

Geology

Novosibirsk State University

Degree or qualification is awarded: **Bachelor of science in Geology**

Language of study: **Russian**

Mode of study: **full-time**

Duration: **4 years**

Availability of free education: **yes**

Price: **4 500 USD per year**

Programme webpage at the university website: https://education.nsu.ru/departments/geology_geophysics_english/

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Department of Geology and Geophysics invites you to join its Bachelor's degree program. Students can choose to specialize in Geology, Geophysics, Geochemistry, Oil and Gas Field Geology. Young scientists are involved in the research work in the Novosibirsk State University and research institutes of the Russian Academy of Science (Siberian Branch).

Specializations within this programme

Geology

Students majoring in geology choose one of the two following specializations: historical geology and paleontology or general and regional geology.

Students majoring in the first field learn to work with fossilized animals, plants and microorganisms to determine the age of layered rocks. They become specialists in the Earth's history, its origin and evolution of life. Paleontologists study the ancient forms of life, geographic and climatic conditions of their habitat as well as the rocks formed by them; while the earliest species of organisms are studied through fingerprints and traces of their activity.

Students majoring in geology acquire a profound understanding of the interaction between the biosphere and geospheres as well as the cycles and processes occurring on Earth. Since the natural cycles correlate with the geological ones, it is very important to study ancient life to understand the current trends in climate. It can be said that without historical geologists and paleontologists modern geology as a science would not exist, since a common scale of geological time is based on paleontological data. It is thanks to these data that it has become possible to create geological maps. Understanding the conditions for the existence of living organisms and disposal of living species makes the specialists in this area very popular in the field of hydrocarbon exploration because they can describe the conditions for the formation of rocks, including oil and gas deposits that make oil and gas fields.

Students majoring in general and regional geology deal with a wide range of tasks. A small ore occurrence as well as a whole continent or a mountain range can become the objects for exploration. Geologists study the ancient river systems, the traces of the recent earthquakes and global glaciation, the structure of the ancient and modern volcanoes, the relief and its relation to geological structure, the movement and interaction of lithospheric plates, the deformation of the Earth's crust, the causes mountain growth and the destruction of supercontinents. Using the detailed descriptions of outcrop geological structures, space images of the surface of the earth and drilling data, students majoring in geology can understand the most complex geological situations. They can determine rock types and their probable age, how they were formed and draw a geological map of the area, which will be an interpretation understandable for every specialist.

Such a graduate can restore the sequence of geological events, their causes and consequences, thus s/he is in high demand in both research and industrial organizations.

In addition to research activities, the geologist can lead the development of an oil field, exploring ore bodies, and draw

conclusions about the direction in which the drilling should continue. Also, by exploring the deposit and its location s/he can determine the location of the source. A geologist can lead the expedition engaged in a comprehensive mapping and prospecting. Graduates with this specialisation can easily find application in organizations working with geo-information systems and remote sensing data.

Geophysics

Curriculum in geophysics differs significantly from that in geochemistry, geology and oil and gas. The students of Geophysics undertake an in-depth study of physical aspects of geological processes: nuclear physics, the physics of the Earth, mining geophysics and more. The students have an opportunity to familiarise themselves with the basic principles of geophysical exploration for mineral resources and the study of contemporary processes in the Earth's crust.

Geophysicists explore the deep structure of the Earth by interpreting the instrumental measurements of natural or artificially created earth fields. For example, many ores have magnetic properties, and their deposits create anomalies in the earth's magnetic field. A geophysicist can detect such an anomaly, conducting reconnaissance on the ground and analyzing geophysical fields with the appropriate tools. S/he can estimate the size and shape of the anomaly and, therefore, to assess the amount of ore in each deposit. Also s/he can do both conventional mapping and explore virtually any kinds of minerals, including oil and natural gas.

Based on the data of the gravitational and magnetic survey and seismic exploration, companies estimate prospective oil and gas areas and plan the location of the first exploration wells. In addition to mapping and exploration, a geophysicist can also address the environmental and geotechnical tasks, including monitoring of modern seismic and volcanic activity areas. S/he can observe an earthquake in real time, visualize the magma chamber of a volcano or the movement of tectonic plates. S/he can also observe how they interact and where the deformation occurs. Thus, a geophysicist can forewarn about the possibility of a major earthquake and its consequences, such as, for example, a tsunami, and predict the strength and mode of its eruption by tracking the activity of a volcano

Geochemistry

The student of geochemistry may get engaged in the study of mineralogy, that is, to study the composition, properties, structure and conditions of formation of minerals; s/he can study petrography, i.e., the description of the composition and structure of rocks; geochemistry, i.e., the study of the cycle of chemical elements in geological processes; geology of ore deposits, i.e., the study all types and structure of ore bodies and the conditions of their formation. The student of geochemistry learns to use modern equipment, allowing for the exploration of the crystalline material at the most detailed level and can successfully take part in a special mineralogical practice at real fields. S/he also finds out where and how to find the rarest and the most valuable ores and minerals.

A geochemist can become a specialist in exploration, but, unlike a geophysicist, s/he conducts the exploration by hands: collects samples from the surface or by means of drilling or blasting, studies their structure and composition and draws a conclusion about the type of ore and its possible amount under the ground. A geochemist can distinguish an ore from a precious metal, has an idea about raw materials for the chemical and nuclear industries; in other words, all his/her activity is concentrated around the evolution of the Earth's substances and minerals. Such specialists are in high demand in exploration and production companies in Russia, CIS and the near-abroad countries.

Oil and Gas Field Geology

Petroleum engineering students learn to identify types of fossil fuels (oil, gas, and coal), classify their deposits and understand the conditions for their formation. They study organic chemistry as well as the subjects in the Economic and Legal Modules deeply, allowing for an in-depth understanding of the Russian laws regulating subsoil use and of how a given field is classified according to the economic indicators.

Using the results of geophysical survey data processing, the results of drilling and the conclusions of geological and geochemical studies, graduates in Petroleum Studies can evaluate the petroleum potential of a given territory. In other words, the graduates of the Department of Geology and Geophysics can interpret complex scientific information to build a model of the field and set out its development strategy. They are ready to carry out similar work at a research institute both in Russian and foreign oil and gas companies or other industrial organization.