NAVOI STATE UNIVERSITY

TEM23044 SOIL EROSION AND MELIORATION — COURSE SYLLABUS

Faculty of Natural Sciences and Medicine | Department of Biology | Master's Programme: 70810203 Soil Science

COURSE PASSPORT & ACADEMIC METADATA

Course Title:	Soil Erosion and Melioration	**Course Code:**	TEM23044
Course Type:	Elective (Master's)	**Field of Study:**	800000 Agriculture, Forestry, Fisheries and Veterinary Science / 810000 Agriculture
Programme:	70810203 Soil Science (Master's Degree)	**Academic Year:**	2026–2027
Semester:	3	**Form of Education:**	Full-time; Uzbek
ECTS Credits:	4 ECTS Credits	**Total Workload:**	120 Hours (30 Lectures, 30 Practical, 60 Independent Study)
Curriculum Reference:	70810203–2.04	**Weekly Contact Hours:**	4
Assessment:	Final written examination	**Aligned UN SDGs:**	SDG 15 (Life on Land); SDG 2 (Zero Hunger); SDG 13 (Climate Action)







1. Course Description & Scope

The course “Soil Erosion and Melioration” (TEM23044) introduces the theoretical and practical foundations of soil erosion processes and land melioration. It develops knowledge and skills for protecting soil resources, restoring degraded land, and planning appropriate meliorative measures. Students examine the causes and development of water and wind erosion, prevention and mitigation methods, and degradation processes in irrigated agriculture, including salinization and waterlogging. The course also introduces modern monitoring and GIS technologies for assessing and forecasting erosion risks.

The course supports sustainable soil management, restoration of degraded land, improved agricultural productivity, and climate resilience. Its strongest alignment is with SDG 15 (Life on Land), with additional relevance to SDG 2 (Zero Hunger) and SDG 13 (Climate Action).

2. Course Aims & Professional Competencies

Course Aim: To develop theoretical knowledge, practical skills, and professional competencies in soil erosion processes, soil melioration, land conservation, and the rehabilitation of degraded soils.

- **Knowledge:** Explain the types, causes, and development patterns of soil erosion; understand soil protection measures, melioration systems, and soil degradation processes.
- **Analytical Skills:** Assess erosion risks, interpret soil and land-condition information, use relevant sources systematically, and understand the application of monitoring and GIS technologies.
- **Conservation Applications:** Select appropriate agro-technical, forest-meliorative, and hydraulic measures; contribute to land reclamation and soil fertility restoration planning.
- **SDG Competencies:** Relate soil conservation and land restoration practices to sustainable agriculture, terrestrial ecosystem protection, and climate-change adaptation.

3. Prerequisites

Required prior knowledge: Biological Diagnostics of Soils (TBDM1104) and Soil Monitoring (TMM1206).

4. Course Learning Outcomes

1. Explain the theoretical foundations, types, and causes of soil erosion.
2. Identify soil conservation and melioration measures and explain their appropriate applications.
3. Describe current developments and prospects in soil melioration and the specific conditions affecting the selection of meliorative measures.
4. Select suitable agro-technical, forest-meliorative, and hydraulic measures for erosion control.
5. Find, assess, and systematically use information from relevant sources to address professional tasks related to soil erosion and melioration.

5. Course Structure & Workload Allocation

Activity Type	Curriculum Focus	Total Hours Allocation
Lectures	Theoretical foundations of erosion, causes, impacts, and melioration approaches	30 contact hours
Practical Classes	Erosion assessment, soil condition analysis, planning conservation and melioration measures	30 contact hours
Independent Study	Research, analysis of local land degradation, and preparation of reports/presentations	60 hours
Total Workload	**Complete academic module**	**120 hours total (4 ECTS)**

Note: The detailed lecture and practical topic list is omitted in this syllabus summary, following the requested format.

6. Independent Study Tasks

- Theoretical foundations of soil erosion and melioration (10 hours)
- Collecting and analyzing information on eroded land in local areas (10 hours)
- Analyzing salinization and waterlogging issues in irrigated land (10 hours)
- Preparing a reference report on modern agro-technical and hydraulic erosion-control measures (10 hours)
- Preparing a presentation on national programmes and projects for protecting Uzbekistan's land resources (10 hours)
- Analyzing methods for measuring and assessing soil moisture (10 hours)

7. Teaching Technologies & Methods

- Lectures and guided discussion
- Practical or laboratory activities followed by interpretation of results
- Case studies
- Group work
- Brainstorming
- Student presentations
- Collaborative project work

8. Requirements for Earning Course Credits

Students are expected to master the theoretical and methodological concepts of the course, present and interpret analytical results correctly, demonstrate independent reasoning about the processes studied, complete assigned coursework and independent tasks, and submit the final written examination.

9. Assessment Criteria

- **Excellent (5):** Demonstrates comprehensive understanding of the course; explains concepts accurately and logically; relates theory to practical applications; answers questions clearly; completes independent assignments fully; demonstrates relevant practical competencies and applies knowledge to different situations.
- **Good (4):** Understands the main concepts and their practical significance; explains topics with adequate scientific and logical consistency; answers questions correctly and completes assigned tasks and independent work.
- **Satisfactory (3):** Demonstrates a general understanding of the subject but gives limited explanations, may make some errors or show gaps in reasoning, and demonstrates partial achievement of course tasks.
- **Unsatisfactory (2):** Shows insufficient preparation or understanding; fails to complete independent tasks; provides substantially incorrect or unclear answers, or demonstrates serious errors in submitted work.

10. Recommended Literature & Information Sources

Core Literature

6. Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan. (2024). Soil Erosion and Methods of Its Prevention [Study Guide].
7. Ministry of Higher Education, Science and Innovation of the Republic of Uzbekistan. (2024). Fundamentals of Soil Science and Soil Melioration [Textbook].
8. Haney, R. L., & Haney, E. B. (2020). Fundamentals of Soil Ecology. Excelic Press.

Additional Literature

9. Yormatova, D. Yo., & Xushvaqtova, X. S. (2018). Ecology and Nature Protection [Textbook]. Fan va texnologiya, Tashkent.
10. Morgan, R. P. C. (Ed.). Soil Erosion and Conservation.

Information Sources

- Food and Agriculture Organization of the United Nations (FAO): https://www.fao.org
- United Nations Convention to Combat Desertification (UNCCD): https://www.unccd.int
- Ministry of Agriculture of the Republic of Uzbekistan: https://www.agro.uz

11. UN Sustainable Development Goals (SDG) Alignment

- **SDG 15 — Life on Land (Primary alignment):** Prevention of soil erosion and land degradation, rehabilitation of degraded soils, protection of soil ecosystems, and sustainable land management. Relevant indicator area: 15.3.1, proportion of land that is degraded over total land area.
- **SDG 2 — Zero Hunger:** Protection of soil fertility and sustainable agricultural production through erosion control, salinity management, and land rehabilitation. Relevant indicator area: 2.4.1, area under productive and sustainable agriculture.
- **SDG 13 — Climate Action:** Assessment of climate-related effects on erosion and land degradation, including changing rainfall patterns, drought, and desertification; supports adaptation and land resilience.

The SDG links above are suggested alignments based on the course content; the stated global indicators are related areas of relevance rather than claims that the course directly measures those indicators.