

**TARAS SHEVCHENKO NATIONAL UNIVERSITY OF KYIV
INSTITUTE OF GEOLOGY**

Department: Hydrogeology and Engineering Geology

«APPROVED»

Deputy Director on academic work

23.10.2025
«29» 08 2025 року

WORK PROGRAMME OF THE DISCIPLINE

Petroleum deposits hydrogeology
(Гідрогеологія родовищ нафти та газу)
For student

Branch of knowledge	E Natural Sciences, Mathematics and Statistics
Training direction (Specialty)	E4 Earth Sciences
Educational level	Master
Educational program	Hydrogeology
Type of discipline	Mandatory

Teaching mode	full-time studies
Academic year	2025/2026
Semester	1
Number of credits ECTS	6
Language of teaching, learning	
And evaluation	English, Ukrainian
Form of final control	Exam

Lecturer: *Havryliuk Ruslan B., PhD in Geology, lecturer, Department of Hydrogeology and Engineering Geology*

To be continued: for 20__/20__ н.р. _____ (_____) «__» 20__ р.
(підпис, ПІБ, дата)

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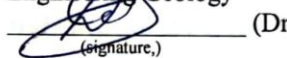
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APPROVED


Head of department of Hydrogeology and Engineering Geology


(signature.) (Dmytro CHOMKO)

Protocol № 1 « 1 » 09 2025

Approved by Scientific-methodical Commission of Institute of Geology

Protocol № 1 « 29 » 08 2025

Head of the Scientific-methodical Commission 
(signature) (Vsevolod DEMYDOV)

The aim of the discipline - is to provide future specialists with theoretical and practical knowledge in the field of petroleum deposits hydrogeology; to familiarize students with the conditions of petroleum deposits' groundwater formation, the main genetic types of oil and gas basins and with the features of hydrogeological surveys and research in oil and gas production areas.

Preliminary requirements:

1. basic knowledge of hydrogeology
2. the level of English proficiency not lower than B1.

Annotation of discipline:

The course content provides two modules and two tests. The discipline is finished by an exam.

In order to determine the role of groundwater in the migration and accumulation of oil and gas deposits, the introduction to different types of groundwater, its geochemical composition and genesis takes place. The course also includes reviewing the possibilities of the underground gas and other hydrocarbons storage formation.

The tasks of the discipline:

- mastering the hydrocarbons' migration, conservation and destruction theoretical issues;
- obtaining the necessary skills to substantiate oil and gas exploration indicators;
- mastering the modern methods of purification of technogenic polluted groundwater that might be formed during petroleum fields development;
- obtaining the necessary knowledge in the field related to research needed for creation and exploitation of underground hydrocarbon storages and injection of industrial effluents into the absorbing horizons.

The results of study:

<i>Learning results</i> (1. to know; 2. be able to; 3. communication; 4. autonomy and responsibility)		<i>Methods of teaching and learning</i>	<i>Assessment methods</i>	<i>Percentage in the final assessment of the discipline</i>
Code	Learninh outcomes			
1.1	<i>Peculiarities of the natural waters' chemical composition formation at the great depths</i>	<i>Lecture, practical class</i>	<i>Paperwork</i>	<i>up to 10%</i>
1.2	<i>Features of groundwater and brines' movement</i>	<i>Lecture, practical class</i>	<i>Paperwork</i>	<i>up to 10%</i>
1.3	<i>Basic conditions for the petroleum deposits' groundwater formation</i>	<i>Lecture, practical class</i>	<i>Paperwork</i>	<i>up to 10%</i>
1.4	<i>Genetic types of oil and gas basins' waters</i>	<i>Lecture, practical class</i>	<i>Paperwork</i>	<i>up to 10%</i>
1.5	<i>Methodology of oil and gas hydrogeological research</i>	<i>Lecture, practical class</i>	<i>Paperwork</i>	<i>up to 10%</i>
2.1	<i>Construct and interpret hydro-geochemical and hydrogeodynamic maps and sections</i>	<i>practical class, self study</i>	<i>Paperwork</i>	<i>up to 10%</i>
2.2	<i>Perform hydrogeological research during the prospecting, exploration and production of oil and gas</i>	<i>practical class, self study</i>	<i>Paperwork</i>	<i>up to 10%</i>
2.3	<i>Assess the oil exploration and industrial value of groundwater</i>	<i>practical class, self study</i>	<i>Paperwork</i>	<i>up to 20%</i>
3.1	<i>Be able to organize team working to solve the problem effectively</i>	<i>practical class</i>	<i>--/-</i>	<i>up to 5%</i>
4.1	<i>Understanding of individual responsibility for personal solving of a part of common task</i>	<i>practical class</i>	<i>--/-</i>	<i>up to 5%</i>

The correlation of the learning outcomes of the discipline with the program results

Learninh outcomes of the discipline Program learning outcomes	1.1	1.2	1.3	1.4	1.5	2.1	2.2	2.3	3.1	4.1
Be able to communicate with specialists and experts of various levels in other fields of knowledge, including in the international context, in the global information environment	+	+	+	+	+	+	+	+	+	+
To know modern methods of research regarding Earth and its geospheres, in particular the ways of studies of geological environment and underground hydrosphere, and to be able to apply these methods in research and development activities.						+	+	+	+	+

Structure of discipline: *Lecture, practical class, students' self-study*

Scheme of grading forms:

Form of student evaluation

1. Semester grading:

- 1) *Control test 1 (min – 6, max – 10)*
- 2) *Control test 2 (min – 6, max – 10)*
- 3) *Works paper and oral reports (min – 24, max – 40)*

2. Final assessment is in the form of an exam (min – 24, max – 40) (total score of discipline (maximum 100 grades) is defined as the sum for the systematic work during the semester).

Final evaluation based on the results of the student's work throughout the semester

Procedure and evaluation system

	Semester grades	Exam	Final grade
Min	36	24	60
Max	60	40	100

For students who have obtained total grades less than critically-calculated minimum of 20 grades are not allowed for taking the exam.

Grading: *For admission to the final grading it is obligatory: 1) to pass two control tests; 2) to complete 8 practical tasks and prepare two abstracts one essay which can be presented in the form of presentations. The final grading is carried out in the form of exam with written and oral parts.*

Assessment:

Excellent	90-100
Good	75-89
Satisfactory	60-74
Fail	0-59

**STRUCTURE OF THE DISCIPLINE
PLAN OF LECTURES AND PRACTICAL CLASSES**

№	Theme	Hours		
		Lectures	Practical class	Self-study
<i>Chapter 1. «Groundwater formation»</i>				
1	Introduction. History of development and current state of petroleum deposits hydrogeology.	2	2	12
2	Movement of groundwater and brines.	2	2	14
3	Groundwater and brines formation. Exogenous (sedimentation, revived, infiltragenous) and endogenous waters).	2	2	6
4	Genetic types of water. Water movement in oil-and-gas bearing basins.	2	2	6
5	Throughgoing fluid-conducting structures (FC-structures)	4	4	22
6	Hydrogeological conditions of formation, preservation and destruction of oil and gas deposits	2	2	8
	Control test	2		
<i>Chapter 2. «Hydrogeological methods of petroleum deposits' studying»</i>				
7	Hydrogeological criteria for petroleum prospects assessment	2	2	10
8	Geological and hydrogeological modeling during petroleum fields development. Industrial classification of waters.	2	2	10
9	Hydrogeological conditions for the manifestation of various modes of oil and gas reservoirs. The use of hydrogeological data for oil and gas fields' designing.	2	4	12
10	Environmental protection during exploitation of oil and gas deposits	2	4	8
11	Contamination of the geological environment with oil products	2	4	12
	Control test	2		
Total		28	28	120

Total hours of the discipline – 180. that include:

lectures – **28 hrs.**

practical classes – **28 hrs.**

consultations – **4 hrs.**

self-studying work – **120 hrs.**

RECOMMENDED LITERATURE:

Basic:

1. Bradley Bryant W (1992) Two oilfield water systems. Robert E, Krieger publishing company Malabar, Florida – 258
2. Fowler, M. G., and C. Riediger, 2000, Origin of the Athabasca tar sands, in D. Barson, R. Bartlett, F. Hein, M. Fowler, S. Grasby, and C. Riediger, eds., Hydrogeology of heavy oil and tar sand deposits: Water flow and supply, migration and degradation: GeoCanada 2000 Field Trip Guidebook 14, Stop 14, p. 117–127
3. Global Overview of Saline Groundwater Occurrence and Genesis. International groundwater resources assessment centre. Utrecht. 2009. – 107
4. Groundwater in Geologic Processes. Cambridge University Press. S.E. Ingebristen, W.E. Sanford. 1998. - 341 p.
5. Екологія геологічного середовища. Забруднення нафтопродуктами. Основні терміни та поняття: словник / А.Л. Брикс, М.С. Огняник, Д.Ф. Чомко. Київ: ВПЦ «Київський університет», 2020. 126 с.
6. Колодій В.В. Нафтогазова гідрогеологія: підручник для ВНЗ Івано-Франківськ:Факел, 2009.
7. Розробка та експлуатація нафтових та нафтогазових родовищ: посібник для студ. ВНЗ / під ред. д-ра. техн. наук, проф. І. М. Фика. – Харків, 2019. – 149 с.
8. Суярко В.Г. Прогнозування, пошук та розвідка родовищ вуглеводнів: Підручник / В.Г. Суярко. – Харків: Фоліо, 2015. – 296 с.
9. Трубенко О.М. Маєвський Б. Й., Куровець С.С., Омельченко В.Г. Геологія і нафтогазоносність морських надр:Підручник. – Івано-Франківськ: ІФНТУНГ, 2011, 232 с.

Additional:

1. Dahlberg, E. C. (1995) Applied Hydrodynamics in Petroleum Exploration. 2nd edn., Springer-Verlag, N.Y., 295p.
2. Dean, E. W., and D. D. Stark, 1920, A convenient method for the determination of water in petroleum and other organic emulsions: Industrial and Engineering Chemistry, v. 12, p. 486 – 490, doi:10.1021/ie50125a025.
3. Devlin, J.F. Groundwater Velocity / J.F. Devlin - Guelph, Ontario, Canada, 2020. 64 pages <https://gw-project.org/books/groundwater-velocity/>
4. England, W. A., 1994, Secondary migration and accumulation of hydrocarbons, in L. B. Magoon and W. G. Dow, eds., The petroleum system: From source to trap: AAPG Memoir 60, p. 211–217
5. Fustic, M., Bennett, B., Hubbard, St., Huang, H., Oldenburg, T., Larter, S.R. - Impact of oil-water contacts, reservoir (dis)continuity, and reservoir characteristics on spatial distribution of water, gas, and high-water – low-bitumen saturated zones and variability of bitumen properties in Athabasca oil sands deposits: Heavy Oil/Bitumen Petroleum Systems in Alberta & Beyond. P. 163 – 205
6. [M. King Hubbert](#) (1953) Entrapment of Petroleum Under Hydrodynamic Conditions: AAPG Bulletin 37(8). P. 1954–2026. <https://doi.org/10.1306/5CEADD61-16BB-11D7-8645000102C1865D>
7. Singhal B.B.S., Gupta R.P. (1999) Principles of groundwater flow and solute transport. In: Applied Hydrogeology of Fractured Rocks. Springer, Dordrecht. https://doi.org/10.1007/978-94-015-9208-6_7

8. U.S. Geological Survey. Online access: <https://www.usgs.gov/>
9. White W.M. Geochemistry. Washington: Mineral. Soc. Amer., 2001. - 701 p.5
10. Борис Маєвський. Актуальні проблеми нафтогазової геології. Навчальний посібник для студентів спеціальності “Геологія нафти і газу”. – Івано-Франківськ: Факел, 2001. – 183 с.
11. Довідник з нафтогазової справи. /В.С. Бойко, Р.М. Кондрат, Р.С. Яремійчук. Львів, 1995
12. Дубей Н.В. Нафтогазова гідрогеологія: Методичні вказівки для самостійного вивчення дисципліни. Івано-Франківськ: ІФНТУНГ, 2022. 31 с.
13. Дубей Н.В. Прикладні аспекти гідрогеології / SWorld Journal No 06-07 (2020) с. 67-70.
14. Климчук О.Б. Наскрізні флюїдопровідні структури як провідна причина формування флюїдогеологічних аномалій: концептуалізація, термінологія, типи, властивості та роль у флюїдообміні. Геол. журн. 2022. № 1 (378). С. 24—49. <https://doi.org/10.30836/igs.1025-6814.2022.1.252279>
15. Климчук О.Б. Наскрізні флюїдопровідні структури: морфогенетична класифікація та характеристика типів. Геологічний журнал. 2022. № 2 (379). С. 03—45. <https://doi.org/10.30836/igs.1025-6814.2022.2.252296>
16. Манюк М.І. Пошуки та розвідка нафтових і газових родовищ. Методичні вказівки. - Івано-Франківськ: ІФНТУНГ, 2010. 22 с
17. Трубенко О.М. Геологія і нафтогазоносність моря. Методичні вказівки. Івано-Франківськ, 2010. – 15. (електронний варіант)