic and applied contexts.	Demonstrates responsibility for managing professional development and ethical practice.
Demonstrates readiness for lifelong learning, doctoral study, and professional development in academia, research, and industry.	Prepared for lifelong learning and further qualifications (PhD level), with autonomy in professional growth.	Demonstrates learning skills that allow further study in a self-directed or autonomous manner.