

Bachelor's Track Program: Earth and Environmental sciences

1. Open Doors winner's skill set

Winning the Open Doors competition requires a firm grasp of earth and environmental science concepts:

- structure and characteristics of Earth's geosphere and biosphere;
- geological processes occurring on Earth's surface and in its interior;
- global relationships between biosphere components and substance circulation;
- basic chemical reactions of the carbon cycle and biogeochemical balance;
- interaction of living organisms with the environment; structure of ecosystems and the biosphere as a global ecosystem;
- global environmental problems and sustainable human development goals; modern sustainability strategies, including preventive measures and adaptation to climate change; resource conservation; carbon economy; circular economy.

The winner is expected to demonstrate a solid command of the following skills:

- assessing the availability of resources for human needs;
- identifying minerals, rocks, and ores; interpreting spatial and geological patterns;
- evaluating the state of natural objects by comparing their characteristics with specified norms;
- establishing cause-and-effect relationships between human impacts on natural systems and changes in their condition.

2. List of degree programs covered by the subject area

2.1. List of bachelor's programs

05.03.01 Geology

05.03.02 Geography

05.03.03 Cartography and Geoinformatics

05.03.04 Hydrometeorology

05.03.06 Ecology and Nature Management

21.03.01 Petroleum Engineering

3. Content

Field of science 1. Geology

Geography

1. Planet Earth, its structure, composition and history of development: basic concepts of the formation, structure and composition of the Earth; cumulative geographical sciences (cartography, geoinformatics, geoecology). Main stages of the Earth's development; Earth's crust and its composition..

Geography, mathematics, and physics

2. Tectonics and structural geology, physical phenomena and geometry of geologic bodies: basic concepts of the tectonic structure and development of Earth. Dynamics and kinematics. Thematic maps: geographic, topographic, tectonic, and structural. Plane and solid geometric figures and their spatial relationships. Basic concepts of rock occurrence forms in Earth's crust.

Geography, mathematics, and chemistry

3. Mineral deposits and energy resources, varieties and mathematical modeling: basic information on varieties and classifications of mineral deposits. Fundamentals of energy resource varieties and classifications. Chemical elements and their compounds. Chemical and physical properties of natural substances—minerals and rocks.

Field of science 2. Geochemistry and geophysics

Geography

1. Earth's crust and its composition. Most common minerals and rocks. Physical and chemical concepts, regularities, phenomena, and processes. Most common minerals and rocks.

Chemistry

2. Geochemistry: relationship between geology and chemistry; diversity of chemical elements (Mendeleev's Periodic Table of Chemical Elements) and isotopes; their distribution within the Earth and on its surface. Chemical properties of inorganic and organic substances; regularities and laws; main academic and applied tasks of geochemistry. Basic chemical reactions of the carbon cycle.

Physics and mathematics

3. Geophysics: relationship between geology and physics; basic understanding of physical processes and physical properties on Earth. Physical laws discovered under terrestrial conditions and their effects in the Universe. Physical phenomena, processes, regularities, and laws. Theoretical and applied aspects of geophysics. Geophysical methods for studying the Earth and exploring mineral resources.

Field of science 3. Meteorology and atmospheric sciences**Geography and physics**

1. Structure, properties, and functions of the atmosphere; concepts of atmospheric structure. Component composition of the modern atmosphere and its formation history. Changes in atmospheric temperature with altitude. Movement of air masses in the atmosphere. Role of the atmosphere in the global circulation of substances. Role of water vapor in the microclimate. Ozone layer and issues related to its depletion and transformation. Methods for studying the state of the atmosphere. Sustainable development goals concerning atmospheric quality and air pollution reduction.

Geography and physics

2. Climatology and meteorology. Modern climate and challenges of its change: concepts of weather and climate. Insights into meteorological conditions and their role in the functioning of living systems and economic entities. Climate change in the history of Earth. Greenhouse gases and their impact on the Earth's climate. Climate change manifestations and their consequences; strategies for adaptation to climate change.

Geography, chemistry, and physics

3. Atmospheric pollution and its prevention: models of pollutant distribution in the atmosphere. Natural and anthropogenic pollution sources and their contributions to atmospheric air quality deterioration. Consequences of atmospheric pollution: characteristics and examples from different regions of the world. Concepts of atmospheric quality and related standards. Technologies for protecting the atmosphere from harmful emissions. Main atmospheric quality issues in different regions of the world.

Field of science 4. Environmental sciences**Physics, chemistry, and geography**

1. Fundamentals of ecology: living organisms and their environments. Properties and structure of populations. Impact of environmental factors on organisms. Community ecology. Ecosystem structure. Succession. Biological diversity.

Geography

2. Nature management: natural conditions and resources. Types of nature management. Environmental and economic approach to solving nature management problems. Environmental aspects of nature management.

Field of science 5. Physical geography

Geography and mathematics

1. Earth climate: climate-forming factors; types of Earth climate. Human impact on Earth climate.

Geography

2. Landscapes and relief. Geological structure: concept of relief, endogenous and exogenous processes, relief-forming factors, relief types. Natural landscape classification; anthropogenic landscapes; natural and anthropogenic landscape-forming factors.

3. Fauna and flora; their distribution across the planet's surface. Biogeography of oceans and seas.

Geography and mathematics

4. Basics of cartography: scales and their types. Cartographic projections. Sheet division and nomenclature of topographic plans and maps. Geographic and Cartesian point coordinates. Topographic maps and plans; relief depiction on topographic maps.

Field of science 6. Mining and mineral processing**Geography and chemistry**

1. Mineral deposits: basic information about varieties and classifications of mineral deposits. Basic concepts of Earth's formation, structure, and composition. Most common minerals and rocks. Visual characteristics of the main minerals and rocks; physical and chemical concepts, regularities, phenomena and processes; statistical regularities in the real world.

Geography, mathematics

2. Exploration and assessment of mineral deposits; types of mineral deposits. Plane and solid geometric figures; their main properties. Location of mineral deposits and their economically recoverable component. Properties of geometric figures and formulas for calculating volumes. Percentage of economically recoverable components and economic indicators. Statistical regularities in nature. Minerals: quality, quantity, reserves, and occurrence modes. Geographic, economic, and environmental conditions.

Mathematics, chemistry, geography, and physics

3. Mining of mineral deposits and its environmental impact: basic chemical and physical concepts, regularities, laws, and theories. Physical, mechanical, and chemical properties of natural materials. Geographical understanding of natural territorial and climatic conditions. Diversity of natural phenomena and processes: landslides and rockslides. Methods for mining solid, liquid, and gaseous mineral deposits: open-pit, underground, combined open-pit–underground, borehole methods; land and sea types.

Physics, chemistry, and geography

4. Processing of mineral deposits: basic chemical and physical concepts, regularities, laws, and theories. Fundamentals of mineral processing. Objectives of processing and technological effects of beneficiation; classification of beneficiation processes. Environmental impact of mining and mineral processing. Differences between primary and secondary mining methods.

Field of science 7. Ecology**Geography, chemistry and physics**

1. Fundamentals of ecology: living organisms and their environments. Properties and structure of populations. Impact of environmental factors on organisms. Community ecology. Ecosystem structure. Succession. Biological diversity. Planetary boundaries.

Geography and chemistry

2. Unity of the living world. Structural and functional foundations of life. Cell theory; cell structure; life processes in a cell; photosynthesis. Diversity of living organisms. Theory of evolution.

Geography

3. Biodiversity: biodiversity conservation for sustainable development and environmental protection. Classification of biological objects; species; species integrity and isolation; species criteria; relativity of species criteria; classification of living organisms.

4. Preparation materials

4.1. Recommended reading

Field of science 1. Geology

Reading list in English
1. Burzynski D., Ellis W. Fundamentals of Mathematics. Houston: OpenStax CNX, 2008. 699 p. URL: https://open.umn.edu/opentextbooks/textbooks/fundamentals-of-mathematics
2. Lant C. Natural Resources Sustainability: An introductory synthesis. Salt Lake City: Utah Education Network Digital Press with Pressbooks, 2023. 749 p. URL: https://open.umn.edu/opentextbooks/textbooks/natural-resources-sustainability-an-introductory-synthesis
3. Patrich J. Physical geography - Version 1. Santa Clarita: College of the Canyons, 2020. 295 p. URL: https://open.umn.edu/opentextbooks/textbooks/physical-geography

Field of science 2. Geochemistry and geophysics

Reading list in English
1. Flowers P., Theopold K., Langley R., Robinson W. Chemistry - 2e. Houston: OpenStax, 2019. 1207 p. URL: https://open.umn.edu/opentextbooks/textbooks/chemistry (free access).
2. Lant C. Natural Resources Sustainability: An introductory synthesis. Salt Lake City: Utah Education Network Digital Press with Pressbooks, 2023. 749 p. URL: https://open.umn.edu/opentextbooks/textbooks/natural-resources-sustainability-an-introductory-synthesis
3. Urone P.P., Hinrichs R., Dirks K. College Physics - 2e. Houston: OpenStax, 2022. 1679 p. URL: https://open.umn.edu/opentextbooks/textbooks/college-physics

Field of science 3. Meteorology and atmospheric sciences

Reading list in English
1. Holden J. Physical geography. The Basics. London and New York: Routhledge, Taylor & Francis Group, 2011. 168 p. URL: https://www.davcollegekanpur.ac.in/assets/ebooks/Geography/Physical%20Geography.pdf
2. Sokhi R.S. World atlas of atmospheric pollution. London, New York, Delhi: Anthem Press, 2008. 144 p. URL: https://libcats.org/book/1390783
3. Zehnder C., Manoylov K., Mutiti S., Mutiti C., VandeVoort A., Bennett D. Introduction to Environmental Science - 2nd Edition. Atlanta: University System of Georgia, 2018. 160 p. URL: https://open.umn.edu/opentextbooks/textbooks/562

Field of science 4. Environmental sciences**Reading list in English**

1. Ahad M.A., Ferdous A.S.M.A. A Textbook of Ecology. Dhaka: Himachal Publication, Bishal Book Complex, 2019. 95 p.
URL: https://www.researchgate.net/publication/360297819_A_Textbook_Of_Ecology
2. Odum E.P. Ecology: The Link Between the Natural and the Social Sciences. London: Holt, Rinehart and Winston, 1975. 260 p.
URL: <https://archive.org/details/ModernBiologySeriesEugenePleasantsOdumEcologyTheLinkBetweenTheNaturalAndTheSocial/page/n5/mode/2up>
3. Sunal D. et al. Forest, Land, and Water: Understanding Our Natural Resources. Natural Resources Education Series. Forest Service: Washington, D.C., 1992. 318 p.
URL: https://www.academia.edu/27770007/Forest_Land_and_Water_Understanding_Our_Natural_Resources_Natural_Resources_Education_Series

Field of science 5. Physical geography**Reading list in English**

1. Berdin V., Dobrolyubova Y., Gracheva E., Konstantinov P., Ryzhova N., Smirnova E., Zamolodchikov D. Climate Box: An interactive learning toolkit on climate change. Moscow: RA ILF publications, 2018. 256 p.
URL: https://www.undp.org/sites/g/files/zskgke326/files/migration/eurasia/Climatebox_textbook_EN.pdf
2. Huggett R.J. Fundamentals of Geomorphology - 3 e, London and New York: Routledge, 2011. 533 p. URL: https://sudartomas.wordpress.com/wp-content/uploads/2012/11/fundamentalsofgeomorphology_routledgefundamentalsofphysicalgeography.pdf
3. LotusArise. World distribution of Plants and Animals. UPSC, 2021. URL: <https://lotusarise.com/world-distribution-of-plants-and-animals-upsc/>
4. Patrich J. Physical geography - Version 1. Santa Clarita: College of the Canyons, 2020. 295 p. URL: <https://open.umn.edu/opentextbooks/textbooks/physical-geography>
5. Swanson F.J., Kratz T.K., Caine N., Woodmansee R.G. Landform Effects on Ecosystem Patterns and Processes. BioScience. Vol. 38. No. 2. P. 92–98.
URL: <https://andrewsforest.oregonstate.edu/sites/default/files/lter/pubs/pdf/pub718.pdf>
6. Uttar Pradesh Topographical Maps. Chapter 5. 2015. P. 50–68.
URL: <https://ncert.nic.in/textbook/pdf/kegy305.pdf>

Field of science 6. Mining and mineral processing**Reading list in English**

1. Armstrong James R. and Menon Raji. Mining and Quarrying. URL: <https://www.iloencyclopaedia.org/part-xi-36283/mining-and-quarrying>
2. Burzynski D., Ellis W. Fundamentals of Mathematics. Houston: OpenStax CNX, 2008. 699 p. URL: <https://open.umn.edu/opentextbooks/textbooks/fundamentals-of-mathematics>

3. Flowers P., Theopold K., Langley R., Robinson W. Chemistry - 2e. Houston: OpenStax, 2019. 1207 p. URL: https://open.umn.edu/opentextbooks/textbooks/chemistry
4. Patrich J. Physical geography - Version 1. Santa Clarita: College of the Canyons, 2020. 295 p. URL: https://open.umn.edu/opentextbooks/textbooks/physical-geography
5. Urone P.P., Hinrichs R., Dirks K. College Physics - 2e. Houston: OpenStax, 2022. 1679 p. URL: https://open.umn.edu/opentextbooks/textbooks/college-physics

Field of science 7. Ecology

Reading list in English
1. Gaston K.J., Spicer J.I. Biodiversity: an introduction – 2 e. Cornwall: Blackwell Publishing, 2004. 191 p.
2. URL: https://www.researchgate.net/profile/Arvind_Singh56/post/Any_related_literature_on_biodiversity_teaching/attachment/59d64edf79197b80779a8234/AS%3A494919505465344%401495009413879/download/Biodiversity+-+An+Introduction.pdf
3. Odum E.P. Ecology: The Link Between the Natural and the Social Sciences. London: Holt, Rinehart and Winston, 1975. 260 p.
4. URL: https://archive.org/details/ModernBiologySeriesEugenePleasantsOdumEcologyTheLinkBetweenTheNaturalAndTheSocialSciences/page/n5/mode/2up
5. Raven P.H., Johnson G.B. Biology - 6 e. New York: McGraw-Hill, 2001. 1239 p. URL: https://biologilover.files.wordpress.com/2011/12/biology-raven-johnson-6th-ed.pdf
6. Stishov M.S., Dudley N. Protected Natural Areas of the Russian Federation and Their Categories, 208 pages. — Moscow, World Wide Fund for Nature (WWF), 2019. https://wilderness-society.org/wp-content/uploads/2022/02/WWF-Protected-Natural-Areas-of-the-Russian-Federation-and-Their-Categories.pdf

4.2 Recommended online courses

Field of science 1. Geology

Online courses in English	Link	Course description
Planet Earth...and You!	https://www.coursera.org/learn/planet-earth	This course examines the Earth through a geological lens, covering topics such as earthquakes, volcanoes, mountain formation, ice ages, landslides, floods, the evolution of life, plate tectonics, rocks and mineral resources, and energy resources. Special attention is given to environmental issues and future sustainability challenges.
Pre-University Physics	URL: https://online-learning.tudelft.nl/courses/pre-university-physics/	This course addresses fundamental physics concepts essential for many engineering disciplines. Participants will gain a foundational understanding of mechanics, electricity and magnetism, and waves. They will

		develop the ability to solve physics problems algebraically without numerical substitution, perform order-of-magnitude estimations without calculation tools, apply basic differential and integral calculus to physics problems, and work with vectors at a conceptual (non-quantitative) level.
Pre-University Chemistry	URL: https://online-learning.tudelft.nl/courses/pre-university-chemistry/	This course provides a foundation in general, organic, and inorganic chemistry. Participants will apply chemical principles across various scientific and engineering contexts, perform quantitative calculations using basic calculus, and integrate knowledge from multiple chemistry disciplines to solve advanced problems.
Geoscience: the Earth and its Resources	URL: https://online-learning.tudelft.nl/courses/geoscience-the-earth-and-its-resources/	Participants will investigate the Earth's interior and develop expertise in the processes responsible for mountain building and sedimentary basin formation. The course covers the fundamentals of plate tectonics; the mechanisms controlling mountain and sedimentary basin formation; sediment formation, transport, and deposition; rock deformation; hydrocarbon geology; hydrogeology; and the geology of geothermal energy.
Fundamentals of Geology	URL: https://www.classcentral.com/course/swayam-fundamentals-of-geology-292958	This course addresses fundamental physical processes essential for understanding Earth System Sciences and a variety of geological phenomena. It covers the origin of Earth and its position in space; the formation and identification of minerals and rocks; land and surface processes; volcanism; earthquakes; and features of groundwater. The course also offers a brief overview of the economics of Earth resources such as coal and petroleum.

Field of science 2. Geochemistry and geophysics

Online courses in English	Link	Course description
Pre-University Chemistry	URL: https://online-learning.tudelft.nl/cour	This course provides a foundation in general, organic, and inorganic

	ses/pre-university-chemistry/	chemistry. Participants will apply chemical principles across various scientific and engineering contexts, perform quantitative calculations using basic calculus, and integrate knowledge from multiple chemistry disciplines to solve advanced problems.
Pre-University Physics	URL: https://online-learning.tudelft.nl/courses/pre-university-physics/	This course addresses fundamental physics concepts essential for many engineering disciplines. Participants will gain a foundational understanding of mechanics, electricity and magnetism, and waves. They will develop the ability to solve physics problems algebraically without numerical substitution, perform order-of-magnitude estimations without calculation tools, apply basic differential and integral calculus to physics problems, and work with vectors at a conceptual (non-quantitative) level.
An Introduction to Pre-University Mathematics	URL: https://opencourser.com/course/nmakhb/an-introduction-to-pre-university-mathematics	This course introduces fundamental mathematical concepts and methods with an emphasis on practical applications. Participants will develop skills in manipulating algebraic expressions; graphing, differentiating, and integrating simple functions; and calculating basic quantities in financial mathematics.
Introduction to Geometry	URL: https://www.classcentral.com/course/geometry-schoolyourself-introduction-to-geometry-2527	This course provides a comprehensive foundation in geometric concepts, ranging from basic principles to advanced theorems and proofs. Participants will learn fundamentals such as angle measurement and parallel lines; properties and proofs concerning triangles, quadrilaterals, and other polygons; area calculations for shapes including triangles, circles, and ellipses; Pythagorean theorem and its applications; relationships between line segments and angles in circles; volume and surface area calculations for three-dimensional solids; and advanced theorems and proofs related to both two- and three-dimensional shapes.

Planet Earth...and You!	URL: https://www.coursera.org/learn/planet-earth	This course examines the Earth through a geological lens, covering topics such as earthquakes, volcanoes, mountain formation, ice ages, landslides, floods, the evolution of life, plate tectonics, rocks and mineral resources, and energy resources. Special attention is given to environmental issues and future sustainability challenges.
Geology—Geochemistry	URL: https://www.classcentral.com/course/swayam-geology-geochemistry-14083	This course introduces a general concept and principles of geochemistry. It includes such topics as crystal chemistry, types of chemical bonds, coordination numbers, colloids in geological systems, ion exchange, periodic table, cosmic abundance of elements, composition of planets and meteorites, geochemical cycles, distribution of major, minor and trace elements in rocks, geochemical thermodynamics, isomorphism and isotope geochemistry.
Basics of Geophysics	URL: https://youtube.com/playlist?list=PLfk0Dfh13pBPXtgn8BT-dpkfaWMRusJwI&si=J0cPtPFVHa8aAh43	This playlist presents a foundational understanding of physical processes and properties on Earth; physical laws discovered under terrestrial conditions and their implications in the Universe; physical phenomena, processes, regularities, and laws; theoretical and applied aspects of geophysics; and geophysical methods used for Earth studies and mineral exploration.

Field of science 3. Meteorology and atmospheric sciences

Online courses in English	Link	Course description
Monitoring Atmospheric Composition. A MOOC on the role of satellite and in situ measurements for Atmospheric monitoring	URL: https://www.atmosphereooc.org/about/about	This course offers insight into the role of ground-based, airborne, and satellite Earth observation technologies in atmospheric monitoring, providing an overview of the methods used to track atmospheric conditions.
Environmental Standards and Norms for the Sustainability	URL: https://stepik.org/course/74537	This course presents the scientific principles and practical applications involved in developing environmental assessment and quality standards.

		Special attention is given to preserving water resource quality.
Planet Earth...and You!	URL: https://www.coursera.org/learn/planet-earth	This course examines the Earth through a geological lens, covering topics such as earthquakes, volcanoes, mountain formation, ice ages, landslides, floods, the evolution of life, plate tectonics, rocks and mineral resources, and energy resources. Special attention is given to environmental issues and future sustainability challenges.
Mechanisms of climate change	URL: https://openedu.ru/course/hse/CLIMATECHANGE/	The course offers a comprehensive understanding of the climate system, including its fundamental principles and both natural and anthropogenic influences. It examines the impacts of climate change on human activities and addresses the reasons behind skepticism toward human-induced global warming. Participants will examine historical climate variations over millennia, investigate the scientific significance of the current warming trend, and study the methods used to reconstruct past climates and forecast future changes. The course concludes by exploring the major consequences of climate change for humanity.

Field of science 4. Environmental sciences

Online courses in English	Link	Course description
Ecology: from cells to Gaia	URL: https://stepik.org/course/114944	The course covers fundamental principles of ecology, including evolutionary processes, population dynamics, and communities. It explores energy flow within ecosystems and examines the impact of human activities on these systems.
Biological Diversity	URL: https://stepik.org/course/114959	This course provides an overview of the theoretical foundations of biological diversity, its evolution, and dynamics, along with methods for calculating and estimating diversity. It introduces key techniques for assessing alpha, beta, and gamma diversity.

Ecology: Ecosystem Dynamics and Conservation	URL: https://www.coursera.org/learn/ecology-conservation	This course examines ecology and ecosystem dynamics through the framework of systems thinking. It explores the role of humans within ecosystems, reviewing strategies for balancing human needs with biodiversity. Special attention is devoted to issues related to ecosystem recovery.
Environmental Standards and Norms for the Sustainability	URL: https://stepik.org/course/74537	This course focuses on key issues related to the development and application of environmental standards and norms aimed at supporting sustainable development.
Surface Water Quality: management and modeling	URL: https://stepik.org/course/66372/promo	This course provides a concise introduction to the principles of modeling surface water pollution, alongside approaches to its prevention and remediation, considering water quality standards and the properties of specific pollutants.

Field of science 5. Physical geography

Online courses in English	Link	Course description
Geography	URL: https://cursa.app/free-courses-geography-online	This course is designed to explore the diverse aspects of the Earth's physical and cultivated landscapes. It covers a broad range of topics, including the study of natural features such as mountains, rivers, and ecosystems, as well as geographic themes like population growth, migration patterns, and cultural traditions.
The Environment of the Earth's Surface	URL: https://ocw.mit.edu/courses/12-090-the-environment-of-the-earths-surface-spring-2007/	This course covers the production and movement of matter on Earth's surface, including soils and soil erosion; precipitation; streams and lakes; groundwater; and glaciers and their deposits. Integrating geology, climatology, hydrology, and soil science, it offers a cohesive introduction to Earth surface studies. The course emphasizes fundamental concepts alongside practical applications to support informed management of the Earth's physical and chemical resources.

Introduction to Biogeography	URL: https://alison.com/course/introduction-to-biogeography	The course provides information on species distribution and conservation challenges while developing skills to create innovative solutions in biogeography.
Mechanisms of climate change	URL: https://openedu.ru/course/hse/CLIMATECHANGE/	This course offers a comprehensive understanding of the climate system, including its fundamental principles and both natural and anthropogenic influences. It examines the impacts of climate change on human activities and addresses the reasons behind skepticism toward human-induced global warming. Participants will examine historical climate variations over millennia, investigate the scientific significance of the current warming trend, and study the methods used to reconstruct past climates and forecast future changes. The course concludes by exploring the major consequences of climate change for humanity.
Specialization GIS, Cartography and Spatial Analysis	URL: https://www.coursera.org/specializations/gis-mapping-spatial-analysis	This course covers selected topics in cartography, GIS, and spatial analysis.

Field of science 6. Mining and mineral processing

Online courses in English	Link	Course description
Planet Earth...and You!	URL: https://www.coursera.org/learn/planet-earth	This course examines the Earth through a geological lens, covering topics such as earthquakes, volcanoes, mountain formation, ice ages, landslides, floods, the evolution of life, plate tectonics, rocks and mineral resources, and energy resources. Special attention is given to environmental issues and future sustainability challenges.
Pre-University Physics	URL: Pre-University Physics (TUDelft) URL: https://online-learning.tudelft.nl/courses/pre-university-physics/	This course addresses fundamental physics concepts essential for many engineering disciplines. Participants will gain a foundational understanding of mechanics, electricity and magnetism, and waves. They will develop the ability to solve physics problems algebraically without

		numerical substitution, perform order-of-magnitude estimations without calculation tools, apply basic differential and integral calculus to physics problems, and work with vectors at a conceptual (non-quantitative) level.
Management of energy resources	URL: https://stepik.org/course/172611	This course aims to provide an understanding of the fundamental principles and concepts underlying the development of the energy sector. It addresses the goals, threats, and opportunities associated with energy resource development and their societal impacts. Topics include major types of energy resources, regulatory methods and tools—including legal frameworks—and environmental risk assessment. Participants will also gain insight into green energy, its various forms, and potential applications.

Field of science 7. Ecology

Online courses in English	Link	Course description
Ecology: from cells to Gaia	URL: https://stepik.org/course/114944	This course introduces foundational principles of ecology, including evolutionary processes, population dynamics, and community structure. It examines energy flow within ecosystems and evaluates the effects of human activities on ecological systems.
Biological Diversity	URL: https://stepik.org/course/114959	This course provides an overview of the theoretical foundations of biological diversity, its evolution, and dynamics, along with methods for calculating and estimating diversity. It introduces key techniques for assessing alpha, beta, and gamma diversity.
Ecology: Ecosystem Dynamics and Conservation	URL: https://www.coursera.org/learn/ecology-conservation	This course is an introduction to ecology and ecosystem dynamics through systems thinking. It examines the role of humans in ecosystems and explores approaches to balance human needs with biodiversity. Special attention is devoted to issues related to ecosystem recovery.