

Navoi State University – Applied Informatics

Program Duration: 2 years

Mode of Study: Full-time

Program Code: 70610102

Total Workload: 120 ECTS credits

ECTS credits per semester: 30

Overview

The Master's degree program in **Applied Informatics** (Program Code: 70610102) at Navoi State University is a two-year, full-time academic program comprising a total workload of 120 ECTS credits (30 ECTS per semester). The program is designed to prepare highly qualified IT architects, software engineers, data analysts, systems analysts, and applied computer scientists equipped with advanced knowledge in enterprise software architecture, data science, artificial intelligence, cloud computing, and information system security.

The curriculum integrates advanced theoretical computer science, modern software engineering methodologies, data-driven decision-making, and practical system design. Students gain hands-on expertise in developing scalable software solutions, managing complex databases, designing intelligent systems, automating business processes, and implementing cybersecurity protocols. The program places strong emphasis on driving digital transformation across industrial, educational, economic, and governmental sectors in Uzbekistan.

Graduates of this program are fully equipped to pursue careers as senior software developers, systems architects, data engineers, IT project managers, cybersecurity analysts, research scientists, and academic staff in higher education institutions, as well as to continue their studies at the doctoral (PhD) level.

Assessment

A comprehensive and multi-component assessment system is applied in the Master's program in Applied Informatics to ensure continuous learning, software engineering proficiency, analytical competence, and academic rigor.

1. Course-based assessment

- **Presentations and seminars** – assess students' ability to analyze, present, and defend software architecture designs, data engineering frameworks, system integration projects, and research papers in academic and professional settings.
- **Mini-tests, quizzes, and oral exams** – monitor understanding of core theoretical concepts, database structures, algorithmic efficiency, cloud architectures, and cybersecurity protocols.
- **Midterm and final examinations** – evaluate theoretical depth, software design capabilities, and problem-solving skills through written exams, code reviews, and practical laboratory tests.

- **Portfolio assignments** – compile software source code, database schemas, system architecture blueprints, data analytics pipelines, and research paper drafts demonstrating technical progression.
 - **Independent assignments** – encourage independent software module development, algorithm optimization, system security auditing, and empirical data processing.
2. **Research-based assessment**
- **Scientific Research Work (ITI)** – evaluated through research proposals, software prototype testing reports, algorithm performance metrics, and defense of research outcomes before the department.
 - **Scientific and Pedagogical Work (IPI)** – evaluated via teaching practice, preparation of practical programming lab manuals, online module guides, and academic reporting.
 - **Master’s Thesis (MD/M)** – evaluated based on overall scientific rigor, software innovation, practical deployment viability, thesis writing quality, and public defense before the State Attestation Commission.
3. **Practice-based assessment**
- **IT and Industrial Practice** – evaluated through performance in software engineering companies, IT departments of industrial enterprises, data centers, and government digital agencies, accompanied by comprehensive practice reports.
 - **Pre-graduation practice** – assessed on the deployment and testing of applied software systems and final thesis preparation.
4. **Work-integrated learning**
- **Software Development & Systems Projects** – assessed on system functionality, code efficiency, user interface design (UI/UX), data security, and alignment with modern software industry standards.

Academic Requirements

Admission Requirements-Applicants applying for the Master’s degree program in Applied Informatics (Code: 70610102) must satisfy the following criteria:

- **Educational background** – A Bachelor’s degree (or equivalent qualification) in applied informatics, computer science, software engineering, information technology, computer engineering, or related quantitative/engineering fields from a recognized higher education institution.
- **Academic excellence** – Applicants holding an honors diploma (*imtiyozli diplom*) are eligible for preferential admission according to current regulations of the Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan.
- **Language proficiency** – A valid national or international certificate demonstrating at least B2-level foreign language proficiency (CEFR, IELTS, TOEFL, etc.) in English, Russian, or another recognized foreign language.

Graduation Requirements

To be granted the Master of Science degree in Applied Informatics, students are required to:

- Complete all compulsory and elective modules specified in the curriculum, accumulating a total of **120 ECTS credits** (30 ECTS per semester).
- Maintain standard academic standing according to Navoi State University regulations (passing marks in all subjects).

- Successfully complete all practical trainings (software engineering practice, educational internship, and pre-graduation practice) with positive supervisor evaluations.
- Fulfill all research requirements (Scientific Research Work and Scientific-Pedagogical Work).
- Prepare, submit, and successfully defend a **Master's Thesis** demonstrating original research and practical software implementation before the State Attestation Commission.
- Pass all required state attestation processes.

Courses Offered

Year 1

Compulsory:

- Research Methodology and Scientific Writing in Applied Informatics
- Reforms in the Education System under the Development Strategy of New Uzbekistan
- Advanced Software Engineering and Enterprise Architecture Design
- Modern Database Systems and Distributed Data Architecture
- Machine Learning and Data Mining in Applied Systems

Elective:

- Cloud Computing and DevOps Technologies
- Web and Mobile Application Development Frameworks
- Cybersecurity Protocols and Information Systems Protection
- Regulatory Documents and Quality Standards in Information Technologies
- Artificial Intelligence and Neural Networks

Year 2

Compulsory:

- Big Data Analytics and Processing Frameworks
- Systems Integration and Microservice Architecture
- Management of IT Projects and Agile Methodologies

Elective:

- Internet of Things (IoT) and Embedded Systems Design
- Computer Vision and Digital Image Processing
- Natural Language Processing (NLP) Applications
- Professional Morality and Ethics in Digital Technologies
- Blockchain Architecture and Decentralized Applications
- Business Process Reengineering and Information Systems Audit
- High-Performance Computing and Parallel Algorithms

Career Opportunities

Graduates of the Master's degree program in Applied Informatics possess high-level software engineering, data processing, and systems integration skills, enabling them to pursue careers across diverse technology, industrial, corporate, and governmental sectors:

- **Software Architect / Senior Software Engineer** developing complex enterprise systems, web services, and mobile applications in IT companies and tech startups.
- **Data Scientist / Data Engineer / Analytics Specialist** in commercial banks, telecommunication operators, research centers, and big data corporations.
- **Systems Analyst / IT Business Analyst** bridging corporate operational needs and digital technology solutions in industrial combines (e.g., NGMK, AGMK), government agencies, and multinational firms.
- **Applied Informatics Lecturer / Instructor** in higher education institutions, specialized academic lyceums, professional colleges, and IT academies.
- **IT Project Manager / Scrum Master / Product Owner** leading software development teams and digital transformation initiatives in public and private organizations.
- **Cybersecurity Specialist / Information Security Officer** in banking institutions, data centers, and state security agencies.
- **Research Scientist / Specialist** at research institutes under the Academy of Sciences of the Republic of Uzbekistan and specialized IT R&D centers.
- **Cloud Infrastructure Specialist / DevOps Engineer** managing automated cloud architectures, server networks, and CI/CD pipelines.

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 adjustment in accordance with university policy and foreign currency exchange rates.)

Learning Outcomes

Master's Degree in Applied Informatics

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

1. Knowledge

- **1.1.** Demonstrate advanced knowledge of software engineering principles, enterprise software architecture, database management systems, and microservices.
- **1.2.** Understand machine learning algorithms, deep learning models, data science frameworks, and big data processing paradigms.
- **1.3.** Explain principles of cloud computing architectures, distributed systems, network protocols, and DevOps automation workflows.
- **1.4.** Demonstrate comprehensive knowledge of cybersecurity frameworks, cryptographic standards, data protection regulations, and system audit methods.
- **1.5.** Recognize national legal standards, software copyright regulations, ISO quality standards, and strategic digital transformation initiatives in Uzbekistan.

2. Skills

- **2.1.** Design, construct, test, and deploy secure, scalable, and resilient software applications and information systems using modern programming languages (Python, Java, C#, C++).
- **2.2.** Architect and optimize relational, NoSQL, and distributed databases for high-volume data storage and retrieval.

- **2.3.** Implement machine learning models, statistical data processing pipelines, and business intelligence dashboards to solve real-world analytical problems.
- **2.4.** Perform cybersecurity vulnerability assessments, system risk audits, and access control implementations to safeguard critical information systems.
- **2.5.** Prepare technical documentation, system specification documents, software design blueprints, research papers, and IT project proposals.
- **2.6.** Effectively present complex software solutions, technical architectures, and data-driven insights to executive boards, software development teams, and academic audiences in national and foreign languages.

3. Competences

- **3.1. Applied Informatics & Research Competence** – Conduct independent, scientifically rigorous, and technologically advanced research to design novel software and algorithmic solutions.
- **3.2. Systems & Technical Leadership Competence** – Lead software engineering teams, direct IT infrastructure projects, and manage digital enterprise architectures in corporate and government sectors.
- **3.3. Methodological & Educational Competence** – Teach applied computer science and informatics subjects in academic institutions using up-to-date practical programming labs.
- **3.4. Innovation & Problem-Solving Competence** – Apply artificial intelligence, automation, and emerging digital tools to optimize complex operational and industrial workflows.
- **3.5. Ethical & Digital Security Competence** – Uphold rigorous standards of professional ethics, user data privacy, intellectual property rights, and algorithmic transparency.
- **3.6. Lifelong Learning Competence** – Continuously adopt rapidly evolving programming paradigms, emerging tech stacks, and international IT industry standards through ongoing self-education and professional development.