

Navoi State University – Soil Science

Program Duration: 2 years

Mode of Study: Full-time

Program Code: 70810203

Total Workload: 120 ECTS credits

ECTS credits per semester: 30

Overview

The Master's degree program in **Soil Science** (Program Code: 70810203) 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 soil scientists, land resources specialists, agronomists, soil fertility experts, and agricultural researchers equipped with advanced knowledge in soil genesis, soil physics and chemistry, soil biology, land evaluation, and sustainable soil management.

The curriculum integrates theoretical instruction, comprehensive laboratory chemical analysis, and field research training. Students gain hands-on expertise in mapping soil types, assessing soil degradation processes (salinization, erosion, desertification), utilizing GIS and remote sensing for land resource monitoring, and developing bio-remediation strategies. The program places strong emphasis on addressing regional agricultural and ecological challenges in Uzbekistan, particularly soil conservation in arid zones, sustainable irrigation, and soil health restoration in the Aral Sea basin and Navoi region.

Graduates of this program are fully equipped to pursue careers as soil analysts, land evaluation consultants, agricultural R&D specialists, environmental monitoring officers, research scientists in scientific institutes, and academic staff in higher education, 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 Soil Science to ensure continuous learning, field/laboratory technical competence, and scientific rigor.

1. Course-based assessment

- **Presentations and seminars** – assess students' ability to present, analyze, and defend research on soil chemistry, soil classification systems, and land remediation strategies in academic settings.
- **Mini-tests, quizzes, and oral exams** – monitor understanding of core theoretical concepts, soil mineralogy, soil microbiology, irrigation impact, and agrochemical standards.
- **Midterm and final examinations** – evaluate theoretical depth, laboratory analytical skills, and soil profile evaluation capabilities through written exams and practical lab tasks.

- **Portfolio assignments** – compile field expedition logs, soil profile descriptions, laboratory soil test reports, thematic soil maps, and research paper drafts demonstrating professional progress.
 - **Independent assignments** – encourage independent soil scientific literature reviews, GIS-based mapping, soil degradation data analysis, and fertility management planning.
2. **Research-based assessment**
- **Scientific Research Work (ITI)** – evaluated through research project proposals, regular laboratory and field progress reports, and defense of soil scientific research outcomes before the department.
 - **Scientific and Pedagogical Work (IPI)** – evaluated via teaching practice, development of practical soil laboratory manuals, field guides, and scientific reporting.
 - **Master’s Thesis (MD/M)** – evaluated based on overall scientific rigor, practical relevance to agricultural production, thesis writing quality, and public defense before the State Attestation Commission.
3. **Practice-based assessment**
- **Field and Industrial Practice** – evaluated through performance in soil testing laboratories, agricultural research institutes, cadastre agencies, and environmental protection organizations, accompanied by comprehensive practice reports.
 - **Pre-graduation practice** – assessed on the integration of field/laboratory research results and final thesis preparation.
4. **Work-integrated learning**
- **Soil Mapping & Remediation Projects** – assessed on analytical precision, innovative use of GIS tools, laboratory test accuracy, and practical alignment with sustainable agriculture needs.

Academic Requirements

Admission Requirements-Applicants applying for the Master’s degree program in Soil Science (Code: 70810203) must satisfy the following criteria:

- **Educational background** – A Bachelor’s degree (or equivalent qualification) in soil science, agronomy, agrochemistry, biology, geography, ecology, or related agricultural/natural science 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 Soil Science, students are required to:

- Complete all compulsory and elective modules 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 (field soil expeditions, research practice, and pre-graduation practice) with positive performance evaluations.

- Fulfill all research requirements (Scientific Research Work and Scientific-Pedagogical Work).
- Prepare, submit, and successfully defend a **Master's Thesis** demonstrating original experimental or field research in soil science before the State Attestation Commission.
- Pass all required state attestation processes.

Courses Offered

Year 1

Compulsory:

- Research Methodology in Soil Science and Agricultural Sciences
- Reforms in the Education System under the Development Strategy of New Uzbekistan
- Advanced Soil Genesis, Morphology, and Classification
- Soil Chemistry and Physical-Chemical Methods of Soil Analysis
- Soil Physics and Hydrology in Arid Regions

Elective:

- GIS and Remote Sensing in Soil Mapping and Land Cadastre
- Bioecology and Fertility Management of Uzbekistan's Soils
- Soil Microbiology and Biochemistry
- Soil Erosion and Salinization Prevention
- Regulatory Documents and Environmental Law in Land Use

Year 2

Compulsory:

- Soil Degradation, Desertification, and Reclamation
- Agrochemistry and Precision Soil Fertility Management
- Environmental Soil Science and Ecotoxicology

Elective:

- Soil Remediation Technologies and Bio-restoration
- Land Evaluation and Soil Valuation Systems
- Hydrogeology and Irrigation Impact on Soil Health
- Professional Morality and Ethics in Agriculture
- Soil Quality Assessment and Crop Yield Modeling
- Soils of Arid Landscapes and Aral Basin Reclamation
- Climate Change and Soil Carbon Sequestration

Career Opportunities

Graduates of the Master's degree program in Soil Science acquire comprehensive field investigation, laboratory analytical, and land assessment skills, enabling them to pursue careers across agricultural, environmental, governmental, and academic sectors:

- **Research Scientist / Senior Specialist** at the Research Institute of Soil Science and Agrochemistry, Ministry of Agriculture, and scientific institutes under the Academy of Sciences.

- **Soil Analyst / Agronomist Specialist** in regional agricultural departments, soil testing laboratories, agrochemical service centers, and farming enterprises.
- **Specialist / Inspector** at the Ministry of Agriculture, Ministry of Ecology, Environmental Protection and Climate Change, and Cadastre Agency of Uzbekistan.
- **Soil Science Lecturer / Instructor** in higher education institutions, agricultural colleges, and vocational institutions.
- **Land Evaluation / Cadastral Specialist** in land survey agencies, urban and agricultural territorial planning bureaus, and private consulting firms.
- **Environmental & Soil Remediation Consultant** in industrial mining enterprises (e.g., NGMK, AGMK), construction firms, and environmental auditing companies.
- **Project Specialist / Coordinator** in international agricultural and environmental development organizations (FAO, ICARDA, UNDP, GIZ) working on land conservation and sustainable agriculture.
- **Independent Soil & Crop Consultant** providing paid advisory services to private farms, agro-clusters, and agricultural holding companies.

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 Soil Science

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

1. Knowledge

- **1.1.** Demonstrate advanced knowledge of soil formation processes, soil morphology, chemistry, physics, microbiology, and soil classification systems.
- **1.2.** Understand state laws, agricultural policies, land cadastre standards, and environmental regulations governing soil and land resource conservation in Uzbekistan.
- **1.3.** Explain principles of soil degradation mechanisms (salinization, erosion, compaction, contamination), soil reclamation techniques, and organic farming principles.
- **1.4.** Demonstrate knowledge of modern analytical chemistry equipment, spectroscopy, field sampling protocols, and GIS/remote sensing spatial tools used in soil research.
- **1.5.** Recognize the impact of climate change, irrigation practices, and industrial activities on soil health, carbon cycles, and agricultural sustainability.

2. Skills

- **2.1.** Conduct comprehensive field soil surveys, excavate and describe soil profiles, and construct thematic digital soil maps using GIS platforms.
- **2.2.** Perform qualitative and quantitative chemical, physical, and biological analyses of soil samples using modern laboratory instrumentation.
- **2.3.** Formulate agrochemical strategies, fertilizer application plans, and precision farming models based on soil testing and crop nutrient needs.

- **2.4.** Develop biological, chemical, and engineering reclamation projects to restore degraded, salinized, or eroded soils.
- **2.5.** Prepare professional soil research reports, land evaluation certificates, scientific publications, and agricultural project proposals.
- **2.6.** Effectively present soil research data, land management strategies, and environmental warnings to farmers, policy-makers, and scientific audiences in national and foreign languages.

3. Competences

- **3.1. Soil & Research Competence** – Conduct independent, scientifically rigorous, and safe field and laboratory research to solve fundamental and applied soil science problems.
- **3.2. Land Resource Management Competence** – Manage soil testing laboratories, direct land quality monitoring projects, and evaluate soil fertility in agricultural enterprises and government agencies.
- **3.3. Methodological & Educational Competence** – Teach soil science and agronomy subjects at academic institutions using interactive field and laboratory training methods.
- **3.4. Agricultural Leadership Competence** – Lead multidisciplinary teams in land reclamation campaigns, agro-cluster soil management, and sustainable land stewardship projects.
- **3.5. Ethical & Environmental Competence** – Demonstrate high ethical standards, environmental responsibility, and dedication to sustainable soil conservation and food security.
- **3.6. Lifelong Learning Competence** – Continuously upgrade technical, laboratory, and remote sensing qualifications through ongoing scientific research, international soil science conferences, and specialized training programs.