

**Taras Shevchenko National University of Kyiv**



**«Approved»**

**Head of Admission Board**

**Rector of Taras Shevchenko National University of Kyiv**

**Volodymyr BUGROV**

**PROGRAM OF THE ENTRANCE EXAM**

**Obtained qualification – Master Degree**

**Educational level – Master**

**Knowledge domain – E Natural science math and statistic**

**Specialty – E4 Earth Sciences**

**Educational program – Applied Geology**

**Kyiv – 2025**

**Institute of Geology**

**«Approved»**

**Approved by Academic Board  
Institute of Geology**

**Protocol #12 by 12 March 2025**



**Sergiy VYZHVA**

**PROGRAM OF THE ENTRANCE EXAM**

**Obtained qualification – Master Degree**

**Educational level – Master**

**Knowledge domain – E Natural science math and statistic**

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**Educational program – Applied Geology**

**Head of Department of General  
and Historical Geology,  
Guarantor of Program**



**Dmytro KRAVCHENKO**

## Foreword

The matriculation program is composed on the base of the educational subject "General Geology". The Admission Test is performed in the form of a written exam with 4 questions. Maximum score for the exam is 200 points. This final score is additive and is derived as a sum of points for every question (max. 50 points). The minimum positive grade is 100 points. The examination work is delivered in written form.

## General requirements

The applicant, taking the exam in General Geology, must show his/her knowledge in the following items:

- 1) structure and material composition of the Earth;
- 2) external and internal geological processes;
- 3) modern tectonic theories and general tectonic subdivision of the Earth crust;
- 4) general knowledge on the geological history of Earth and its periodization;
- 5) methods of geological research;
- 6) development of scientific views on the composition and evolution of the Earth;
- 7) modern trends in geological research.

## I. General

**Geology as science.** Study object, scope and research methods in geology. Primary areas of geology. History of geology as a scientific discipline.

**Earth's form and motion.** Overview of the structure of the Universe. Solar system, its constituents. Terrestrial globe, its composition, shape and size. Gravitational and magnetic field of the Earth. Pressure and temperature, their change with depth. Notion of the heat flux. Earth's external shells – atmosphere, hydrosphere, biosphere. Earth's inner shells – crust, mantle, core.

**Earth's crust.** Composition and structure of the Earth's crust. Relation between relief and structure of the crust. Types of the Earth's crust. Material composition of the Earth's crust. Minerals and principles of their classification. Main rock forming minerals. Rocks, their genetic and material classification.

**Age of the Earth.** Relative and absolute geochronology, methods of investigations. Geochronological and stratigraphical charts. Subdivisions and relations of geochronological and stratigraphic units.

## II. External dynamic (exogenous) processes

**Notion of a geological process.** Processes of internal and external dynamics, their manifestations.

**Weathering processes.** Physical and chemical weathering and its factors. Main chemical reactions in the weathering zones. Organic world and its role in weathering. Weathering profile as a natural complex. Main types of soils, their zonation.

**Geological activity of the wind.** Impact of climate and vegetation on the wind-driven processes. Geological action of the wind – deflation, corrasion, material transfer accumulation. Characteristics of eolian deposits. Eolian landforms, types of deserts.

**Geological impact of surface water flows.** Sheet washing. Ephemeral waterflows - plain and mountain streams. Formation of gulleys and their development stages. Destructive, transporting and accumulative activity of ephemeral mountain streams. Geological impact of river flows. Lateral and downcutting erosion. Transport and accumulation of material by river flows. Alluvial deposits, their classification and role in the formation of river valleys. Types of terraces, their formation. Fluvio-marine part of river course – deltas, estuaries, limans.

**Geological impact of phreatic (underground) waters.** Forms of water deposition in rocks. Water-permeable and watertight rocks. Types of phreatic waters – suspended waters, free-surface and artesian confined waters. Origin of phreatic waters. Mineral waters, composition, characteristics. Karst development processes. Conditions for karst formation and growth. Surface and underground karst landforms. Cave deposits. Suffosion. Karst and engineering works.

**Geological impact of glaciers.** Modern expansion of glaciers. Types of glaciers and their regimes. Destructive action of glaciers (exaration). Transfer of detrital material with glaciers. Moraines, their types, structural features. Fluvio-glacial flows and their deposits. Osses, kames, sanders. Limnoglacial deposits, their features.

**Gravitational processes.** Impact of gravity and water course in the slope processes. Talus and landslide processes on hillsides. Formation of colluvium. Landslides, factors of their origination. Morphology of landslide bodies. Types of landslides. Underwater landslides.

**Geological impact of lakes and swamps.** Lake types. Destructive and accumulative activity of lakes. Swamps: overview. Types of swamps, their temporal evolution. Turf formation and coalification. Types of coal deposits.

**Geological impact of seas.** Submarine topography. Atlantic and Pacific types of continental margin topography. Chemical and gaseous regimes of marine and ocean waters. Movement of water masses in the global ocean. Organic world of seas and oceans. Destructive action of seas (abrasion), material runaway and accumulation in water areas. Sedimentation in seas and oceans. Genetic types of sediments. Principal mechanisms of deep water sedimentation. Lithoral, neritic, bathyal and abyssal sediments. Facies, their role in the understanding of geological history.

**Diagenesis of sediments.** Transformation of sediments into sedimentary rocks (lithification). Post-diagenesis changes in sedimentary rocks (catagenesis, metagenesis, hypergenesis).

### **III. Processes of internal dynamics (endogenous)**

**Tectonic movements of Earth's crust and tectonic deformations.** Types of tectonic movements. Mechanisms of deformation and destruction of solid bodies, elasticity, strength, ductility, viscosity. Types of nonconformities, their layout in cross sections. Horizontal and monoclinical bedding of rocks.

**Folding deformations of rocks.** Conditions for the development of folded structures. Types of folds, elements of folds, their outlook in plan and in sectional view. Periclinal and centroclinal closure of folds. Genetic types of folds. Fold structures in the mountain areas, types of folding.

**Fractures and faults in rocks.** Physical models of disjunctive structures. Geometric types of disjunctions. Composition and structure of fault planes. Geological and geophysical signatures of faults.

**Earthquakes** Geography of earthquakes, their tectonic setting, examples of great earthquakes. Energy, magnitude, energy class of earthquakes. Seismic zonation, its practical use. Problem of earthquake forecasting.

**Magmatism.** Magma, its volatile and nonvolatile components. Magma crystallization sequence. Effusive magmatism and volcanic eruption products. Structure of a volcanic apparatus, volcano types. Distribution of active volcanos. Intrusive magmatism, types of intrusions. Magma differentiation, pneumatolitic and hydrothermal processes. Mineral resources of magmatic rocks.

**Metamorphism.** Types of metamorphism. Role of fluids for the contact metamorphism. Metasomatism. Facies of regional metamorphism. Mineral resources of metamorphic rocks.

#### **IV. Structural elements of tectonosphere.**

**Main structural elements of the Earth's crust.** Oceans and continents as high order structural elements, their composition and structural units. Differences in the structure of ancient and young platforms. Evolution of the Earth's crust: overview of concepts of its causes and driving mechanisms. Hypotheses of XVIII-XIX centuries. Main hypotheses of XX century.