

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ

НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ БІОРЕСУРСІВ І ПРИРОДОКОРИСТУВАННЯ УКРАЇНИ

«Положення про робочу програму навчальної дисципліни» СУ СМЯ НУБіП України 7.5-072-05

Введено в дію:

Наказ №_____

від _____

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

CURRICULUM OF ACADEMIC DISCIPLINE

GEOINFORMATICS, INFORMATICS AND PROGRAMMING

Area of knowledge	G "Engineering, Manufacturing and Construction"
Specialty	G18 Geodesy and land management
Academic programme	"Geodesy and Land Management"
Faculty	Land Management
Developed by:	Assistant Professor, PhD, Bohdanna ZAYACHKIVSKA
	Assistant Professor, Doctor of Philosophy Anastasiia Gorodnycha

Description of the course Geoinformatics, Informatics and Programming

Tasks of discipline are to develop an expert understanding of the prospects for further development and practical use of computer technology, theoretical knowledge and practical computer skills among OS WINDOWS, basic techniques using the Microsoft Office package Office.

Branch of knowledge, direction of education, specialty, educational-qualification level (EQL)						
Educational qualification level	Bachelor					
Specialty	G "Engineering, Manufacturing and					
	Construction"					
Educational program	Geodesy and Land Management					
Description of the course						
Туре	Compulsory					
Total number of hours	120					
Number of credits ECTS	4					
Number of content modules	4					
Course project (work)	-					
Form of Control	Test, Exam, Exam					
Discipline parameters for full-time studen	s and students studied by correspondence					
	Full-time					
Year of training	1					
Semester	1-2					
Lectures	15-15					
Practical, seminars	-					
Laboratory studies	30-30					
Self-dependent work	15-15					
Number of weekly hours	2-2					
for full-time study:						
classroom						

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

Aim of the discipline "Geoinformatics, Informatics and Programming" is to form in the specialist an awareness of the prospects for the development and further practical use of computer technologies, theoretical knowledge and practical skills of working on a computer in word and spreadsheet processors, writing programs using the Python programming language, working with files and file systems, acquiring skills in a systematic approach to learning, building algorithms of actions, automating calculations and working with information in general and search engines.

Acquisition of competencies:

Integrated competency (IC)

IC. The ability to solve complex specialized problems of geodesy and land management *- general competencies:*

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. Ability to preserve, multiply moral, cultural, scientific values and achievements of society based on understanding of 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 technology. activities for recreation and healthy living.

- special competencies:

SC04. Ability to select and use effective methods, technologies and equipment for professional activities in the field of geodesy and land management.

SC06. Ability to perform remote, ground, field and in-house research, engineering calculations for processing research results, prepare research results, prepare reports in solving problems of geodesy and land management.

SC07. Ability to collect, update, process, critically evaluate, interpret, store, publish and use geospatial data and metadata on objects of natural and man-made origin.

SC09. Ability to use tools, instruments, equipment, facilities in the performance of geodetic and land management tasks.

SC10. Ability to monitor and evaluate land.

expected learning outcomes (ELO):

ELO2. Organize and manage the professional development of individuals and groups.

ELO3. Communicate information, ideas, problems, solutions, personal experience and arguments to specialists and non-specialists.

ELO4. To know and apply in professional activity normative-legal acts, normative-technical documents, reference materials in the field of geodesy and land management and related branches.

ELO9. Collect, evaluate, interpret and use geospatial data, metadata on objects of natural and manmade 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, hardware and software required for remote, terrestrial, field and in-house surveys in the field of geodesy and land management.

ELO11. Organize and perform remote, ground, field and camera work in the field of geodesy and land management, prepare the results of the work, prepare relevant reports.

ELO15. Develop and make effective decisions on professional activities in the field of geodesy and land management, including under conditions of uncertainty.

	Hours											
Madulas and tamias	full-time study						correspondence					
Modules and topics	weeks	weeks Total weeks				Total	fotal weeks					
			1	р	lab	ind	s.st.		1	р	lab	ind
1	2	3	4	5	6	7	8	9	10	11	12	13
		Semes	ter I									
Module1. Information	n techno	ologies	in ge	ode	sy an	d lar	nd ma	anagem	ent			
Theme 1. Theoretical prerequisites	1-2	19	2		2		15					
for the study of geoinformatics												
Theme 2. Modern technical means	3-4	8	2		6							
of working with data												
Theme 3. Digital transformation	5-6	4	2		2							
Total module1		31	6		10		15					
Module2. Processing of	land m	anagen	nent	info	rmati	on iı	n wor	d proce	essors	5		
Theme 4. Use of word processors	7-8	8	2		6							
when performing land management												
works												
Theme 5. Working with tables in	9-10	4	2		2							
text editors												

2. Program of the discipline

		1									
Theme 6	6. Work with graphic objects	11-12	6	2	4						
in text e	ditors	10.15	11	2	0			+			
Theme / Work with scientific and		13-15	11	3	8						
Total m	adula?		20	0	20	0		+			
Total Sa	omostor I		29 60	9	20	15					
10141 50			Semes	ter II	50	13					
	Module1 (3). Processing	of land	manag	ement	informat	tion in t	able pro	ocesso	rs		
Theme	1 (8). The use of table	1-2	23	2	6	15					
processo	ors when performing land		_			_					
manager	ment works										
Theme 2	2 (9). Work with formulas	3-4	6	2	4						
and fi	unctions in spreadsheet										
processo	ors										
Theme 3	3 (10). Visualization of data	5-6	6	2	4						
in the fo	rm of diagrams by means of										
spreadsh	neet processors										
Total me	odule1 (3)		35	6	14	15	<u> </u>	<u> </u>			
Module	$\frac{1}{2}$ (4). Processing of land mar	nageme	nt info	rmatio	n using h	high-leve	el progi	ammi	ng la	anguag	ges
Theme	4 (11). Modern	7 -8	6	2	4						
program	f the Dethew languages. The basic										
Thoma	$\frac{5}{5}$ (12) The concent of	0.10	6	2	1			+			
control	5 (12). The concept of	9-10	0	2	4						
Function	structures in programming.										
Theme (6 (13) Work with complex	11-12		2	4						
data type	es	11 12		2							
Theme 7	7 (14). Work with files	13-15	8	3	4						
Total m	odule2 (4)		25	9	16	0					
Total Se	emester II		60	15	30	15					
Total ho	ours		120			30					
3.	Lecture topics			1				<u> </u>			
No.		Т	nic no	ma					N	lumbe	er
salary	Topic name						hours				
			1 sem	ester							
1	Topic 1. Theoretical prerequ	uisites fo	or stud	ying g	eoinform	natics				2	
2	Topic 2. Modern technical r	neans o	f work	ing wi	th data					2	
3	Topic 3. Digital Transformation						2				
4	Topic 4. Using word proces	sors wh	en per	formin	ig land su	irveying	work			2	
5	Topic 5. Working with table	s in wo	rd proo	cessors	5					2	
6	Topic 6. Working with grap	hic obje	ects in	word r	processor	S			1	2	
7	Topic 7 Working with scientific and technical documentation			+	3						
		2	2nd ser	nester							
1	Topic 1 (8). Using spreadsh	eets in 1	and su	rvevin	g					2	
2	Topic 2 (9). Working with f	ormulas	and fi	inction	s in spre	adsheet	5			2	
3	Topic 3 (10). Data visualiza	tion in t	the for	mofd	iagrams	using sn	readshe	eets	+	2	
4	Topic 4 (11). Modern progr	ammino	1ano11	ages 1	Basic svn	tax of P	vthon		+	2	
5	Topic 5 (12). The concept α	f contro	struc	tures i	n program	nmino	Functio	ons	+	2	
6	Topic 6 (13) Working with	comple	$\frac{1}{x}$ data	types	- program				+	$\frac{2}{2}$	
7	Topic 7 (14) Working with	files	11 autu	-JP-3					+	3	
1 1						1	5				

4. Laboratory topics

N⁰	Торіс	Hours			
	Semester I				
Module 1. Information technologies in geodesy and land management					
1	Work in the Windows OS environment. Basic actions with files and folders	2			
2	Moodle distance learning information system of the university. Part1	2			
3	Moodle distance learning information system of the university. Part 2	2			
4	Moodle distance learning information system of the university. Part 3	2			
5.	Work with antivirus programs	2			
	Module 2. Processing of land management information in word processors				
6	Text editing and formatting. Part 1	2			
7	Text editing and formatting. Part 2	2			
8	Entering special characters in word processor	2			
9	Working with tables in word processor	2			
10	Work with simple graphic images in the form of flowcharts in text documents	2			
11	Working with graphics in word processor	2			
12	Work with the formula editor and elementary calculations in word processor	2			
13	Work with links and footers in word processor	2			
14	Document review in word processor	2			
15	Hyperlinks and macros	2			
Total S	emester I	30			
	Semester II				
Ν	Adule 1 (3). Processing of land management information in table processors				
1 (16)	Creation of spreadsheets and data entry in table processor spreadsheet	2			
2 (17)	Formatting and editing the table structure in table processor	2			
3 (18)	Conditional formatting of table cells	2			
4 (19)	Work with formulas in the table processor	2			
5 (20)	Working with sheets in the table processor, exchanging data between sheets	2			
6 (21)	Table processor: work with diagrams	2			
7 (22)	Table processor: creation of value distribution diagrams	2			
Modul	e 2 (4). Processing of land management information using high-level programming	languages			
8 (23)	Basics of programming in Python	2			
9 (24)	Program structure, data, expressions and operations in Python	2			
10 (25)	Programming functions in Python	2			
11 (26)	Conditional and looping flow control structures in the Python programming	2			
	language				
12 (27)	Lists and tuples (records) in Python	2			
13 (28)	Arrays in Python	2			
14 (29)	Dictionaries and working with files in Python	2			
15 (30)	Date and time objects in Python	2			
Total S	emester II	30			
Total		90			

5. Self-dependent work

N⁰	Topic	Hours
1.	Working with Google Drive	15
2	Excel Drop Down List using Data Validation and Excel Tables that updates dynamically	15
3.	Maps.visicom.ua is a Ukrainian geospatial data portal	15
	Total	45

6. Methods and means of diagnosing learning outcomes:

- final test;
- exam;
- module tests;
- essays;
- defence of laboratory work.

7. Teaching methods:

- verbal method (lecture, discussion, interview, etc.);
- practical method (laboratory, practical classes);
- visual method (illustration method, demonstration method);

- work with educational and methodical literature (summarizing, summarizing, annotating, reviewing, writing an abstract);

- video method (remote, multimedia, web-oriented, etc.);

- independent work (task performance).

8. Assessment of learning outcomes.

The knowledge of a higher education applicant is assessed on a 100-point scale and is translated 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 aducational activities

ð.1.	Distribution of points by types of educational activ	lues
Торіс	Learning outcomes	Evaluation
	First semester	
Module 1. INFORMATION	NAGEMENT	
Laboratory work 1. Working in	PRN2, 3, 4, 9. Including the prerequisites for the	15
the Windows environment.	development of computer science as a science and the	
Basic actions with files and	basic techniques of working in the Windows	
folders	environment. Apply practical skills in creating,	
	copying, moving, deleting, restoring, searching and	
	archiving files and documents. Be able to use various	
	types of cloud environments for storing significant	
	amounts of information.	
Laboratory work 2. Moodle	PRN2, 3, 4, 9, 10, 11, 15. Including the principles of	10
University distance learning	the functional construction of a computer as a	
information system. Part 1	technical means of working with data	
		10
Laboratory work 3. Moodle	PRN2, 11, 15. Including the ability to work with	10
University distance learning	various distance learning systems using a personal	
information system. Part 2	computer. Analyze the features of the hardware of	
	DDN4 0 10 11 15 Including to lower the main	1.5
Laboratory work 4. Moodle	PKIN4, 9, 10, 11, 15. Including to know the main	15
University distance learning	the factures of decision matrice, to be able to form	
information system. Part 3	ine leatures of decision-making, to be able to form	
Laboutenza zverla 5. Werleine	DDN4 10 11 Including analyzing a file and file	10
Laboratory work 5. working	evotes the full note to a file and emplying prostical	10
with antivirus programs	system, the full path to a file, and apprying practical	
Independent work 1. Working	skins in working with antivirus software.	
with Google Drive data storage		10
	Modular control	30
Together by content module 1		100

Laboratory work 6. Editing	ING OF LAND INFORMATION IN WORD FROCE	SSORS
and formatting text. Part 1	PRN2, 3, 4, 9, 10, 11, 15. Including the purpose and main tasks of application software packages, such as Microsoft Office, as well as the test processor	5
Laboratory work 7. Editing and formatting text. Part 2	PRN2, 3, 9. Including the ability to configure the interface and set parameters for working with the word processor	5
Laboratory work 8. Entering special characters in a word processor	PRN2, 10,11. Apply practical skills in editing and formatting text in a word processor, as well as entering special characters	10
Laboratory work 9. Working with tables in a word processor	PRN2, 3, 4, 9, 15. Know the capabilities of a spreadsheet processor for creating, editing, and formatting tables of various structures, be able to create and insert tables into a document, edit and format tables, sort data in tables, and perform basic calculations in them, highlight additional features for working with tables: headers, automatically adding captions to a table, creating a list of tables, etc.	10
Laboratory work 10. Working with simple graphic images in the form of flowcharts in text documents	PRN2, 3, 11, 15. Including the capabilities of a word processor to create special templates, flowcharts, diagrams, graphs and place graphic objects in a text editor	10
Laboratory work 11. Working with graphics in a word processor	PRN2, 3, 4, 15. Be able to select, place various layouts of graphic objects, edit, format graphic objects, in particular create, edit your own block diagrams	10
Laboratory work 12. Working with the formula editor and elementary calculations in a word processor	PRN2, 3, 9, 11. Apply practical skills in creating templates and forms, as well as links on the page, as well as forming a list of used literature	5
Laboratory work 13. Working with links and headers in a word processor	PRN2, 3, 9, 11. Know the basic methods for creating formulas, headers and footers	5
Lab 14. Reviewing a document	PRN2, 3, 4, 9, 10, 11, 15. Be able to perform simple calculations in tables in the MS Word text editor, as	5
in a word processor	well as edit headers and footers,	
in a word processor Laboratory work 15. Hyperlinks and macros	well as edit headers and footers, PRN2, 3, 9, 11. Including being able to link information within one document or with other documents, including those of different formats, and automate actions	5
in a word processor Laboratory work 15. Hyperlinks and macros	well as edit headers and footers, PRN2, 3, 9, 11. Including being able to link information within one document or with other documents, including those of different formats, and automate actions	5
in a word processor Laboratory work 15. Hyperlinks and macros Modular control Together by content module 2	well as edit headers and footers, PRN2, 3, 9, 11. Including being able to link information within one document or with other documents, including those of different formats, and automate actions	5 30 100
in a word processor Laboratory work 15. Hyperlinks and macros Modular control Together by content module 2 Only for 1 semester	well as edit headers and footers, PRN2, 3, 9, 11. Including being able to link information within one document or with other documents, including those of different formats, and automate actions	5 30 100 70
in a word processor Laboratory work 15. Hyperlinks and macros Modular control Together by content module 2 Only for 1 semester Test	well as edit headers and footers, PRN2, 3, 9, 11. Including being able to link information within one document or with other documents, including those of different formats, and automate actions	5 30 100 70 30
in a word processor Laboratory work 15. Hyperlinks and macros Modular control <i>Together by content module 2</i> Only for 1 semester Test Module 1 (3). PROCESSING	well as edit headers and footers, PRN2, 3, 9, 11. Including being able to link information within one document or with other documents, including those of different formats, and automate actions 2nd semester OF LAND-BASED INFORMATION IN SPREAD F	5 30 100 70 30 PROCESSORS
in a word processor Laboratory work 15. Hyperlinks and macros Modular control Together by content module 2 Only for 1 semester Test Module 1 (3). PROCESSING Laboratory work 1. Creating spreadsheets and entering data in a spreadsheet processor Independent work 1. Drop-	well as edit headers and footers, PRN2, 3, 9, 11. Including being able to link information within one document or with other documents, including those of different formats, and automate actions 2nd semester OF LAND-BASED INFORMATION IN SPREAD F PRN2, 4, 9, 10, 11, 15. Including the purpose and main tasks of application packages, in particular Microsoft Office, as well as a spreadsheet	5 30 100 70 30 PROCESSORS 10

processor , conditional formatting of cells by values		
Laboratory work 2. Formatting and editing the structure of tables in a spreadsheet	PRN2, 3, 4, 9, 10. Including applying practical skills in creating, copying, moving, deleting, restoring, searching, and archiving workbooks.	10
Laboratory work 3. Conditional formatting of table cells	PRN2, 3, 4, 9. Including being able to create, edit, and format books in a spreadsheet	10
Laboratory work 4. Working with formulas in a spreadsheet	PRN2, 3, 4. Including the elements and composition of a formula, absolute and relative references to cells in a spreadsheet , the ability to create and edit formulas in a spreadsheet	10
Laboratory work 5. Working with sheets in a spreadsheet, exchanging data between sheets	PRN2, 3, 4, 9. Analyze the features copying formulas in a spreadsheet	10
Laboratory work 6. Working with charts in a spreadsheet	PRN2, 3, 4, 9. Apply formulas when calculating the monetary valuation of land plots in a spreadsheet processor	5
Laboratory work 7. Creating value distribution diagrams in a spreadsheet	PRN2, 3, 4, 9, 10, 11, 15. Including the types of diagrams and the features of their use for visualizing numerical data, be able to choose the type and build diagrams in a spreadsheet, analyze the presentability of a diagram when visualizing numerical data, apply practical skills in working with diagrams in a spreadsheet	10
	Modular control	30
Together by content module 1	1	100
Module 2 (4). PROCES PROGRAMMING LANGUA	SING OF LAND INFORMATION USING	HIGH-LEVEL
Laboratory work 8. Fundamentals of programming in Python	PRN2, 3, 4, 9, 10, 11, 15. Including the classification of programming languages, the general structure of a program in the Python programming language	5
Laboratory work 9. Program structure, data, expressions and operations in Python	PRN2, 3, 4, 9. Including the ability to create an elementary program in Python using mathematical operators, built-in functions, and outputting the result to the console.	10
Laboratory work 10. Programming functions in Python	PRN2, 3, 4, 10, 11. Including applying practical skills in Python to process angular and metric measurements.	10
Laboratory work 11. Conditional and cyclic flow control structures in the Python programming language	PRN10, 11, 15. Including the classification of control structures, the syntax of cyclic and conditional structures, functions in Python	10
Lab 12. Lists and tuples (records) in Python	PRN10, 11, 15. Including the ability to program your own functions in Python , perform cyclic and conditional operations in the program. , use programming to convert degrees of angles to	10

	decimal and vice versa, to perform verification of entered variables.	
Laboratory 13. Arrays Python	in PRN2, 3, 4, 9, 10, 11, 15. Including definitions of lists, records, dictionaries, sets in Python	10
Lab 14. Dictionaries a working with files in Python	nd PRN2, 3, 4, 9, 10, 11, 15 Including the ability to choose the type of complex data depending on the task, program the input, recording and output of complex data types , apply practical programming skills using complex data types when working with large amounts of information	5
Laboratory work 15. Date a time objects in Pyth Independent work Maps.visicom.ua – Ukraini geospatial data portal	nd PRN2, 3, 4, 9, 10, 11, 15. Including understanding the classification of files into text and binary, Python 2. syntax when working with files, being able to open, write to, and close files in a Python program , calculating program runtime, and applying programming skills to output results to a file when	5
	working with large amounts of information.	
Modular control		30
Together by content module	2	100
Total for the second		70
semester		
Exam		30

9. Teaching and learning aids:

- electronic educational course of the educational discipline (on the educational portal of NUBiP of Ukraine eLearn - <u>http://elearn.nubip.edu.ua/course/view.php?id=705</u>; <u>http://elearn.nubip.edu.ua/course/view.php?id=706</u>;

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);

- abstracts of lectures 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, training aids, workshops;

- methodical materials on the study of the academic discipline for students of higher education full-time and part-time forms of higher education:

- Methodologiacal guideline for education practice of discipline з дисципліни «Geoinformatics, informatics and programming» (2 курс) / Л.В. Примак, А.А. Москаленко. Київ, 2023. 68 с.
- Методичні рекомендації до виконання лабораторних робіт з дисципліни "Геоінформатика, інформатика й програмування. Частина 2" для студентів ОС «Бакалавр» спеціальності 193

"Геодезія та землеустрій" / Л.В. Примак, А.А. Москаленко, Б.Б. Заячківська, - К., ЦП «КОМПРИНТ», 2024, 138 с.

- Методичні рекомендації до виконання лабораторних робіт з дисципліни "Geoinformatics, Informatics and programming. Part 2" англійською мовою для студентів ОС «Бакалавр» спеціальності 193 "Геодезія та землеустрій" / Л.В. Примак, А.А. Москаленко, Б.Б. Заячківська, - К., ЦП «КОМПРИНТ», 2024, 140 с.
- Конспект лекцій з дисципліни "Геоінформатика, інформатика й програмування. Частина
 2" для студентів ОС «Бакалавр» спеціальності 193 "Геодезія та землеустрій" / Л.В.
 Примак, О.П. Дроздівський, Б.Б. Заячківська, К., ЦП «КОМПРИНТ», 2024, 167 с.
- Конспект лекцій з дисципліни "Geoinformatics, Informatics and programming. Part 2" англійською мовою для студентів ОС «Бакалавр» спеціальності 193 "Геодезія та землеустрій" / Л.В. Примак, О.П. Дроздівський, Б.Б. Заячківська, К., ЦП «КОМПРИНТ» 2024, 165 с.
- program of teaching practice of the academic discipline

10. Recommended sources of information Basic:

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 p.

2. Bolstad P., Manson S. GIS Fundamentals: A First Text on Geographic Information System. 7th Edition. 2022. 764 p.

3. Павлиш В. А., Гліненко Л. К., Шаховська Н. Б.. Основи інформаційних технологій і систем. Львів: Львівська політехніка. 2018. 620с.

Addition:

4. 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.

5. Alexander M., Kusleika D. Microsoft Excel 365 Bible. Wiley 2022. 1072 p.

6. Еллен Лаптон, Дженніфер Коул Філліпс. Графічний дизайн. Нові основи. Київ: ArtHuss. 2019. 262 с.

7. Берінато С. Хороші діаграми. Поради, інструменти та вправи для кращої візуалізації даних. Київ: ArtHuss. 2022. 288 с.

8. Марк Лутц. Python. Довідник програміста. Київ: Науковий світ. 2023. 294 с.

9. Пол Беррі. Head First. Python: Легкий для сприйняття довідник. Харків: 2021. 624 с.

10. Шипулін В. Д. Основні принципи геоінформаційних систем: навчальний посібник. Харків: ХНАМГ, 2010. 313 с.

- 11. Moodle Documentation. URL: https://docs.moodle.org/403/en/Main_page
- 12. Word help & learning. URL: https://support.microsoft.com/en-us/word
- 13. Excel help & learning. URL: https://support.microsoft.com/en-us/excel
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