



Sustainable Development of Mountain Territories

Coordinator	Oxana Klimova
Credits	3 ECTS (compulsory course), 36 in-class hours
Lecturer	Oxana Klimova
Level	MSc
Host institution	Gorno-Altai State University , Department of Natural Sciences and Geography
Course duration	1 semester (the classes will be scheduled in accordance with the university timetable)

Summary

The course is aimed at the formation of knowledge about the sustainable development of mountain territories, including the study of the basic imperatives of sustainable development. It will be based on the works by Russian and foreign scientists devoted to the formation of ideology of sustainable development. The students will study social, political, cultural, legislative, geographical, ecological, awareness raising, and recreational issues of sustainable development of mountain territories. By exploring the economic aspects of development in mountain regions and traditional nature management practices of indigenous peoples, they will consider the issues of using, managing, and protecting such territories. The emphasis will be placed on the study of specific features of the formation of mountain landscapes, their vulnerability, and biodiversity. The course will also include the study of the influence of global problems and human activities on natural complexes. The students will be introduced to the modern methodology of assessment of ecosystem resilience to anthropogenous pressure and of its current state. Among important objectives of the course is the development of students research skills based on the ideas of sustainable development under their academic courses and programs.

Target student audiences

Second year MSc students majoring in Ecology & Environmental Management and in Geography.

Prerequisites:

Required courses (or equivalents):

- Environmental protection
- Nature and climatic resources
- Current Problems of Geography

Aims and objectives

The aim of the course is to provide students with knowledge about the sustainable development of mountain territories, including the study of the basic imperatives of sustainable development; to prepare specialists able to effectively meet the challenges associated with ecology and environmental management.

The objectives of the course:



- to form the ability to articulate problems and tasks, to choose appropriate research methods, to acquire new reliable facts based on observations, experiments, and analysis of empirical evidence;
- to form the ability to summarize research papers, to prepare analytical reviews of knowledge accumulated in the world science and practice;
- to form the ability to generalize obtained results, to draw conclusions and make practical recommendations based on representative and original research findings;
- to study the contribution of Russian and foreign science to the formation of the ideology of sustainable development and the basic imperatives of sustainable development;
- to study the mechanisms and key technologies of sustainable development;
- to study the specificity of traditional nature management in mountain territories;
- to study the specific features of the formation of mountain landscapes, their vulnerability to the impact, their environmental resistance, and biodiversity of natural complexes;
- to form the ability to assess human impact on the environment;
- to form the ability to develop and conduct monitoring in the sphere of sustainable development of mountain territories;
- to study administrative, economic, informational, legislative, and recreational ways to facilitate the sustainable development.

General learning outcomes:

By the end of the course, successful students will:

- know methods of analysis and synthesis of information;
- know research methods;
- know key concepts related to the sustainable development of the territory;
- know economic, social, and ecological aspects and indicators of sustainable development;
- be aware of geographical and ecological specifics of the formation of mountain landscapes (edaphic, climatic, hydrological, etc.);
- be aware of specific features of nature management in mountain areas (socio-economic indicators);
- be able to collect data about the state of the environment (to calculate concentration of pollutants, to determine exceedance of critical load, state of flora and fauna, etc.);
- be able to identify the indicators of sustainable development for mountain territories;
- be able to develop administrative, economic, informative, and recreational solutions to promote sustainable development and management of mountain territories.

Contents

The course will cover the following aspects:

Topic 1. Ecological conditions for the formation of mountain landscapes. Geographic and ecological characteristics of forming mountain landscapes (edaphic, climatic, hydrological, etc). Classification and types of assessment of anthropogenous impact on the environment. Biodiversity of natural complexes. Landscape structure of the region (nature-climatic indicators).

Topic 2 (e-learning module). Sustainable development: its essence and concept. The history of developing the concept of sustainable development. A three-pronged perspective on the



concept of sustainable development: economic, social, and ecological. Indicators of sustainable development. Contribution of Russian and foreign science to the development of the ideology of sustainable development. International organizations and programs aimed to environmental protection and sustainable development.

Topic 3. The conceptual basics of sustainable development of mountain territories. The conceptual basics of sustainable development of mountain territories. The specifics of traditional nature management in mountain areas. Specifics of solution of socio-ecological problems in the mountain territories inhabited by indigenous peoples. The administrative, economic, informative, legislative, and recreational solutions to promote sustainable development. Biodiversity Conservation Strategies.

Topic 4. An economic approach to the concept of sustainable development. Nature, functions, and a system of economic aspects of sustainable development. Basic set of economic indicators. Economic indexes.

Topic 5. Ecological and economic characteristics of the development of mountain territories. Existing ways of nature management resulting from specifics of local climate and transport inaccessibility of such territories. Economic structure of the region and its indicators. The economic specialization of the region, characteristics of local businesses, energy resources, waste management, etc.

Topic 6. Indicators of social aspects of sustainable development. Social approach to the concept of sustainable development. Basic set of social indicators (population dynamics, unemployment rate, life expectancy, urbanization, etc.). Ethno cultural aspects of sustainable development. Indexes (annual growth rate of population, proportion of urban population, etc.).

Topic 7. Indicators of ecological aspects of sustainable development. Ecological approach to the concept of sustainable development. Basic ecological indicators (atmosphere, water, terrestrial, and other resources). Role of protected areas in the system of sustainable development.

Topic 8. Assessment of anthropogenous impact on the environment. Types and forms of human impact on the environment. Methodology and techniques of eco-geographical and environmental expertise. Landscape assessment, major problems and their indicators (concentrations of pollutants in the environment, critical load exceedance, state of flora and fauna, etc.). Positive and negative consequences of the use of natural resources.

Topic 9. The administrative, economic, informative, legislative, and recreational solutions to promote sustainable development.

The creation of conditions for restructuring and reducing human impact on the environment. Indicators of sustainable development for mountain territories. The administrative, economic, informative, legislative, and recreational solutions to promote sustainable development of such regions.

Overview of sessions and teaching methods

The course will use a variety of teaching methods. At the introductory lectures the students will learn about the prerequisites for the development of the Strategy for sustainable mountain



development, its mechanisms, key technologies, and approaches of Russian and foreign science to the formation of the ideology of sustainable development; will study the basic terminology. The students will be offered problem situations concerning the course topics and given a list of relevant literature.

Practical trainings will be aimed at complementing lectures and forming skills of formulating problems, objectives, conclusions, and practical recommendations concerning the issues of sustainable development of mountain territories. The topics will range from the study of the nature and the formation of the traditional nature management of indigenous peoples under the specific climate conditions and remoteness from major transport corridors to the study of the methodology of assessment of anthropogenous pressure, ecosystem resilience, and the principles of the monitoring of the territory. That will help future specialists understand and develop administrative, economic, informative, legislative, and recreational ways to promote sustainable natural and economic development of mountain territories. The classes will include discussions, work in small groups, and individual tasks. To draw attention of potential employers and other stakeholders to the problems of sustainable development of the territory and coherence of economic activities, they will be invited to participate in the round tables organized as a part of educational process.

A guided self-study will comprise a half of the course time and include processing of theoretical and practical materials given at the lectures and practical trainings, preparing for discussions and round tables, performing individual assignments, and reading additional literature. As a result of work with literature, the students will develop their ability to analyze the data obtained, to prepare analytical overviews of knowledge accumulated in the world science and practice, and write research paper abstracts. While working on e-learning module, the students should watch the suggested videos, study the suggested theoretical material, and complete on-line tasks. As an individual task the students will have to prepare a) a research paper, b) a research project and to present (defend) them. They will be given a list of potential ecological problems caused by the exploitation of natural resources or other economic activities. The students will have to summarize the obtained results in the context of knowledge accumulated in the world science, make conclusions and practical recommendation on the basis of representative and original results of the research.

33 percent of the course time will be allocated for in-depth study of theoretical questions and working on individual research projects and papers. The end-of-course evaluation will be in the form of an oral exam, at which the students will have to answer one theoretical question and to present (defend) their research projects and papers. The paper should be made in compliance with the requirements of the internal university documents placed on reports, research abstracts, and other written papers.

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities			



Lectures	Understanding of a three-pronged perspective on the concept of sustainable development (economic, social, and ecological), its indicators and indexes.	Class participation	2
Moderated in-class discussions	Understanding of socio-economic characteristics of development of mountain territories, traditional nature management of indigenous peoples, geo-ecological characteristics of forming mountain landscapes (edaphic, climatic, hydrological, etc).	Class participation and preparedness for discussions	13,35
In-class assignments	Ability to assess the current state of the environment; to identify economic, social, and ecological indicators of sustainable development; to develop administrative, economic, informative, and recreational solutions to promote sustainable development and management of mountain territories.	Class participation and preparedness for assignments	8
Independent work			
Reading and discussion of assigned papers for seminars and preparation for lectures	Familiarity with and ability to critically and creatively discuss key concepts, tools and methods as presented in the literature	Class participation, creative and active contribution to discussion	14
E-learning module	Understanding information presented in the E-learning module	Quality of the tasks completion	10
Final project and paper preparation and presentation	Ability to soundly and reasonably summarize the information on the aspects of sustainable development of mountain territories; ability to cover the topic in-depth, to present the material logically and consistently, and to state one's own opinion properly	Completeness and accuracy of the information presented, visibility and informativeness of the presentation	25,9
Preparation for the exam and the exam	Knowing of key concepts related to the sustainable development of the territory; of economic, social, and ecological aspects and indicators of sustainable development. Ability to present the information in a logical and consistent way; to interpret the obtained data using the indicators of sustainable development of mountain territories.	Completeness and accuracy of the answer	34,75



Total			108

Grading

The students' performance will be based on the following:

- Level of preparedness for participation in class discussions and seminars (20 %);
- Performance of the course assignments (20 %);
- E-learning module (10%);
- Quality of the final paper (5%);
- Quality of the final project (20%);
- Results of the final exam (25%).

Course schedule

All the classes will be taught in accordance with the university timetable.

Classes	Topics
1	Lecture: Ecological conditions for the formation of mountain landscapes.
2	E-learning module: Sustainable development: its essence and concept. The history of developing the concept of sustainable development.
3	Seminar/practical training: The conceptual basics of sustainable development of mountain territories.
4	Seminar/practical training: An economic approach to the concept of sustainable development.
5	Seminar/practical training: Ecological and economic characteristics of the development of mountain territories.
6	Seminar/practical training: Indicators of social aspects of sustainable development.
7	Seminar/practical training: Indicators of ecological aspects of sustainable development.
8	Seminar/practical training: Assessment of anthropogenous impact on the environment.
9	Seminar/practical training: The administrative, economic, informative, legislative, and recreational solutions to promote sustainable development.

Course assignments

The students will be offered to choose the area of study or a natural object (e.g. a city, a rural settlement, an administrative district, a river valley, etc).

- Assignment #1 – the study of a). socio-economic structure and specialization of the region (local businesses, energy resources, waste management population dynamics, unemployment rate, life expectancy, urbanization, etc.); b). geo-ecological characteristics of the formation of mountain landscapes (edaphic, climatic, hydrological, etc.).
- Assignment #2 – the study of ecological state of the environment (concentration of pollutants in the environment, critical load exceedance, state of flora and fauna, etc.).



- Assignment # 3 - the development of administrative, economic, informative, legislative, and recreational solutions to promote sustainable development with account of indicators of sustainable development of mountain territories.

Assignment #1 The students should analyze the socio-ecological characteristics of the territory using cartographic and statistical materials. That will allow them to understand the existing ways of environmental management and to define socio-economic indicators of existing problems.

Assignment #2 The students should collect data about the ecological state of the environment using the laboratory equipment (if available) or analyze existing statistical data. That will allow them to assess the current state of the environment and to identify ecological indicators.

Assignment #3 Based on the results of the assignments #1 and #2 the students should develop administrative, economic, informative, legislative, and recreational solutions to promote sustainable development of the chosen area.

Literature & Internet resources

1. Rastopchina Yu.L., Kovaleva E. I. *Indikatory ustoichivogo razvitiya kak instrument otsenki razvitiya sel'skogo khozaistva i sel'skikh territoriy* [Indicators of sustainable development as a tool to assess the development of agriculture and rural territories]. *Molodoi uchenyi*. Kazan, 2012, Vol. 11, pp. 195-197. — URL <https://moluch.ru/archive/46/5748/> (in Russ).
2. On-line lecture of V.I. Danilov-Danilyan. *Ustoichevoe razvitie. Predopredelennoye budushchee ili illuziya* [Sustainable development. Predestined future or illusion.] — URL <https://www.hse.ru/data/2016/08/09/1125668218/Уст%20развитие%20Новые%20Вызовы%20full.pdf> (in Russ).
3. *Ustoichivoe razvitie: Novye vyzovy* [Sustainable development: New challenges.]: Textbook for HEIs / Edited by V.I. Danilov-Danilyan, N.A. Piskulova. — Moscow, 2015. — 336 p. — URL <https://www.hse.ru/data/2016/08/09/1125668218/Уст%20развитие%20Новые%20Вызовы%20full.pdf> (in Russ).
2. *Indikatory ustoychivogo razvitiya Rossii (ekologo-ekonomicheskie aspekty)*. [Indicators of sustainable development in Russia (ecological and economic aspects)]. Moscow: TSPRP, 220 p. (In Russ.).
3. Encyclopedia of Life Support Systems (EOLSS), 2002, Oxford, UK, www.eolss.net
4. Indicators of Sustainable Development, UN Department for Policy Coordination and Sustainable Development, December, 1994.
5. The Little Green Data Book 2006. World Bank, Washington DC, 2006, P. 256.
6. Human Development Report 2003. UNDP, New York: Oxford University Press, 2003.
7. Human Development Report 1990. UNDP, New York: Oxford University Press, 1990.