



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

Instructor

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eLearn webpage

<https://elearn.nubip.edu.ua/course/view.php?id=1597>

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.

The discipline provides the formation of a number of competencies:

Integral competencies

The ability to solve complex specialized tasks and practical problems during professional activity in the field of geodesy and land management or during the training process, which involves the application of theoretical knowledge and methods of geodetic, photogrammetric, geoinformation, cartographic technologies and systems, and real estate cadastre and valuation.

- general competencies:

GC 2. Ability to learn to absorb the acquired knowledge in the field of geodesy, photogrammetry, land management, State Land Cadastre, land and real estate valuation, cartography and geoinformatics and integrate them with existing ones.

GC 4. Ability to plan and manage time.

GC 5. Ability to produce new ideas, show creativity and ability to think systematically.

GC 7. Be security-oriented.

GC 8. Ability to have a flexible way of thinking that allows you to understand and solve problems and problems, while maintaining a critical attitude to established scientific concepts.

GC 9. Ability to apply knowledge in practice.

GC 10. Have research skills.

GC 11. Have skills in project development and management.

GC 12. Ability to work both individually and in a team.

GC 13. Ability to communicate effectively at the professional and social levels.

- special competencies:

SC 2. Knowledge of basic regulations and reference materials, current standards and specifications, instructions and other regulatory documents in professional activities;

SC 6. Knowledge of modern technological processes and systems of technological preparation of production;

SC 7. Ability to apply and integrate knowledge and understanding of disciplines of related engineering fields;

SC 11. Ability to use knowledge and skills to calculate the a priori assessment of accuracy and choice of technologies for the design and implementation of applied professional tasks;

SC 13. Ability to investigate the problem and identify constraints, including those related to the problems of sustainable development and environmental impact;

SC 14. Ability to argue the choice of methods for solving specialized problems, critically evaluate the results and defend decisions;

SC 15. Use of appropriate terminology and forms of expression in professional activities.

learning results:

KU 3. Knowledge and understanding of the theoretical foundations of geodesy, higher and engineering geodesy;

KU 4. Knowledge and understanding of the theoretical foundations of topographic and thematic mapping, compilation and updating of maps, remote sensing of the Earth and photogrammetry;

KU 5. Knowledge and understanding of the theoretical foundations of land management, real estate valuation, registration system and the State Land Cadastre;

KU 6. Knowledge and understanding of the basics of the legal framework for ensuring the rational use, protection, accounting and evaluation of land at the national, regional, local and economic levels;

KU 8. Knowledge and understanding of methods and technologies of creation of state geodetic networks and special engineering-geodetic networks, topographic surveys of the area, topographic and geodetic measurements for survey;

KU 9. Knowledge and understanding of design, construction and operation of engineering structures, public, industrial and agricultural complexes using modern ground and aerospace methods;

AKU 10. Application of knowledge and understanding for the use of basic methods of collecting information in the field of geodesy and land management, its systematization and classification in accordance with the design or production task;

AKU 11. Application of knowledge and understanding of the use of geodetic and photogrammetric equipment and technology;

AKU 12. Application of knowledge and understanding of methods of mathematical processing of geodetic and photogrammetric measurements;

AKU 14. Application of knowledge and understanding of land use planning and protection, cadastral surveys and maintenance of the State Land Cadastre;

AKU 15. Application of knowledge and understanding on the development of land management projects, land management and cadastral documentation and land valuation documentation;

AKU 16. Application of knowledge and understanding of map development and cadastral data collection using computer technology, geographic information systems and digital photogrammetry;

AKU 17. Application of knowledge and understanding of processing the results of geodetic measurements, topographic and cadastral surveys, using geographic information technologies and computer software and database management systems;

FJ 18. Formation of judgments on the main technologies and methods of planning and execution of geodetic, topographic and cadastral surveys;

FJ 19. Formation of judgments on computer processing of survey results in geographic information systems;

FJ 23. Formation of judgments on the sale of topographic and land management products based on the use of knowledge of the basics of legislation and production management.

The course Program and Structure

Topic	Hrs (lectures /laboratory/ individual)	Education result	Tasks	Grade
3 semestr				
SEMANTIC MODULE I. Experience of cadastral projects regional and national level by using GIS technology				
Theme 1. GIS - technology in land cadaster. Automated land cadaster in Ukraine.	0/6/28	Know information technology in cadastral systems Understand the possibilities of organization cadastral Information in a GIS Recognize differences between GIS technology in the land cadaster, Land management and land monitoring	Submitting in eLearn Laboratory work: Using GIS tools to calculate the monetary evaluation of individual plots Individual work: 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	35
Theme 2. Features of cadastral systems in foreign countries	0/8/18	Know The development of cadaster system Be able to ArcGIS-ArcMap tools for Analysis zones around objects with special regulations	Submitting in eLearn Laboratory work: Construction of sanitary and coastal protection zones around objects with special regulations. Analysis zones around objects with special regulations Individual work: Features cadastral systems in foreign countries. World experiences to build and use cadaster and registry	35
Module control			Test	30
Total module 1	0/14/46			100
SEMANTIC MODULE II. Object Model of cadastral database				
Theme 3. Concepts of cadastral database	0/4/14	Know basic concepts cadastral database Be able to ArcGIS-ArcMap tools for select information from the geodatabase by location and by attributes Use Basic requirements for cadastral database	Submitting in eLearn Laboratory work: The selection of information from the geodatabase by location and by attributes Individual works: Concepts of cadastral database. Models of cadastral databases	20

Theme 4. Data on the land fund and its displaying	0/6/15	Know basic stages of Spatial analysis of cadastral systems Be able to ArcGIS-ArcMap tools for analyze land fund Analyze sources of information and their quality	Submitting in eLearn Laboratory work: Data analysis using ArcGIS tools. Individual works: Data on the land fund and its displaying. Use of GIS in various industries	25
Theme 5. Server GIS	0/6/15	Know specifications for the inventory system Be able to ArcGIS-ArcMap online tools for analyze land fund Recognize differences between ArcSDE, ArcIMS, ArcGIS Server	Submitting in eLearn Laboratory work: Data analysis using ArcGIS Online tools. Individual works: Server GIS. Comparison of database models architecture used in cadastral systems	25
Module control			Test	30
Total module 2	0/16/44			100
Total 3 semester				70
Final test			Final exam	30
Total course				100

THE COURSE POLICY

<i>Deadline and rearrangement policy:</i>	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).
<i>Policy of Academic Plagiarism:</i>	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.
<i>Policy of Attendance:</i>	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”	
0-59	“Unsatisfactory”	fail

RECOMMENDED SOURCES OF INFORMATION

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.
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>