

**TARAS SHEVCHENKO KYIV NATIONAL UNIVERSITY  
GEOGRAPHIC DEPARTMENT**

***Chair of Physical Geography and Geoecology***

**«APPROVE»**

Deputy Dean on academic study

As. Prof. Pasko V.F.

« 27 » *August* 2025

**WORK PROGRAM OF THE ACADEMIC DISCIPLINE**

*INTERNATIONAL AND NATIONAL  
GEOSPATIAL DATA INFRASTRUCTURES*

Scope of knowledge C Social Sciences, Journalism, Information and International Relations

|                     |                                         |
|---------------------|-----------------------------------------|
| Specialty           | C6 Geography and Regional Studies       |
| Educational degree  | Master                                  |
| Educational program | Transboundary environmental cooperation |
| Discipline kind     | Mandatory                               |

|                                           |                    |
|-------------------------------------------|--------------------|
| Form of education                         | <b>full-time</b>   |
| Academic year                             | <b>2025/2026</b>   |
| Semester                                  | <b>1</b>           |
| Number of ECTS credit                     | <b>5</b>           |
| Language of tuition, study and evaluation | <b>English</b>     |
| Form of final testing                     | <b>examination</b> |

**Lecturers:**

**Ivanok D.V.**, *Candidate of Science in Geography, Assistant at the Chair of Physic Geography and Geoecology*

Prolonged: to 20\_\_/20\_\_ A.y. \_\_\_\_\_ (\_\_\_\_\_) «\_\_»\_\_ 20\_\_.  
(Signature, Surname)

to 20\_\_/20\_\_ A.y. \_\_\_\_\_ (\_\_\_\_\_) «\_\_»\_\_ 20\_\_.  
(Signature, Surname)

KYIV – 2025

**Authors: Samoilenko V.M.**, *Doctor of Sciences in Geography, Professor, Senior Researcher of Landscape Ecology Laboratory at the Chair of Physic Geography and Geoecology*; **Ivanok D.V.**, *Candidate of Sciences in Geography, Assistant at the Chair of Physic Geography and Geoecology*

TARAS SHEVCHENKO KYIV NATIONAL UNIVERSITY  
GEOGRAPHIC DEPARTMENT

APPROVED

«26» August 2025

Chief of the Chair of Physic Geography and  
Geoecology

 As. Prof. Bilous L.F.

Protocol No 1 dated «26» August 2025

Approved by geographic faculty academic-methodological commission

Protocol No 7 dated «27» August 2025

Chief of the academic-methodological commission  As. Prof. Korohoda  
N.P.

«27» August 2025

| Form of education                                                                                         | Full-time   |
|-----------------------------------------------------------------------------------------------------------|-------------|
| Academic year                                                                                             | 2024/2025   |
| Semester                                                                                                  | 1           |
| Number of ECTS credits                                                                                    | 2           |
| Language of tuition, study and evaluation                                                                 | English     |
| Form of final testing                                                                                     | examination |
| Lecturers:                                                                                                |             |
| Ivanov D.V., Candidate of Science in Geography, Assistant at the Chair of Physic Geography and Geoecology |             |

Proposed: \_\_\_\_\_ to 20 \_\_\_\_ A.Y. \_\_\_\_\_  
(Signature, surname)

\_\_\_\_\_ to 20 \_\_\_\_ A.Y. \_\_\_\_\_  
(Signature, surname)

KYIV – 2025

Author: Samoilenko V.M., Doctor of Sciences in Geography, Professor, Senior  
Researcher of Landscape Ecology Laboratory at the Chair of Physic Geography  
and Geoecology; Ivanov D.V., Candidate of Science in Geography, Assistant at  
the Chair of Physic Geography and Geoecology

## INTRODUCTION / BCTYII

**1. The goal of the academic discipline** is to form in higher education applicants ability to solve complex tasks and make appropriate analytical and management decisions in the scope of geography and regional studies, in particular transboundary cooperation in sustainable nature management and conservation, based on an application of methodological bases and technological-organizational approaches for development of international and national Geospatial Data Infrastructures (GDI) as technologies, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve utilization of geospatial data.

**2. Advance claims to mastering or selection of the academic discipline:**

1. To know key principles of profile common-geographic academic disciplines and computer sciences.
2. To be able to apply the approaches of geographic modeling, geographic information systems and technologies, information networks and environmental management.
3. To possess the expertise in using of international environmental conventions and treaties.

**3. Annotation of the academic discipline:** The discipline deals with general principles and approaches to GDI development; technologies of metadata and Geospatial Data Catalogues' development; technologies of geospatial data visualization for GDI, open geospatial access in GDI and different GDI services; approaches to outreach and capacity building of GDI and also with factors of an effective GDI organization and operations with Web Mapping Service (WMS) Interfaces.

**4. The tasks of the discipline** are to ensure the acquisition by students of knowledge, skills and expertise for the formation of *abilities*:

- to learn and master modern knowledge (GC01);
- to work in a team (GC04);
- to communicate in a foreign language [English and/or other languages of the European Union] (GC05);
- to conduct research at an appropriate level (GCO6);
- to complex spatial thinking, research of spatial (territorial) relationships and interactions at global, regional and local levels (SC03)

## 5. Results of academic discipline study:

| The result of study<br>(1. To know; 2. To be able to; 3. Communication;<br>4. Autonomy and responsibility) |                                                                                                                                                                                                                                                                | Forms (and/or<br>methods and<br>technologies) of<br>tuition and<br>study | Evaluation<br>methods and<br>threshold<br>evaluation<br>criterion (if<br>necessary)           | Percent in<br>final grade<br>on<br>discipline |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------|
| Code                                                                                                       | The result of study                                                                                                                                                                                                                                            |                                                                          |                                                                                               |                                               |
| 1.1                                                                                                        | General principles and approaches to GDI development with the opportunity to communicate freely on professional and scientific issues in a foreign language                                                                                                    | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     | <i>Test,<br/>implementation<br/>of creative<br/>analytic<br/>assignments,<br/>examination</i> | 7%                                            |
| 1.2                                                                                                        | Technology of geospatial data development for GDI                                                                                                                                                                                                              | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     |                                                                                               | 7%                                            |
| 1.3                                                                                                        | Technology of metadata development for GDI                                                                                                                                                                                                                     | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     |                                                                                               | 7%                                            |
| 1.4                                                                                                        | Technology of geospatial Data Catalogues' development                                                                                                                                                                                                          | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     |                                                                                               | 7%                                            |
| 1.5                                                                                                        | Technology of geospatial data visualization for GDI                                                                                                                                                                                                            | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     |                                                                                               | 7%                                            |
| 1.6                                                                                                        | Technology of open geospatial access in GDI                                                                                                                                                                                                                    | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     |                                                                                               | 7%                                            |
| 1.7                                                                                                        | Technologies of different GDI services                                                                                                                                                                                                                         | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     |                                                                                               | 7%                                            |
| 1.8                                                                                                        | Modern methods and models of problem-oriented research, the use of information technology in the field of geography, spatial planning, nature management, nature protection, ecosystem services, environment restoration, nature-based solutions, based on GDI | <i>lection, seminar,<br/>analytic<br/>assignment</i>                     |                                                                                               | 7%                                            |
| 2.1                                                                                                        | Define the factors of an effective GDI organization based on the application of geoinformation technologies, creation and research of models for geosystem development realization                                                                             | <i>seminar, analytic<br/>assignment</i>                                  | <i>Test,<br/>implementation<br/>of creative<br/>analytic<br/>assignments,<br/>examination</i> | 30%                                           |
| 2.2                                                                                                        | Set interoperable levels of GDI                                                                                                                                                                                                                                | <i>seminar, analytic<br/>assignment</i>                                  |                                                                                               |                                               |
| 2.3                                                                                                        | Implement necessary approaches for geospatial data development concerning GDI                                                                                                                                                                                  | <i>seminar, analytic<br/>assignment</i>                                  |                                                                                               |                                               |



|                                                                                                                                                                                                                                                                                                                                                                                                |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| services, environment<br>restoration, nature-based<br>solutions (PRS06)                                                                                                                                                                                                                                                                                                                        |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3. To conduct independent<br>observations and research of<br>the environment state in field<br>and laboratory conditions.<br>Know the principles of<br>environmental monitoring and<br>methods of analyzing its<br>results for the organization of<br>sustainable nature<br>management and protection.<br>(PRS10)                                                                              | + | + | + | + | + | + | + | + | + |   | + | + | + | + | + | + | + | + | + | + |
| 4. To adhere to ethical norms<br>and principles of academic<br>integrity in research activities,<br>take into account the<br>principles of inclusivity,<br>transparency, diversity and<br>multiculturalism, aesthetic<br>appeal and comfort of<br>landscapes, involvement of<br>citizens in scientific-research<br>activities, integrate a nature-<br>centric dimension in research<br>(PRS12) | + |   |   |   |   |   |   |   |   | + | + | + | + | + | + | + | + | + | + | + |

## 7. Scheme of grade formation:

The level of achievement of all planned results of study is determined by the results of oral answers and writing control tests.

The share of study results in the final grade, provided that it is mastered at the appropriate level is as follows:

- results of study – **1.1 – 1.8 (knowledge)** – up to 7% for each;
- results of study – **2 (skills)** – up to 30%;
- results of study – **3 (communication)** – up to 10%;
- results of study – **4 (autonomy and responsibility)** – up to 4%

### 7.1. Forms of students' evaluation:

The discipline consists of two content modules. Studies are conducted as lectures and seminars. During semester, after proper themes completing, *two modular tests* are carried out.

Evaluation by forms of testing:

|                                                                                                       | <i>First content module</i> |                         | <i>Second content module</i> |                         |
|-------------------------------------------------------------------------------------------------------|-----------------------------|-------------------------|------------------------------|-------------------------|
|                                                                                                       | <i>Min. – 15 points</i>     | <i>Max. – 30 points</i> | <i>Min. – 15 points</i>      | <i>Max. – 30 points</i> |
| Implementation of assignment                                                                          | „1” x 9 = 9                 | „2” x 9 = 18            | „1” x 9 = 9                  | „2” x 9 = 18            |
| Modular test No 1                                                                                     | „6” x 1 = 6                 | „12” x 1 = 12           |                              |                         |
| Modular test No 2                                                                                     |                             |                         | „6” x 1 = 6                  | „12” x 1 = 12           |
| „3” – minimal/maximal point which can be get by student.<br>1 – test quantity of assignments or tasks |                             |                         |                              |                         |

Results of students' academic study are evaluated by 100-point scale. Students who got point quantity, which is lesser than *critical-calculating minimum (30 points)*, have to pass modular test for the second time in order to allow them to take the examination. Maximal examination grade is *40 points*.

|                | First content module | Second content module | Examination | Final grade |
|----------------|----------------------|-----------------------|-------------|-------------|
| <i>Minimum</i> | 15                   | 15                    | 30          | 60          |
| <b>Maximum</b> | <b>30</b>            | <b>30</b>             | <b>40</b>   | <b>100</b>  |

In general, the formation of the evaluation is based on the "Regulations on the organization of the educational process at the Taras Shevchenko National University of Kyiv", enacted by Order № 170-32 of April 11, 2022.

### 7.2. Organizing of evaluation:

Evaluation is carried out during semester for all kinds of students' studies including their self-ruling studies.

#### Grades-points' correspondence scale

| <i>100-point scale</i> | <i>Grade of the national scale</i> |                     |
|------------------------|------------------------------------|---------------------|
| <b>90-100</b>          | <b>5</b>                           | <b>Excellent</b>    |
| <b>75-89</b>           | <b>4</b>                           | <b>Good</b>         |
| <b>60-74</b>           | <b>3</b>                           | <b>Satisfactory</b> |

|      |   |                       |
|------|---|-----------------------|
| 1-59 | 2 | Unsatisfactory (Fail) |
|------|---|-----------------------|

## STRUCTURE OF THE ACADEMIC DISCIPLINE

### SUBJECT PLAN OF LECTURES AND SEMINARS

| No of topic                                                         | Topic name                                                                | Number of hours |           |                      |
|---------------------------------------------------------------------|---------------------------------------------------------------------------|-----------------|-----------|----------------------|
|                                                                     |                                                                           | lectu- res      | seminars  | self- ruling studies |
| <b><i>Content module 1 General and technological GDI bases</i></b>  |                                                                           |                 |           |                      |
| 1                                                                   | <b>Topic 1.</b> Introduction to the discipline                            | 4               | 2         | 14                   |
| 2                                                                   | <b>Topic 2.</b> Geospatial data development for GDI                       | 4               | 2         | 14                   |
| 3                                                                   | <b>Topic 3.</b> Metadata for GDI                                          | 4               | 2         | 14                   |
| 4                                                                   | <b>Topic 4.</b> Geospatial Data Catalogues                                | 4               | 2         | 14                   |
| <b><i>Modular test No 1</i></b>                                     |                                                                           |                 |           | 4                    |
| <b><i>Content module 2 Service and organizational GDI bases</i></b> |                                                                           |                 |           |                      |
| 5                                                                   | <b>Topic 5.</b> Geospatial data visualization for GDI                     | 4               | 2         | 14                   |
| 6                                                                   | <b>Topic 6.</b> Open Geospatial access in GDI                             | 4               | 2         | 14                   |
| 7                                                                   | <b>Topic 7.</b> Other GDI services, outreach and capacity building of GDI | 4               | 2         | 14                   |
| <b><i>Modular test No 2 and examination</i></b>                     |                                                                           |                 |           | 6                    |
|                                                                     | <b>TOTAL</b>                                                              | <b>28</b>       | <b>14</b> | <b>108</b>           |

Total amount – ***150 hours***, including:

lectures – **28** hours,

seminars – **14** hours,

self-ruling studies – **108** hours.

## RECOMMENDED SOURCES

### **Basic sources / Основна**

1. *Samoilenko V.M., Dibrova I.O.* Training-methodical complex on the academic discipline 'Spatial Data Infrastructures' (electronic version). – Kyiv: LLC 'DIA', 2021. – 36 c. – ISBN 978-617-7785-26-1. [https://drive.google.com/file/d/1HZVsTwLynb52S46New\\_eo0r\\_zt1otlyf/view](https://drive.google.com/file/d/1HZVsTwLynb52S46New_eo0r_zt1otlyf/view)
2. *Samoilenko V., Bilous L.* (2024). Designing geoinformation systems: textbook (electronic version, in English and Ukrainian). Kyiv: Nika-Tsentr. 254 p. [https://www.researchgate.net/publication/379077120\\_Designing\\_geoinformation\\_systems\\_textbook\\_electronic\\_version\\_in\\_English\\_and\\_Ukrainian\\_Kyiv\\_Nika-Tsentr\\_2024\\_254\\_p](https://www.researchgate.net/publication/379077120_Designing_geoinformation_systems_textbook_electronic_version_in_English_and_Ukrainian_Kyiv_Nika-Tsentr_2024_254_p)
3. *Spatial Data Infrastructure Cookbook: Manual.* GGDI Association, 2012. 150 p. <http://www.gGDI.org/index.php/55-capacity-building/GDI-cookbooks.html>
4. *Samoilenko V.M.* The academic discipline 'Spatial Data Infrastructures'. *Online education platform of Taras Shevchenko National University of Kyiv. Geographic department.* 2020. Available at: <https://geo.univ.org.ua>
5. *Geoinformation technologies and geospatial data infrastructure: Tutorials in 6 volumes* / D. Cake et al. Planet-Print, 2017-2021.
6. *Geographic Information Systems to Spatial Data Infrastructures. A Global Perspective* / Edited by Ian Masser. CRC Press, 2019. 396 p.
7. *Williamson I., Rajabifard A., Feeney M.F.* Developing Spatial Data Infrastructures: From Concept to Reality: Monograph. CRC Press, 2018. 338 p.
8. *Geospatial data infrastructure: concepts, cases, and good practice: Monograph* / Edited by Richard Groot and John McLaughlin. Oxford: Oxford University Press, 2000. 286 p.
9. *Masser I.* GIS Worlds: Creating Spatial Data Infrastructures: Monograph. ESRI Press, 2005. 336 p.
10. *Samoilenko V.M.* GIS designing: Textbook (in English and Ukrainian) / V.M. Samoilenko, L.M. Datsenko, I.O. Dibrova. Kyiv: SE 'Print Service', 2015. 256 p.
11. *Samoilenko V.M.* Geographic information systems and technologies: Electronic Textbook (in Ukrainian), DVD. Kyiv: Nika-Center, 2011. ISBN 978-966-521-585-1.
12. *Samoilenko V.M. et al.* Information management of international Dnipro basin environmental rehabilitation: Monograph. Kyiv: Nika-Center, 2004. 152 p.

### **Additional sources / Додаткова:**

13. *Hepper S. et al.* Portlets and Apache Portals: Monograph. Manning Publications, 2005. 436 p.
14. *Web Services for Remote Portals Specification 1.0.* OASIS, 2003. 86 p.
15. *Directive 2007/2/EC of the European Parliament and of the Council of 14 March 2007 establishing an Infrastructure for Spatial Information in the European Community (INSPIRE).* 23 p.
16. *Samoilenko V.M.* Substantiation of subject units for electronic data base of Dnipro Basin state as GIS component (in Ukrainian) // *Cartography and High School.* 2003. Vol.8. P.77-85.
17. *Samoilenko V.M.* Experience on development on data bases and information systems of hydro-environmental data (in Ukrainian) // *Hydrology, Hydrochemistry and Hydroecology.* 2004. Vol.6. P.200-208.
18. *Samoilenko V.M.* Strategy for trans-boundary Danube Basin GIS development (in Ukrainian) // *Hydrology, Hydrochemistry and Hydroecology.* 2004. Vol.6.P.20-31.
19. *Samoilenko V.M.* Geographic information systems: designing with examples from international hydro-environmental cooperation // *Hydrology, Hydrochemistry and Hydroecology.* 2011. Vol.1 (22). P.8-32.
20. *Boosygin et al.* English-Ukrainian glossary on geoinformatics. Kyiv: Carbon, 2007. 433 p.

21. *The Law of Ukraine 'On National Geospatial Data Infrastructure'*. 554-IX, 2020. Available at: <https://zakon.rada.gov.ua/laws/show/554-20#Text>
22. Samoilenko, V., Bilous, L., Havrylenko, O. and Dibrova, I. (2020) Geoinformation modeling of anthropization extent in the Zakhidnoukrainskyi physic-geographic region. *European Association of Geoscientists & Engineers. Conference Proceedings, XIV International Scientific Conference "Monitoring of Geological Processes and Ecological Condition of the Environment"*, Nov. 2020, V.2020: 1-5. <https://doi.org/10.3997/2214-4609.202056010>
23. Samoilenko V., Bilous L., Havrylenko O., Dibrova I. (2021a) Geoinformation model cause-effect analysis of anthropogenic impact in the Podilsko-Prydniprovskyi region. *European Association of Geoscientists & Engineers. Conference Proceedings, Geoinformatics, May 2021*, V.2021: 1–6. <https://doi.org/10.3997/2214-4609.20215521006>
24. Samoilenko V., Bilous L., Havrylenko O., Dibrova I. (2021b) Monitoring of anthropogenic impact in the Left Bank Dnipro and the Eastern Ukrainian regions. *European Association of Geoscientists & Engineers. Conference Proceedings, XV International Scientific Conference "Monitoring of Geological Processes and Ecological Condition of the Environment"*, Nov. 2021, Kyiv, V.2021: 1-5. <http://dx.doi.org/10.3997/2214-4609.20215K2013>

**Web sources / Джерела Інтернет:**

25. <http://www.gGDI.org>
26. <http://www.opengis.org>
27. <http://www.fgdc.gov>
28. <https://globalmaps.github.io>
29. <http://www.esri.com>