Natural resource potential of territories

Spring semester, 2018-2019

Coordinator	**Nina Pakharkova** (Siberian Federal University, Russia)
Credits	3 ECTS (optional course), 54 in-class hours
Lecturer	Anna Grenaderova (Siberian Federal University, Russia)
Level	BSc
Host institution	**Siberian Federal University**, School of Ecology and Geography, Department of Ecology and Environmental Management
Course duration	January 21 – June 8, 2019

Summary

This 3 ECTS course is elaborated for undergraduate students studying ecology and environmental management. The course is aimed at developing students' basic knowledge and understanding of natural resources diversity as well as issues of using natural resource potential, methods of its analysis and assessment. The course represents a basic understanding of natural resources distribution dependence in terms of physiographic conditions. It introduces the basics of integrated assessment of natural resource and natural-ecological potentials of territories, shows how to analyze the relations between development of society and the level of study, awareness, use, regeneration and protection of natural resources and how to evaluate the impact of environmental management on the ecological status of the territory.

Target student audiences

BSc students in ecology and environmental management

Prerequisites

Required courses (or equivalents):

- Ecology,
- Geography,
- Geology,
- Climatology and Meteorology,
- Hydrology,
- The Study of the Biosphere,
- Cartography with the basics of topography,
- Landscape Science,
- Environmental Protection.

Goals and objectives

The main course objective is to provide students with an insight into relevant natural resource potential of the territory. The first part of the course is devoted to the study of the main approaches to the natural resources classification, the principles of using renewable, relatively renewable and non-renewable natural resources. We will review the ecological issues of using mineral resources, flora and fauna resources, trends in biopotential and biodiversity changes at the national and the regional levels including mountainous areas and the Arctic zone. We will examine the concept of "land fund" and its qualitative and quantitative parameters as well as soil

productivity and its dependence on the zonal-belt structure of the natural environment, the land degradation causes. By using certain cases of countries around the globe and districts of the Russian Federation, we will consider the use of climate resources and the importance of climate potential for economic development; water resources storage in Russia and other countries, its fluctuation tendencies; landscapes recreational potential.
In the second part of the course, we will study the types of limitations (technological, ecological, economic, social) when using natural resources (land, forest, water, biological resources, fossil fuels, etc.). We will examine the factors of differentiation of quantitative parameters and qualitative capabilities of the natural resource potential; its landscape dependence. The role of geographical location for development of the territory natural resource potential. We will learn the modern concept of the interrelations between nature, resources and society; international legal principles of interaction between the government involved in resource use and environmental protection.

General learning outcomes:

By the end of the course, successful students will:

- understand types, principles of classification of natural resources and the geographical patterns of their distribution;
- be aware of the general characteristics of the natural resource potential;
- be aware of the relation between social development and progress in development and use of natural resources (mineral and energy resources of the world and individual regions, water resources, land and soil resources, climatic and agroclimatic resources, forest resources);
- understand the system of accounting and assessment of individual types of resources and the natural and ecological potential of the territories as a whole;
- be able to use modern methods of processing and identifying environmental information when conducting scientific and production research;
- have a command of the integrated assessment method applicable to the natural and production potentials of the territories.
- be able to use modern methods of processing and identifying environmental information when conducting scientific and production research.

Overview of sessions and teaching methods

The discipline program consists of lecture-type classes (36 hours) and seminars (18 hours). Individual studies (54 hours) are arranged by exploring theoretical course and accomplishing practical tasks available at e-course platform. Tasks are developed for both group and individual work (case-studying, various data analysis and generalization). The process of individual studies is very convenient as the students will be provided with a diverse range of electronic resources (tutorials, scientific articles, cartographic material, databases, video sessions) enabling them to learn and analyze various information.
Examples of tasks: Data analysis, information generalization on the topic "The importance of climate resources for the regional economy"; Information search, materials analysis on the topic "Specialization of recreation depending on the natural-resource potential of the territory"; The design task "Calculation of the demographic capacity of the territory, the justification of the limiting factors", etc.

Guidelines about tasks completion and response placement procedure shall be presented in the task description message. The quality point shall be awarded for each assignment (test, interactive lecture, exercise, case analysis) during semester period with all the points summarized in the end.
Monitoring of individual studies shall be organized at the time of classroom activities and by means of e-learning course (calculation tasks attachments, test tasks performance, scientific papers reviews, essays, etc.)

Course workload

The table below summarizes course workload distribution:

Activities	Learning outcomes	Assessment	Estimated workload (hours)
In-class activities			
Lectures	Understanding theories, concepts, methodology and tools	Class participation	18
Moderated in-class discussions	Understanding various policies and management contexts and common problems in communication in environmental governance	Class participation and preparedness for discussions	36
Independent work			
E-course: - the study of theoretical material and development of group and individual assignments in the online environment	The ability to analyze and interpret data from various information resources, own methods of processing and interpreting environmental information during scientific and industrial research	Class participation, creative and active contribution to discussion	44
Settlement tasks	Solution of settlement tasks, situational tasks using the knowledge gained	Analysis and interpretation of settlement results	10
Total			*108*

Grading

The students' performance will be based on the following:
- level of readiness to participate in classroom discussions and seminars (50%)
- contribution to group tasks (20%)
- individual calculation tasks (30%)

Course schedule

Day	Time	Topic	Lecturer
January 21, Monday	17:40-19:15	Introduction to the discipline "Natural resource potential of the territory", objects and methodology. Natural environment and natural resources. The main	Anna Grenaderova

		approaches to the classification of natural resources. Principles for the use of renewable, relatively renewable and non-renewable natural resources.	
January 28, Monday	17:40-19:15	Mineral and energy resources. Discussion: Alternative sources (resources) of energy. Technical and economic problems of using alternative energy sources.	Anna Grenaderova
January 30, Wednesday	15.55-17.30	End-use resources. Recycling. Methods of processing and recycling of household waste.	Anna Grenaderova
February 04, Monday	17:40-19:15	Discussion of examples of the production and use of biofuels of different generations in the world, in Russia.	Anna Grenaderova
February 11, Monday	17:40-19:15	Biological resources. The value of biodiversity for the conservation of the natural resource potential of the Earth.	Anna Grenaderova
February 13, Wednesday	15.55-17.30	The conceptual carousel of the "Biodiversity Conservation Strategy"	Anna Grenaderova
February 18, Monday	17:40-19:15	Discussion on the specifics of the program for the protection of biodiversity of the Arctic territories, the importance of preserving mountainous areas	Anna Grenaderova
February 25, Monday	17:40-19:15	Economically sustainable forest management. Forestry as a way to ensure sustainability of forest management	Anna Grenaderova
February 27, Wednesday	15.55-17.30	Land resources. The concept of "land fund", its qualitative and quantitative parameters. Economic, natural, artificial fertility. Causes of land degradation.	Anna Grenaderova
March 18, Monday	17:40-19:15	Calculation task to determine the magnitude of economic damage from pollution of a water body by nutrients from mineral fertilizers	Anna Grenaderova
March 25, Monday	17:40-19:15	Climate resources. Assessment of climatic and weather conditions for various purposes of economic activity.	Anna Grenaderova
March 27, Wednesday	15.55-17.30	The state of atmospheric air and climatic resources of the Krasnoyarsk Territory	Anna Grenaderova
April 01, Monday	17:40-19:15	Discussion on the topic: The Impact of Climate Change on the Ecological Equilibrium and Natural Resource Potential of the Arctic Territories	Anna Grenaderova
April 08, Monday	17:40-19:15	Discussion on the topic: Impact of climate change on the ecological balance and natural-resource potential of mountain landscapes	Anna Grenaderova
April 10, Wednesday	15.55-17.30	Water resources in Russia, the world, and their trends. Water use and water consumption. Standardization in the field of protection and rational use of water resources	Anna Grenaderova
April 15, Monday	17:40-19:15	Ecological problems of water use. The estimated task "Determination of economic damage from water pollution by pesticides"	Anna Grenaderova
April 22, Monday	17:40-19:15	Transboundary water resources. Ecological problems of reservoirs and rivers located within several countries	Anna Grenaderova
April 24, Wednesday	15.55-17.30	Recreational resources. Types of recreational environmental management. Factors limiting the development of recreational environmental management.	Anna Grenaderova
April 29,	17:40-	Recreational potential of arctic landscapes	Anna Grenaderova

Monday	19:15		
May 06, Monday	17:40-19:15	Recreational potential of mountain landscapes	Anna Grenaderova
May 08, Wednesday	15.55-17.30	Types of restrictions (man-made, environmental, economic, social restrictions) in the use of natural resources (land, forest, water, biological resources, fuel and energy, etc.).	Anna Grenaderova
May 13, Monday	17:40-19:15	Resource and ecological potential of the environment	Anna Grenaderova
May 20, Monday	17:40-19:15	Economic and environmental conservation mechanisms. Ecological patterns as a theoretical foundation of environmental management.	Anna Grenaderova
May 22, Wednesday	15.55-17.30	The concept of the economic value of nature. Assessment of natural resources.	Anna Grenaderova
May 27, Monday	17:40-19:15	Discussion of individual cases "Natural resource potential of the Krasnoyarsk region"	Anna Grenaderova
June 03, Monday	17:40-19:15	Discussion of individual cases "Natural resource potential of the Russian subject"	Anna Grenaderova
June 05, Wednesday	15.55-17.30	Discussion of individual cases "Natural resource potential of the world"	Anna Grenaderova

Course assignments

Assignment #1 Natural resource potential of mountain areas. The resulting assignment on the topics "Climate Resources", "Biological Resources", "Recreational Resources", "Water Resources". Work in groups of 4-5 people consists of preparing a presentation message that includes comprehensive coverage of the natural resource potential of the mountain system and its use (Altai, Western and Eastern Sayan Mountains, the Caucasus, the Alps, the Himalayas).

Assignment #2 Individual task "Natural resource potential of the Krasnoyarsk Territory district". By using the example of the region, outline the resource and environmental potential and make the message-presentation.

Assignment #3 Individual task "Natural-resource potential of the districts of Russia". Describe the resource and ecological potential of the territory, indicate the main types of environmental management, measure the demographic capacity of the territory. Submit as a presentation message.

Assignment #4 Individual task "Natural-resource potential of the country of the world." Describe the resource and environmental potential of the territory, indicate the main types of environmental management, set examples of resources rational use and innovative technologies for resources exploration, actions for environmental protection. Submit as a presentation message.

Literature

Gee, D (ed.), Grandjean, P (ed.), Hansen, SF, van den Hove, S (ed.), MacGarvin, M (ed.), Martin, J (ed.), Nielsen, G (ed.), Quist, D (ed.) &Stanners, D (ed.) 2013, Late lessons from early warnings: science, precaution, innovation. European Environment Agency, Copenhagen. EEA Report, no. 1, vol. 2013, , 10.2800/70069

Nesshöver, C., Timaeus, J., Wittmer, H., Krieg. A., Geamana, N., van den Hove, S., Young, J., Watt, A. 2013. Improving the science-policy interface of biodiversity research projects. Gaia 22(2): 99-103.

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