NAVOI STATE UNIVERSITY

TRMQ2306 NATURAL RESOURCE CONSERVATION — COURSE SYLLABUS

Faculty of Natural Sciences & Medicine | Department of Biology | Master's Program: 70520202 Ecology

COURSE PASSPORT & ACADEMIC METADATA

Course Title:	Natural Resource Conservation	**Course Code:**	TRMQ2306
Course Type:	Elective (Master's)	**Field of Study:**	500000 Natural Sciences / 520000 Environment
Program:	70520202 Ecology (Master's Degree)	**Academic Year:**	2026–2027
Semester:	3 (Autumn)	**Form of Education:**	Full-time (Uzbek)
ECTS Credits:	6 ECTS Credits	**Total Workload Allocation:**	180 Hours (44 Lectures, 46 Practical, 90 Independent)
Assessment:	Examination	**Aligned UN SDGs:**	SDG 15 (Life on Land), SDG 13 (Climate Action), SDG 6 (Clean Water)



1. Course Description & Scope

The course 'Natural Resource Conservation' (TRMQ2306) covers scientific, theoretical, and practical principles for the rational use and protection of natural resources (water, land, flora, fauna, and mineral deposits). Master's students examine global and regional ecological crises, land degradation, Aral Sea disaster mitigation, biodiversity protection, environmental law, and international conservation frameworks.

In alignment with SDG 15 (Life on Land), SDG 13 (Climate Action), and SDG 6 (Clean Water & Sanitation), the course develops advanced analytical skills to design sustainable ecosystem management strategies and ecological startup projects.

2. Course Aims & Professional Competencies

Course Aim: To develop scientific-theoretical knowledge, practical analytical skills, and professional competencies in natural resource conservation, biodiversity preservation, and sustainable environmental governance.

- **Knowledge:** Understand theoretical foundations of natural resource protection, human-nature interaction laws, environmental safety, and national/international conservation legislation.
- **Analytical Skills:** Evaluate water/soil chemical parameters, conduct Remote Sensing & GIS mapping of soil degradation, track bioresources, and measure ecological indicators.
- **Conservation Applications:** Design melioration strategies for disaster regions (Aral Sea basin), establish phytomelioration belts, and formulate ecological startup solutions.
- **SDG Competencies:** Develop cross-border ecological collaboration protocols, implement Red Data Book protection plans, and support United Nations SDGs.

3. Prerequisites

Prerequisites: Rational Use of Biological Resources (BROF1106), Ecological Risks (EKXA), Theoretical Foundations of Ecological Problems (EMNA2206).

4. Course Structure & Workload Allocation

Activity Type	Curriculum Focus	Total Hours Allocation
Lectures	Theoretical Foundations & Resource Dynamics	44 Contact Hours
Practical Classes	Biochemical Analysis & GIS Degradation Mapping	46 Contact Hours
Independent Study	Research Projects, GIS Remote Sensing & Case Studies	90 Self-Directed Hours
Total Workload	**Full Academic Module**	**180 Hours Total (6 ECTS)**

5. Detailed Course Curriculum Outline

5.1 Lecture Syllabus Outline

- **L1: Introduction & Fundamentals of Conservation:** Subject history, human-nature interaction evolution, ecological laws, and environmental factors. [A1, A3, A4]
- **L2: Causes and Consequences of Ecological Crises:** Global crisis, anthropogenic impacts, environmental degradation, and risk evaluation. [A2, A3, Q2]
- **L3: Rational Use of Natural Resources:** Exhaustible/inexhaustible, renewable/non-renewable assets, resource conservation principles, environmental economics. [A2, A4, A5]

- **L4: Demographics, Urbanization & Sustainability:** Population explosion, urban ecology, megapolis issues, pollution, sustainable development concept. [A3, Q4, Q5]
- **L5: Atmosphere Structure & Air Quality Protection:** Ozone layer depletion, greenhouse effect, climate warming, industrial emission control. [A3, A4, Q2]
- **L6: Water Resources & Hydrosphere Protection:** Freshwater deficit, inner water basin pollution, Aral Sea disaster, biochemical water monitoring. [A2, A4, A6]
- **L7: Pedosphere & Soil Conservation:** Soil organic carbon, erosion dynamics (water/wind), salinization, desertification, remote sensing monitoring. [A2, A3, A4]
- **L8: Biosphere & Biodiversity Conservation:** Flora/fauna evolution, food chains, Red Data Book, endemic/relict species preservation. [A1, A2, Q3]
- **L9: Biological Resources of Uzbekistan:** Flora and fauna objects, afforestation in arid regions, reserves, national parks, and sanctuaries. [A1, A4, Q1]
- **L10: Mining Industry & Subsoil Impact:** Lithosphere, mining environmental risks, heavy metal contamination, land recultivation. [A4, A5, Q7]
- **L11: Mineral Raw Materials & Waste Management:** Strategic mineral deposits, metallurgical pollution, zero-waste processing technologies. [A4, A5, Q1]
- **L12: Natural & Anthropogenic Landscapes:** Landscape ecological capacity, multi-row shelterbelts in sandy arid areas against garmsel winds. [A3, A6, Q5]
- **L13: Practical Measures for Nature Conservation:** Engineering ecology, EIA expertise, monitoring technologies, agricultural resource saving. [A1, A2, A4]
- **L14: Legal & Organizational Frameworks in Uzbekistan:** Environmental legislation, ecological education, public monitoring, KPI assessment. [A4, Q1, Q6]
- **L15: International Cooperation in Conservation:** UNEP, CIS agreements, global conventions, university-industry ecological project integration. [A1, A2, Q2]

5.2 Practical & Laboratory Outline

- Analyzing the distribution state of natural resources across Uzbekistan regions.
- Studying atmospheric composition and air pollution detection methods.
- Biochemical water analysis: Determining water pollution indices and sample parameters.
- Aral Sea disaster analysis: Evaluating meliorative state improvements in the Aral region.
- Soil melioration analysis: Identifying soil degradation drivers and rehabilitation methods.
- Mapping protected flora and fauna species distribution across Uzbekistan regions.
- Evaluating subsoil mining impacts and mineral resource spatial distribution.
- Analyzing mining industry impacts on natural desert and mountain landscapes.
- Human impact analysis on natural/anthropogenic landscapes and ecological stability.
- Analyzing environmental education frameworks and public conservation organization activities.
- Evaluating Uzbekistan's CIS and international cross-border ecological agreements.

5.3 Independent Study & Research Tasks

- MT1: Analyzing soil degradation & organic carbon in Lower Zarafshon river basin using Remote Sensing & GIS technologies. (20 Hours)

- MT2: Designing multi-row shelterbelts in arid desert zones against garmsel winds to combat desertification. (10 Hours)
- MT3: Formulating a university-industry roadmap for zero-waste technology in chemical/metallurgical plants. (10 Hours)
- MT4: Modeling student ecological startup projects (resource-saving agrotech / biodiversity) & writing KPI evaluation frameworks. (20 Hours)
- MT5: Researching international experience (UN, UNEP, CIS) in preserving endangered species under global climate change. (10 Hours)
- MT6: Monitoring biochemical water parameters & evaluating phytomelioration efficiency on the dried Aral seabed. (20 Hours)

6. Recommended Literature & Information Sources

- Primack, R. B. (2014). Essentials of Conservation Biology (6th ed.). Sinauer Associates (TOP-300 University Textbook).
- Sodhi, N. S., & Ehrlich, P. R. (Eds.). (2010). Conservation Biology for All. Oxford University Press (TOP-300 University Textbook).
- Ergashev, A. (2003). General Ecology [Textbook]. Tashkent.
- Sultonov, P. S. (2007). Fundamentals of Ecology and Environmental Protection [Textbook]. Tashkent.
- Monson, R. K. (2014). Ecology and the environment. Springer.
- Mirziyoyev, Sh. M. (2021). New Uzbekistan Strategy. Tashkent.
- Ministry of Ecology, Environmental Protection and Climate Change of Uzbekistan: https://www.uznature.uz