NAVOI STATE UNIVERSITY

ET404 EVOLUTIONARY THEORY — COURSE SYLLABUS

Faculty of Natural Sciences & Medicine | Department of Biology | Program: 60110900 Biology

COURSE PASSPORT & ACADEMIC METADATA

Course Code: ET404

Course Title: Evolutionary Theory

Course Type: Elective Course (60110900-2.15)

Field of Knowledge: 100000 Education

Field of Education: 110000 Education

Field of Study: 60110900 Biology

Academic Year: 2026–2027

Semester: VIII

Form of Education: Full-time

Language of Instruction: Uzbek / Kazakh / Russian

Total Workload Allocation: 120 Hours Total (60 Classroom Contact Hours: 20 Lectures, 40 Seminars + 60 Independent Study)

Credits: 4 ECTS

Aligned UN SDGs: SDG 13 (Climate Action - Adaptation & Evolutionary Dynamics), SDG 15 (Life on Land - Biodiversity Origin, Speciation & Ecosystem Stability)





1. Course Purpose & Alignment with UN Sustainable Development Goals (SDGs)

The course aims to provide students with a comprehensive scientific understanding of organic evolution, driving forces of natural selection, macro- and microevolutionary mechanisms, and the origin and development of life on Earth.

The course directly maps to key UN SDGs for THE Impact Rankings:

• SDG 13 (Climate Action): Analyzes evolutionary adaptation strategies, adaptive shifts, and population dynamics under rapid environmental and climate stress.

• SDG 15 (Life on Land): Examines the origins of terrestrial biodiversity, speciation pathways, phylogenetic relationships, and ecosystem stability.

2. Intended Learning Outcomes (LO)

Upon completing the course, students will master the following competencies:

- LO1–LO2 (Professional Knowledge): Thorough understanding of evolutionary history, Lamarckian and Darwinian paradigms, synthetic theory of evolution (STE), population genetics, geochronology, and human origin (anthropogenesis).
- LO3–LO4 (Practical Skills): Ability to differentiate species criteria, analyze natural selection dynamics, construct evolutionary models, and evaluate population adaptiveness.

3. Prerequisites

Prerequisites: Cytology, Histology & Embryology (SGE11208), Biochemistry and Molecular Biology (BVM13408).

4. Course Structure & Workload Allocation

Semester / Academic Activity	Curriculum Focus & SDG Analytical Focus	Workload Allocation
Semester VIII: Interactive Lectures (M)	20 Hours of Core Theoretical Instruction	20 Contact Hours
Semester VIII: Seminars (S)	40 Hours of Practical Seminars & Case Analysis	40 Contact Hours
Semester VIII: Independent Study	90 Hours of Analytical Assignments & Evolutionary Projects	60 Hours
Total Workload (ET404 Module)	Full Academic Module (SDG Aligned)	120 Hours Total (4 ECTS)

5. Detailed Course Curriculum Outline

5.1 Lecture Syllabus Outline

• **M1: Introduction to Evolutionary Theory:** Definition, principles, interdisciplinary connections, history of evolutionary thought, and fundamental problems.

• **M2: History of Evolutionary Thought:** Ancient philosophy, XVIII-XIX century transformism, Linnaeus, Lamarckian theory, and socio-economic prerequisites of Darwinism.

• **M3: Darwinian Driving Forces of Evolution:** Variation, heredity (pangenesis hypothesis), artificial selection, domestication, and origin of breeds/varieties.

• **M4: Organic World as an Objective Process:** Levels of biological organization, theoretical biology axioms, discrete vs. holistic nature, and biotic potential.

• **M5: Development of Life across Geologic Eras (SDG 15):** Archean, Proterozoic, Paleozoic, Mesozoic, and Cenozoic eras; geochronological scale and key aromorphoses.

• **M6: Main Directions of Evolution:** Biological progress vs. regress; aromorphosis, idioadaptation, general degeneration and their interrelations.

• **M7: Microevolution Theory & Population Structure:** Population as the elementary unit of evolution, genetic/ecological structure, and population dynamics.

• **M8: Natural Selection & Adaptive Mechanisms (SDG 13):** Factors and forms of natural selection (stabilizing, directional, disruptive); mimicry, protective coloration, and adaptive relativity.

• **M9: Speciation & Species Criteria (SDG 15):** Species concept, criteria (morphological, physiological, genetic, geographic), allopatric, sympatric, and phyletic speciation.

• **M10: Anthropogenesis & Human Origin:** Systematic position of Homo sapiens, Ramapithecus, Australopithecus, Neanderthals, race origins, and biosphere evolution.

5.2 Laboratory & Practical / Seminar Sessions Outline

- Analyzing ancient Eastern and Greek philosophical views on natural history.
- Evaluating Carl Linnaeus's taxonomy and its role in biological systematics.
- Comparative analysis of J.B. Lamarck's evolutionary theory.
- XIX century scientific discoveries laying foundations for Darwinism.
- Role of biogeography, embryology, and comparative anatomy in supporting evolutionary theory.
- Mechanisms of natural selection and artificial selection in domesticated species.
- Geochronology, era boundaries, and major aromorphoses in Earth history.
- Analyzing species structure, population variation, and reproductive isolation mechanisms.
- Homologous and analogous organs: Structural and functional evolutionary evidence.
- Human evolution stages: Fossil hominid comparative skeletal analysis.

5.3 Independent Study Assignments

- History of natural science development in medieval Central Asia (Ibn Sina, Al-Biruni).
- Contributions of Uzbek scientists to evolutionary biology and genetics.
- Core principles of Charles Darwin's theory: Heredity, variation, struggle for existence.
- Comparative analysis of contemporary scientific literature on evolutionary transitional forms.
- Human racial unity, critique of social Darwinism, and future evolutionary dynamics.

6. Recommended Literature & Information Sources

- Gofurov A.T., Fayzullayev S.S. Genetics and Evolutionary Theory. Tashkent, 2013.
- Zhuravlev A.Yu. Adventures of Species: Transitional Forms in Animal Evolution. Alpina Non-Fiction, 2021.
- Markov A.V., Naimark E.B. Human Evolution: Bones, Genes, and Culture. Corpus, 2022.
- Yablokov A.V., Yusufov A.G. Evolutionary Theory (Higher School Textbook). Moscow, 2020.