NATIONAL UNIVERSITY OF LIFE AND ENVIRONMENTAL SCIENCES OF UKRAINE
Department of Geoinformatics and Aerospace Research of the Earth

APPROVED
Faculty of Land Management

May 15, 2025

TEACHING PRACTICE
from discipline

GEOINFORMATICS, COMPUTER SCIENCE AND PROGRAMMING

Area of knowledge	19. Architecture and Construction
Specialty	193. Geodesy and Land Management
Academic programme	"Geodesy and Land Management"
Faculty	Land Management
Developed by:	Assistant Professor, PhD Anastasia Horodnycha
	(position, academic degree, academic title)

Kyiv – 2025

Description of the academic discipline

The fourth semester practical training in the discipline "Geoinformatics, Computer Science and Programming" is provided for by the curriculum for the specialty 193. Geodesy and Land Management. The practical training is a logical continuation of the study and consolidation of the acquired theoretical knowledge from the course "Geoinformatics, Computer Science and Programming". Its completion is mandatory for every student of the Faculty of Land Management. The tasks of the practical training: systematization, consolidation, deepening and generalization of the knowledge that 2nd-year students received during the study of the discipline; acquisition of practical skills in the use of computer technologies by specialists in geodesy and land management in their practical work.

Students who have completed and defended all laboratory and independent work during theoretical training are allowed to take part in the practice. The logical conclusion of the practice is a test.

Its completion is mandatory for every student of the Faculty of Land Management.

Field of knowledge, specialty, educational program, educational degree		
Educational degree	*Bachelor*	
Specialty	*193. Geodesy and land management*	
Educational program	*Geodesy and land management*	
Characteristics of the academic discipline		
View	Required	
Total hours	25	
Number of ECTS credits	1	
Number of content modules	-	
Course project (work) (if available)	-	
Control form	*Test*	
Academic discipline indicators for full-time and part-time forms of higher education		
	Form of obtaining higher education	
	daytime	**correspondence**
Course (year of training)	2	-
Semester	4	-
Lecture classes	-	-
Practical, seminar classes	*3 hour.*	-
Laboratory classes	-	-
Independent work	-	-
Number of weekly classroom hours for full-time higher education	-	-

1. Purpose, competencies and program outcomes of the academic discipline

It consists in forming theoretical knowledge in students on the use of specialized software tools, mastering their capabilities for working with diverse geospatial data, results of field measurements and surveys, and creating digital cartographic works.

Acquisition of competencies:

Integral competence (IC):

The ability to solve complex specialized problems in geodesy and land management.

General competencies (GC):

GC01. Ability to learn and master modern knowledge.

GC02. Ability to apply knowledge in practical situations.
GC05. Ability to communicate in a foreign language.
GC06. Ability to use information and communication technologies.
GC07. Ability to work autonomously.
GC08. Ability to work in a team.
GC13. The ability to preserve and multiply moral, cultural, scientific values and achievements of society based on understanding the history, patterns of development of the subject area, its place in the general system of knowledge about nature and society, as well as in the development of society, technology and engineering, to use various types and forms of physical activity for recreation and leading a healthy lifestyle.

Special (professional) competencies (SC):

SC04. Ability to select and use effective methods, technologies and equipment for carrying out professional activities in the field of geodesy and land management.
SC06. Ability to perform remote, ground, field and office research, engineering calculations for processing research results, formalize research results, prepare reports when solving geodesy and land management tasks.
SC07. Ability to collect, update, process, critically evaluate, interpret, store, publish and use geospatial data and metadata regarding objects of natural and man-made origin.
SC09. Ability to use tools, devices, equipment, and facilities when performing geodesy and land management tasks.
SC10. Ability to monitor and assess land.

Expected learning outcomes (ELO):

ELO02. Organize and manage the professional development of individuals and groups.
ELO03. Communicate information, ideas, problems, solutions, own experience and arguments to specialists and non-specialists.
ELO04. Know and apply in professional activities regulatory and legal acts, regulatory and technical documents, reference materials in the field of geodesy and land management and related industries.
ELO09. Collect, evaluate, interpret and use geospatial data, metadata regarding objects of natural and man-made origin, apply statistical methods of their analysis to solve specialized problems in the field of geodesy and land management.
ELO10. Select and apply tools, equipment, facilities and software necessary for remote, terrestrial, field and desk research in the field of geodesy and land management.
ELO11. Organize and perform remote, ground, field and office work in the field of geodesy and land management, document the results of the work, and prepare relevant reports.
ELO15. Develop and make effective decisions regarding professional activities in the field of geodesy and land management, including under conditions of uncertainty.

PRACTICE BASES

The training practice in the discipline of GEOINFORMATION, COMPUTER SCIENCE AND PROGRAMMING in the first year of the Bachelor's degree program is conducted on the basis of the Geoinformation Technologies laboratory, which is located in rooms 120, 102, 103 of the educational building No. 6 of the National University of Biology and Chemistry of Ukraine.

ORGANIZATION OF INTERNSHIPS

Internal regulations and safety regulations.

The general management of the practice is carried out by the head of the Department of Geoinformatics and Aerospace Research of the Earth.

Academic study groups are led by department teachers.

The responsibilities of the academic group leader include:

- drawing up a schedule of training practice for individual types of work;
- highlighting and explaining the content of the tasks, issuing initial data (task variants);
- demonstration of the correct methodology for completing tasks;
- monitoring the progress of tasks;
- timely acceptance and evaluation of work performed by students;
- constant supervision of the state of labor discipline, order and organization of students.

The duration of the internship for 2nd year students, according to the curriculum for specialty 193. Geodesy and Land Management – 6 working days (1 week): working with search engines – 2 days, familiarization with the main software modules – 2 days, preparation of a report on the internship – 1 day, acceptance of completed tasks and assessment – 1 day.

Familiarization with safety techniques and rules for using the workplace

The main task of occupational safety and health is to prevent the causes that cause accidents at work.

The work of studying the tools of modern software currently requires spending the majority of working time at a computer, and therefore it is necessary to know the rules for safe use of a computer and peripheral devices. The main goal of computer security is to prevent occupational injuries and damage to health.

When performing work on computers, it is necessary to comply with the requirements of the general instructions and this occupational health and safety instruction.

Individuals who have passed the exam in the discipline "GEOINFORMATICS, COMPUTER SCIENCES AND PROGRAMMING", have undergone introductory briefing on labor protection and primary briefing on labor protection at the workplace are allowed to work independently on computers.

While working on computers, dangerous and harmful factors such as physical factors and psychophysiological factors may act.

The main equipment of a computer user's workplace is a monitor, system unit, and keyboard.

When working with text information (in data entry and text editing mode, reading from the screen), the most physiologically correct is the image of black characters on a light (white) background.

The monitor should be placed at the workplace so that the screen surface is in the center of the field of vision at a distance of 400-700 mm from the user's eyes. It is recommended to place the elements of the workplace so that the eyes are at the same distance from the screen, keyboard, text. In order to relieve eye strain, it is recommended to look away from the monitor every half hour and look at distant objects.

A comfortable working posture when working with a computer is ensured by adjusting the height of the desk, chair and footrest. A rational working position can be considered a position in which the operator's feet are located horizontally on the floor or footrest, the hips are oriented in a horizontal plane, and the upper arms are vertical. The angle of the elbow joint varies within 70-90°, the wrists are bent at an angle of no more than 20°, and the head is tilted 15-20°.

To neutralize static electricity charges in a room where work is done on computers, including laser and LED printers, it is recommended to increase the humidity of the air using room humidifiers. It is not recommended to wear clothing made of synthetic materials.

To maintain eye health, it is recommended to:

- turn the monitor so that it is comfortable to look at the screen - at a right angle (not from the side) and slightly from top to bottom, while the screen should be slightly tilted, its lower edge closer to the operator;
- screen brightness – not less than 100Kd/m2;
- the ratio of the monitor brightness to the brightness of the surrounding surfaces in the working area is no more than 3:1;
- the minimum size of the glow dot is no more than 0.4 mm for a monochrome monitor and no less than 0.6 mm for a color monitor, the contrast of the sign image is no less than 0.8;
- the resolution must be at least 768X640 pixels per inch, and the frame rate must be at least 75 Hz;
- If any malfunctions are detected, do not start work until the negative factors have been eliminated.
- Safety requirements during work:
- it is necessary to place the keyboard stably on the desktop, preventing it from shaking;
- while working, sit straight, do not strain. Maintaining the correct position when working with a computer is helped by a rationally selected work chair or armchair, which can be easily adjusted to the

figure. The back of the chair should support the lower half of the back, but at the same time be rigidly fixed so as not to hinder movements during work;

- To prevent adverse effects on the user of devices such as a "mouse", a large, free table surface should be provided for moving the "mouse" and for comfortable support of the elbow joint;
- Extraneous conversations and irritating noises are not allowed;
- the user is individually responsible for the sanitary, technical condition and staffing of the workplace;
- If you smell or/and see any visible signs of smoke, you must immediately notify the teacher or system administrator and disconnect the device from the power supply. If necessary, use a fire extinguisher;
- Periodically, when the computer is turned off, remove dust from the surfaces of the equipment with a cotton cloth slightly moistened with soapy water. Wipe the VDT screen and protective screen with a cloth moistened with alcohol. Do not use liquid or aerosol cleaners to clean the surfaces of the computer.

It is forbidden (when working in the laboratory):

- Use the workplace without the permission of the system administrator, head of the department or teacher;
- Turn the computer on and off independently;
- Repair equipment yourself;
- Place any objects on the computer equipment;
- Cover the ventilation holes of the equipment with anything, which may lead to its overheating and failure;
- Use programs and information that are not used in the assignment; - Record or rewrite programs and information without the permission of the system administrator and teacher;
- It is strictly forbidden to change computer options and settings.
- To remove static electricity, it is recommended to touch metal surfaces from time to time.

Safety requirements after work :

- Complete and save the file in progress to the computer's memory (in your own working folder);
- Turn off the printer and other peripheral devices. Unplug the power cords from the outlets.
- clean the workplace;
- wash your hands thoroughly with warm water and soap;
- turn off the air conditioning, lighting and general power supply;

To avoid serious problems with the spine, it is recommended to work at the computer for no more than six hours a day, and to do gymnastics for thirty minutes every two hours.

You need to adjust the height of the keyboard to choose the most comfortable angle for yourself.

You need to take regular short breaks from working on the keyboard with massage and hand warming up, which really helps eliminate unpleasant sensations in the upper extremities.

2. Program and structure of the academic discipline

– full-time (part-time) study period

Content module names and topics	Number of hours												
	day uniform							correspondence form					
	weeks	total	including					total	including				
			l	n	lab	ind	s.r.		l	n	lab	ind	s.r.
Topic 1. Initial data processing	1	1		5									
Topic 2. Working with administrative-territorial data				5									
Topic 3. Working with road and rail network data				5									
Topic 4. Working with hydrographic network data				5									

Topic 5. Forming and defending a report				5									
Together for practice				**25**									
Total hours				**25**									

3. **Topics of practical classes**

№	Topic	Hours
1	Initial data processing	5
2	Working with administrative-territorial data	5
3	Working with road and rail network data	5
4	Working with hydrographic network data	5
5	Report generation and protection	5
	Together	**25**

4. Methods and means of diagnosing learning outcomes:

– oral or written survey;
– defense of practical works;
– defense of the internship report.

5.* Teaching methods *:

– problem-based learning;
– practice-oriented learning;
– teamwork.

6. Assessment of learning outcomes.

The knowledge of a higher education applicant is assessed on a 100-point scale and is converted into a national assessment in accordance with the current "Regulations on Examinations and Tests at the NUBiP of Ukraine"

8.1. Distribution of points by types of educational activities

Type of educational activity	Learning outcomes	Evaluation
Topic 1. Initial data processing	Data loading. Determination of variants by districts. Data trimming by districts. Physico-geographical description of the territory . ELO02; ELO03; ELO10	**20**
Topic 2. Working with administrative-territorial data	Creating a layout for printing in QGIS ATU district. Description of ATU district . ELO03; ELO04; ELO11	**20**
Topic 3. Working with road and rail network data	Creating a printable layout in QGIS of the district's road and rail networks. Description of the district's transport system . ELO02; ELO09; ELO15	**20**
Topic 4. Working with hydrographic network data	Creating a printable layout in QGIS of the district's hydrographic network. Description of the district's hydrographic network . ELO03; ELO09; ELO11	**20**
Topic 5. Forming and defending a report	Formation and defense of a report on the topic "Creation of technical documentation for district development planning". ELO02; ELO03; ELO04; ELO10; ELO15	**20**
Educational practice		**100**
Total per course		**(Teaching practice) ≤ 100**

8.2. Higher education student knowledge assessment scale

Higher education applicant rating, points	Assessment according to the national system (exams/credits)
90-100	perfectly
74-89	good
60-73	satisfactorily
0-59	unsatisfactorily

8.3. Evaluation Policy

Deadline and resubmission policy	Works submitted after the deadline without good reason will be given a lower grade. Modules can be retaken with the permission of the lecturer if there are good reasons (for example, sick leave).
Academic Integrity Policy	Cheating during tests and exams is prohibited (including using mobile devices). Term papers and essays must have correct text references to the literature used
Visitation Policy	at classes is mandatory. For objective reasons (e.g. illness, international internship), studies may be conducted individually (online upon agreement with the dean of the faculty).

7. **Educational and methodological support:**

- electronic educational course of the academic discipline (on the educational portal of the NUBiP of Ukraine eLearn - *http://elearn.nubip.edu.ua/course/view.php?id=705*; *http://elearn.nubip.edu.ua/course/view.php?id=706*; *http://elearn.nubip.edu.ua/course/view.php?id=707*; *http://elearn.nubip.edu.ua/course/view.php?id=2436*; *http://elearn.nubip.edu.ua/course/view.php?id=2437*; *http://elearn.nubip.edu.ua/course/view.php?id=2438*);
- lecture notes and their presentations (in electronic form - *http://elearn.nubip.edu.ua/course/view.php?id=705*; *http://elearn.nubip.edu.ua/course/view.php?id=706*; *http://elearn.nubip.edu.ua/course/view.php?id=707*; *http://elearn.nubip.edu.ua/course/view.php?id=2436*; *http://elearn.nubip.edu.ua/course/view.php?id=2437*; *http://elearn.nubip.edu.ua/course/view.php?id=2438*);
- textbooks, study guides, workshops;
- methodological materials for studying the academic discipline for full-time and part-time higher education students
- Methodical instructions for teaching practice in the discipline "Geoinformatics, Computer Science and Programming" (2nd year) / L.V. Primak, A.A. Moskalenko. – Kyiv, 2023. – 68 p.
- Methodical instructions for teaching practice in the discipline "Geoinformatics, Computer Science and Programming" (1st year) / A.A. Moskalenko, O.M. Shykula, I.M. Shkvyr. – Kyiv, 2022. – 64 p.

- Lecture notes on the discipline "Geoinformatics". Part 1 (for students of the direction of training "Geodesy, cartography and land management") / O.M. Shykula, I.M. Shkvyr, A.A. Moskalenko, T.A. Gez. – Kyiv, 2015. – 241 p.
- Lecture notes on the discipline "Geoinformatics". Part II (for students of the direction of training "Geodesy, Cartography and Land Management") / O.M. Shykula, I.M. Shkvyr, A.A. Moskalenko. – Kyiv, 2015. – 305 p.
- Lecture notes on the discipline "Geoinformatics". Part III (for students of the direction of training "Geodesy, Cartography and Land Management") / O.M. Shykula, O.P. Drozdivskyi, I.M. Shkvyr, A.A. Moskalenko. – Kyiv, 2015. – 162 p.
- Course of lectures on the discipline "Informatics and Programming" (for students of the direction of training "Geodesy, Cartography and Land Management" shortened term of study) / O.M. Shykula, I.M. Shkvyr, A.A. Moskalenko, T.A. Gez, N.M. Nazarenko. – Kyiv, 2014. – 128 p.
- Methodical instructions for performing independent work in the discipline “Informatics and Programming” (for students of the direction of training “Geodesy, Cartography and Land Management” shortened term of study) / O.M. Shykula, I.M. Shkvyr. – Kyiv, 2013. – 16 p.
- Methodical instructions for performing independent work in the discipline "Informatics and Programming" (for students of the direction of training "Geodesy, Cartography and Land Management") / O.M. Shykula, I.M. Shkvyr. – Kyiv, 2013. – 32 p.

8. **Recommended sources of information**

Main:

1. Sandra L. Arlinghaus, Joseph J. Kerski, Ann Evans Larimore, Matthew Naud. Spatial Thinking in Environmental Contexts. Maps. Maps, Archives, and Timelines. 1st Edition. 2023. 248
2. Bolstad P., Manson S. GIS Fundamentals: A First Text on Geographic Information Systems. 7th Edition. 2022. 764 p.
3. Pavlysh V. A., Glinenko L. K., Shakhovska N. B.. Fundamentals of Information Technologies and Systems. Lviv: Lviv Polytechnic. 2018. 620p.
4. Karpinsky Yu.O., Lyashchenko A.A., Lazorenko N.Yu., Kin D.O. Fundamentals of creating interoperable geospatial data. Kyiv. KNUBA. 2023.302 p.

Auxiliary:

5. James Holler. The Microsoft Office 365 Bible: The Most Updated and Complete Guide to Excel, Word, PowerPoint, Outlook, OneNote, OneDrive, Teams, Access, and Publisher from Beginners to Advanced. 2022. 359 p.
6. Alexander M., Kusleika D. Microsoft Excel 365 Bible. Wiley 2022. 1072
7. Ellen Lupton, Jennifer Cole Phillips. Graphic Design. New Fundamentals. Kyiv: ArtHuss. 2019. 262 p.
8. Berinato S. Good Diagrams. Tips, Tools, and Exercises for Better Data Visualization. Kyiv: ArtHuss. 2022. 288 p.
9. Mark Lutz. Python. Programmer's Handbook. Kyiv: Naukovyi svit. 2023. 294 p.
10. Paul Berry. Head First. Python: An Easy-to-Understand Reference. Kharkiv: 2021. 624 p.

11. Shipulin V. D. Basic principles of geoinformation systems: a textbook. Kharkiv: KhNAMG, 2010. 313 p.
12. Moodle Documentation. URL: https://docs.moodle.org/403/en/Main_page
13. Word help & learning. URL: https://support.microsoft.com/en-us/word
14. Excel help & learning. URL: https://support.microsoft.com/en-us/excel
15. Python Language Reference. URL: https://docs.python.org/uk/3/reference/index.html
16. Online IDE - Code Editor, Compiler, Interpreter. URL: https://www.online-ide.com/
17. Google Earth Help. URL: https://support.google.com/earth/?hl=en#topic=7364880
18. QGIS User Guide. URL: https://docs.qgis.org/3.28/en/docs/user_manual/index.html