NAVOI STATE UNIVERSITY

BETT2404 SUSTAINABLE ECOLOGICAL DEVELOPMENT EDUCATION — COURSE SYLLABUS

Faculty of Natural Sciences & Medicine | Department of Biology | Program: 60110901 Biology & Additional Natural Sciences

COURSE PASSPORT & ACADEMIC METADATA

Course Title: Sustainable Ecological Development Education

Course Code: BETT2404

Course Type: Elective

Field of Study: 100000 Education

Field: 110000 Education

Program: 60110901 Biology & Additional Natural Sciences

Academic Year: 2026–2027

Semester: IV

Form of Education: Full-time

Language: Uzbek

Total Workload Allocation: 120 Hours (60 Contact, 60 Independent Study)

Credits: 4 ECTS

Aligned UN SDGs: SDG 4 (Quality Education), SDG 12 (Responsible Consumption), SDG 13 (Climate Action), SDG 15 (Life on Land)









1. Course Description & Pedagogical Framework

This course equips prospective biology teachers with pedagogical strategies to integrate Education for Sustainable Development (ESD) and environmental ethics into secondary and higher education curricula. Students explore UN/UNEP/UNESCO frameworks, Rio Declarations, Agenda 2030, PISA/TIMSS eco-literacy frameworks, and ecological crisis resolution.

In alignment with SDG 4, 12, 13, and 15, the curriculum fosters ecological culture, environmental responsibility, and innovative pedagogical design for future natural science educators.

2. Course Aims & Teaching Competencies

Course Aim: To develop professional competencies in designing ESD lesson plans, applying interactive eco-pedagogical methods, analyzing global/regional environmental crises, and cultivating eco-literacy in student youth.

- Pedagogical Competency: Master ESD principles, UNESCO guidelines, PISA/TIMSS eco-literacy assessment frameworks, and interdisciplinary natural science teaching.
- Environmental Literacy: Understand global climate change, transboundary pollution, ozone depletion, Aral Sea disaster, and biodiversity conservation.
- Methodological Competency: Design interactive ESD learning modules, case studies, project-based eco-campaigns, and debate simulations.
- SDG & Cultural Competencies: Instill environmental spirituality, sustainable lifestyle values, and active citizenship among youth (SDG 4, SDG 12, SDG 13).

3. Prerequisites

Prerequisites: Fundamentals of Ecology, Social Ecology, Economic Theory, Environmental Economics, Pedagogy & Psychology.

4. Course Structure & Workload Allocation

Activity Type	Curriculum & Pedagogical Focus	Workload Allocation
Lectures	ESD Theory, UN/UNEP Frameworks & Policy	30 Hours
Practical / Seminars	Interactive Pedagogical Simulations & Debates	30 Hours
Independent Study	Lesson Plans, Case Studies & Eco-Projects	60 Hours
Total Workload	Full Pedagogical Elective Module	120 Hours (4 ECTS)

5. Detailed Course Curriculum Outline

5.1 Lecture Syllabus Outline

• **L1: Introduction & International Assessment Frameworks (PISA, PIRLS, TIMSS):** Evaluating educational quality and eco-literacy in natural sciences via PISA/TIMSS frameworks.

• **L2: Subject Matter, Aims & Evolution of ESD:** Definition, scope, historical development, and interdisciplinary role of Sustainable Ecological Development Education.

• **L3: UN Sustainable Ecological Development Frameworks:** UN conventions, regional environmental safety analysis, and international environmental governance.

• **L4: UN Environment Programme (UNEP) Principles & Scope:** UNEP structure, global environmental monitoring, and sustainable resource management goals.

• **L5: Global Earth Summits: Rio Declaration & Agenda 21:** Historical Earth Summits, Rio principles on environment & development, and Agenda 21 implementation.

• **L6: UN Agenda 2030 & The 17 Sustainable Development Goals:** Detailed analysis of SDG 4, SDG 12, SDG 13, SDG 15 and their integration into education.

• **L7: International Ecological Cooperation & Global Conventions:** Bilateral and multilateral agreements, UNFCCC, CBD, UNCCD, and Uzbekistan's international role.

• **L8: Socio-Economic & Ecological Interactions in Human History:** Historical evolution of human-nature relationships, industrial impacts, and ecological balance.

• **L9: Sustainable Resource Management & Biodiversity Protection in 3rd Millennium:** Conserving real/potential natural resources, healthy gene pool, and species diversity.

• **L10: Global Ecological Security Challenges I (Atmosphere & Energy):** Air pollution, ozone depletion, transboundary pollution, fresh water and clean energy management.

• **L11: Global Ecological Security Challenges II (Soil & Demographics):** Soil erosion, waste management, demographic explosion, nuclear risk, and land degradation.

• **L12: Practical Significance of UN Framework Convention on Climate Change (UNFCCC):** Mechanisms of climate change mitigation, carbon emission reduction, and adaptation policies.

• **L13: Forming Youth Ecological Spirituality & Culture:** Role of environmental education, ethics, consciousness, and active citizenship in ESD.

• **L14: National Environmental Legislation & Policy in Uzbekistan:** Review of national laws on nature protection, water, air, waste, and protected areas.

• **L15: Concept for Development of Environmental Education in Uzbekistan (2019):** Decree implementation, coordinating ESD across educational institutions, enterprises, and NGOs.

5.2 Practical & Seminar Discussion Outline

- Analyzing principles, aims, and objectives of BETT2404 via cluster and mind-mapping methods.
- Designing educational eco-projects based on UN Sustainable Ecological Development Programme priorities.
- Formulating project proposals aligned with UNEP grant criteria and international standards.
- Debate simulation on the modern relevance of Earth Summits, Agenda 21, and Rio Declaration principles.
- Exploring legal and environmental dimensions of the Sustainable Development concept.
- Analyzing eco-financial mechanisms and green funding sources for environmental sustainability.
- Evaluating Millennium Development Goals (MDGs) transition to Sustainable Development Goals (SDGs).
- Analyzing climate change impacts on local and regional ecosystems using real-time data.
- Developing national action plan proposals based on Vienna Convention and Montreal Protocols.

- Brainstorming practical solutions and policy proposals for global ecological security risks.
- Classifying atmospheric pollution sources (chemical, biological, transport, municipal).
- Case-study analysis on land degradation, water contamination, and industrial environmental impacts.
- Formulating practical guidelines and field measures for soil conservation and erosion control.
- Analyzing statistical data and mitigation measures for freshwater scarcity and the Aral Sea crisis.
- Final project defense: Presenting comprehensive ESD lesson plans and regional green strategies.

5.4 Independent Study & Analytical Projects

- Stages of ESD evolution and primary functions of UNEP in global environmental education.
- Analytical report on Rio Declaration principles and modern environmental governance.
- Critical essay on sustainable development, economic growth, and ecological balance.
- Implementation strategies for Agenda 21 in halting environmental degradation.
- Designing measures for 21st-century sustainable living and community green initiatives.
- History and significance of UN International Mother Earth Day (April 22).
- Comparative study on UN member states and evolving international climate treaties.
- Role of international organizations in maintaining global environmental peace and security.
- Essay on balanced development theories and ecological footprint reduction.
- Formulating practical pathways for nature conservation in Uzbekistan.
- Researching atmospheric pollution impacts on human health and protective measures.
- Soil ecology: Land degradation problems, legal protections, and soil conservation methods.
- Flora conservation: Ecological role, biodiversity value, and protection of plant species.
- Fauna protection: Wildlife conservation, ecosystem roles, and Red Book strategies.
- Industrial impact assessment on land, water resources, and local ecosystems.
- Comparative analysis of environmental security and sustainable growth frameworks.
- Research paper on international cooperation in addressing Central Asian ecological challenges.
- Group project: Sustainable development problems, innovative solutions, and future prospects.
- Analysis of the 1992 Rio Earth Summit on Environment and Development.
- Conceptual review of sustainable development models in developing economies.
- Evaluating alternative renewable energy sources (solar, wind, biogas) in Uzbekistan.
- Mitigation strategies for Aral Sea ecological disaster and Aral Sea basin restoration.
- Electromagnetic field radiation: Environmental impacts and safety protocols.
- Comparative study of the world's cleanest eco-cities and urban sustainability models.
- Stages and types of state and civic environmental control in Uzbekistan.
- Ecological dimensions of sustainable development in national economic planning.
- Action plan evaluation for Agenda 21 and 21st-century environmental resilience.

6. Recommended Literature & Information Sources

- UN Key Factors. Tashkent, 2001.
- UNECE Strategy for Education for Sustainable Development. Tashkent, 2007.

- Azizov A.A., Akishina N.G. Education for Sustainable Development. Tashkent, 2008.
- Nigmatov A.N. Nature, Society, Spirituality: Ecological Issues in Presidential Works. Tashkent: O'zbekiston, 2009.
- Nigmatov A.N. et al. Ecological Aspects of Sustainable Development. Tashkent: Bioekosan, 2004.
- Nigmatov A.N. From Environmental Education to Education for Sustainable Development. Tashkent, 2007.
- Mamashokirov S., Usmonov E. Ecological Security Issues of Sustainable Development. Tashkent: Fan, 2009.
- Tursunov X.T. Ecology and Sustainable Development. Tashkent, 2009.
- Xo'janazarov O'.E. et al. Ecology and Sustainable Development Education. Tashkent: Navro'z, 2014.
- Ergashev A. General Ecology (Textbook). Tashkent: O'qituvchi, 2003.