



## Syllabus « GIS in cadastral systems »

**Educational-qualification level** - Master  
**Specialty** 193. Geodesy and Land Management  
**Educational program** «Geodesy and Land management»  
**Year of study** 2, semester 3  
**Mode of study:** full  
**ECTS hours** – 4,0  
**Language:** English

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**Instructor****Contacts****(e-mail)****eLearn webpage**

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### Course Overview:

Discipline "GIS in cadastral systems" provides the opportunity to use for the national cadastral system and land management software and hardware for automated accounting, storage, display, analysis, modeling of spatially coordinated information.

Aim of the discipline is learning and gaining master students and acquire the necessary theoretical knowledge and practical skills in the use of geographic information systems in creating cadastral systems and the formation of knowledge about the development of cadastral systems of Ukraine and the world, the contribution of Ukrainian and foreign scientists.

Tasks of discipline is forming the specialist and subsequent practical use of technologies of GIS in land management and land cadaster to take stock of land resources and land owners predicting the state land fund, monitor the use and protection of soil, registration and protection of the rights of citizens and businesses and more. Understand the significance of GIS tools in land consolidation projects and identify various types of GIS tools that can be used. Ability to utilize GIS tools in land consolidation, such as enhancing project planning, stakeholder engagement, and decision-making processes. Collect and manage spatial data using GIS tools and understand the importance of spatial data in land consolidation projects. Utilize GIS tools to prepare maps as part of a land consolidation project and understand the role of maps in facilitating effective communication and decision-making among stakeholders involved in land consolidation.

- general competencies:

GC01. Ability to identify, formulate and solve problems;

GC04. Ability to generate new ideas (creativity);

GC05. Ability to adapt and act in a new situation.

- special competencies:

SC01. Ability to plan and perform theoretical and/or applied research, create new knowledge and technologies in the field of geodesy and land management;

SC03. Ability to effectively apply the theories, principles and technologies of mathematics, natural, technical, social, economic sciences in solving complex problems of geodesy and land management;

SC04. Ability to search for the necessary information, select and apply modern methods of processing, analysis, evaluation and publication of data, including geospatial data and metadata in solving complex problems of geodesy and land management;

SC05. Ability to substantiate and evaluate methods of surveys, surveys, tests, diagnostics, monitoring of geodesy and land management objects;

SC09. Ability to develop and apply new strategic approaches to solving problems in the field of geodesy and land management.

Programme learning outcomes:

RN03. To make effective decisions on solving applied, research and/or innovative problems in the field of geodesy and land management, analyse alternatives, make forecasts, assess risks, in particular in conditions of incomplete and/or contradictory information and ambiguous requirements;

RN04. To build and research conceptual, mathematical and computer models of objects and processes, apply them to create innovations in the field of geodesy and land management;

RN05. To create and develop geospatial data infrastructures, process and publish geospatial data and metadata related to geodesy and land management;

RN07. To justify the choice of equipment, technologies and processes for production management and research in the field of geodesy and land management and related fields;

RN09. To develop and implement measures for operational and prospective management, forecasting and planning of geodetic, cartographic and land management production, taking into account available resources and time constraints;

RN11. To perform a comprehensive analysis and assessment of the state of geodesy and land management objects and assess the consequences of the implementation of practical measures;

RN13. Perform surveys, tests, diagnostics, monitoring of geodesy and land management objects, develop land protection measures and assess their consequences;

RN14. To critically comprehend current problems and promising directions of development of geodesy and land management, related interdisciplinary issues.

### The course Program and Structure

Topic	Hrs (lectures /laboratory/ individual)	Education result	Tasks	Grade
<b>3 semestr</b>				
<b>SEMANTIC MODULE I. Experience of cadastral projects regional and national level by using GIS technology</b>				
<b>Theme 1.</b> GIS - technologies in land cadastre. Geographic information systems of land cadastre in Ukraine. Collection and management of geospatial data using GIS tools.	<b>0/6/28</b>	Know modern GIS technologies in land cadastres of foreign countries. Understand geographic information systems of land cadastre in Ukraine. Understand the importance of GIS tools in land consolidation projects, distinguish and be able to apply different types of GIS tools.	Submitting in eLearn <b>Laboratory work:</b> Using GIS tools to calculate the monetary evaluation of individual plots <b>Individual work:</b> Professional terminology for GIS in cadastral systems. GIS - technology in land cadaster. Automated land cadaster in Ukraine. Experience in cadastral projects regional and national levels using GIS technology	<b>35</b>
<b>Theme 2.</b> Features of cadastral systems in foreign countries.	<b>0/8/18</b>	Understand the strengths and weaknesses of cadastral systems in foreign countries. Be able to identify the main types of cadastral systems.	Submitting in eLearn <b>Laboratory work:</b> Construction of sanitary and coastal protection zones around objects with special regulations. Analysis zones around objects with special regulations <b>Individual work:</b> Features cadastral systems in foreign countries. World experiences to build and use cadaster and registry	<b>35</b>
<b>Module control</b>			Test	<b>30</b>
<b>Total module 1</b>	<b>0/14/46</b>			<b>100</b>
<b>SEMANTIC MODULE II. Object Model of cadastral database</b>				
<b>Theme 3.</b> Data on the land fund and ways of displaying it. Basic concepts of cadastral database. Server-based GIS. Preparation of maps (plans) as a component of land consolidation projects.	<b>0/4/14</b>	Understand the concept of land fund data. Know the functions of data processing in land cadastre systems. Understand the ways in which land data can be displayed. Be able to use GIS tools in land consolidation, e.g. to improve project planning, stakeholder engagement and decision-making processes.	Submitting in eLearn <b>Laboratory work:</b> The selection of information from the geodatabase by location and by attributes <b>Individual works:</b> Concepts of cadastral database. Models of cadastral databases	<b>20</b>

<b>Theme 4.</b> GIS tools and their importance in land consolidation projects. Different types of GIS tools and how they can be used in land consolidation.	<b>0/6/15</b>	Understand the concept of a cadastral database. Know the basic ways of organising cadastral databases and operations with them. Collect and manage geospatial data using GIS tools and understand the importance of geospatial data in land consolidation projects.	Submitting in eLearn <b>Laboratory work:</b> Data analysis using ArcGIS tools. <b>Individual works:</b> Data on the land fund and its displaying. Use of GIS in various industries	<b>25</b>
<b>Theme 5.</b> The benefits of using GIS tools in land consolidation, including their ability to improve project planning, stakeholder engagement and decision-making processes.	<b>0/6/15</b>	Understand the concept of server-based geographic information technologies. Know the main functions that server-based GIS can perform. Use GIS tools to prepare maps (plans) as part of a land consolidation project and understand the role of maps in facilitating effective communication and decision-making between stakeholders involved in land consolidation.	Submitting in eLearn <b>Laboratory work:</b> Data analysis using ArcGIS Online tools. <b>Individual works:</b> Server GIS. Comparison of database models architecture used in cadastral systems	<b>25</b>
<b>Module control</b>			Test	<b>30</b>
<b>Total module 2</b>	<b>0/16/44</b>			<b>100</b>
<b>Total 3 semester</b>				<b>70</b>
<b>Final test</b>			Final exam	<b>30</b>
<b>Total course</b>				<b>100</b>

### THE COURSE POLICY

<b><i>Deadline and rearrangement policy:</i></b>	Deadlines are defined in e-learn course. Works being submitted after deadlines without a reason are evaluated at a lower grade. Rearrangement of module tests takes place with the permission of the lecturer in case of a specific reasons (for example, illness).
<b><i>Policy of Academic Plagiarism:</i></b>	Copying other materials during individual works, tests and final test (including the use of mobile devices) are forbidden. Abstracts must have correct text references to the literature used.
<b><i>Policy of Attendance:</i></b>	Attendance of lessons is mandatory. According to objective reasons (for instance, illness, international internship) training can take place individually (in distance form (on-line) by agreement with the dean of the faculty)

### STUDENT'S RATING SCALE

Student's rating points	The Ukrainian National Grades	
	exams	final tests
90-100	“Excellent”	passed
74-89	“Good”	
60-73	“Satisfactory”	

## RECOMMENDED SOURCES OF INFORMATION

### Основна:

1. Географічні інформаційні системи в кадастрових системах (методичні вказівки до виконання лабораторних робіт) – Київ: ЦП «КОМПРИНТ», 2018. – 40 с.
2. GIS in Cadastral Systems (навчально-методичний посібник) / Кохан С.С., Москаленко А.А., Кошель А.О., Дьоміна І.І.) – Київ: ЦП «КОМПРИНТ», 2020. – 88 с.
3. ArcGIS for Environmental and Water Issues / William Bajjali. - 2018 - p.362
4. Мартин А.Г., Палеха Ю.М., Євсюков Т.О., Кошель А.О. Геоінформаційне забезпечення оціночного районування територій громад в Україні. Сучасні досягнення геодезичної науки та виробництва. 2022. Випуск I (43). С. 121–126.
5. Martyn A., Koshel A., Palekha Y., etc. (2020). Normative monetary valuation of land: on the way to unification and renewal of methodology. Land Management Bulletin, No. 8, 24–31
6. Геоінформаційні системи і бази даних : монографія / В. І. Зацерковний, В. Г. Бурачек, О. О. Железняк, А. О. Терещенко. – Ніжин : НДУ ім. М. Гоголя, 2014. – 492 с.
7. Геоінформаційні системи і бази даних : монографія. – Кн. 2 / В. І. Зацерковний, В. Г. Бурачек, О. О. Железняк, А. О. Терещенко. – Ніжин : НДУ ім. М. Гоголя, 2017 – 237с
8. Martyn A. G., Lukhograd O. M., Koshel A. O. (2017). Features of Monetary Valuation of Lands of Settlements of Ukraine in Terms of Market Relations [Text]: monograph / NULES of Ukraine. Kyiv: Comprint, 300 p.
9. Географічні інформаційні системи: Посібник/ За ред. М. Ван Мерввіна, С.С.Кохан.-К.: НАУ. 2003.-206 с.

### Допоміжна:

10. Patichenko O. M. (2018). Constructive-geographical principles of normative monetary valuation of lands of settlements with the use of geoinformation technologies: abstract of the dissertation of the cand. of geogr. sciences: 11.00.11; Kyiv National University named after Taras Shevchenko. Kyiv, 20 p.
11. Національний стандарт України «ДСТУ ISO 19101:2009 Географічна інформація. Еталонна модель (ISO 19101:2002, IDT)»// 2009-10-15.
12. СОУ ISO 19136:2009 "Обмінний формат геопросторових даних на основі географічної мови розмітки GML (ISO 19136:2007)" // 30.09.2010
13. СОУ 742-33739540 0012:2010 "Комплекс стандартів База топографічних даних Правила кодування та цифрового опису векторних даних" Том 2 // 30.09.2010
14. Основи геоінформаційних систем. Методологія. В.М.Самойленко. Навчальний посібник. –К.: Ніка-Центр.-2003.-276 с.
15. Єршов В.П., Гора І.М. Автоматизовані земельні інформаційні системи. Учебний посібник. –К.: НАУ. 1999.- 196 с.
16. **eLearn webpage** - <https://elearn.nubip.edu.ua/course/view.php?id=1597>
17. ГІС рішення [Електронний ресурс]. – Режим доступу: <http://ndiasb.kiev.ua/ua/teren.php>
18. Законодавство України [Електронний ресурс]. – Режим доступу: <http://rada.gov.ua>