



Syllabus «Digital Plans and Maps»

Educational-qualification level - Bachelor
Specialty 193. Geodesy and Land Management
Educational program «Geodesy and Land management»
Year of study 3, **semester** 6
Mode of study: full
ECTS hours – 3,0
Language: English

Instructor

Kokhan Svitlana Stanislavivna, Dr. Sci., Prof.

Contacts

Department Geoinformatics and Aerospace Research of the Earth
Build#6, room.129

(e-mail)

kokhan_s@nubip.edu.ua

eLearn webpage

<https://elearn.nubip.edu.ua/course/view.php?id=106>

Course Overview:

The course "Digital Plans and Maps" introduces students the basics of digital mapping and the possibilities of GIS application in creating of digital cartographic products. The course covers issues related to the requirements for digital plans and maps, and the ways to displaying objects, determining the quality of digital cartographic data, as well as spatial data formats, technologies of designing digital plans and maps, and encoding cartographic information.

The course provides obtaining the capabilities in creating and filling basic cartographic layers, making plans based on vector models, editing spatial and attribute data, designing cartographic materials with the formation of a set of topographic symbols in ArcGIS-ArcMap and cartographic signs for individual thematic layers.

Aim of the: The course "Digital plans and maps» provides obtaining skills of GIS cartographic modeling for land management and land cadaster.

The aim of the discipline: To learn main principle, methods and means of geoinformation mapping to use in land management and land cadaster.

Tasks of the discipline: formation theoretical knowledge in the area of GIS mapping and obtaining practical skills in GIS applications in designing digital plans and maps.

The discipline provides the formation of a number of competencies:

Integrated competency (IC)

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

- general competencies:

GK 01. Ability to learn and master modern knowledge.

GK 02. Ability to apply knowledge in practical situations.

GK 05. Ability to communicate in a foreign language.

GK 06. Ability to use information and communication technologies.

GK 09. Ability to interpersonal interaction.

GK 13. 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:

SC 01. Ability to apply fundamental knowledge to analyze phenomena of natural and man-made origin in the performance of professional tasks in the field of geodesy and land management.

SC 02. Ability to apply theories, principles, methods of physical and mathematical, natural, socio-economic, engineering sciences in performing tasks of geodesy and land management.

SC 03. Ability to apply regulations, regulatory and technical documents, reference materials in professional activities.

SC 04. Ability to choose and use effective methods, technologies and equipment for professional activities in the field of geodesy and land management.

SC 05. Ability to use modern information, technical and technological support to address complex issues of geodesy and land management.

SC 06. 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.

SC 07. Ability to collect, update, process, critically evaluate, interpret, store, publish and use geospatial data and metadata on objects of natural and man-made origin.

SC 08. Ability to carry out professional activities in the field of geodesy and land management, taking into account the requirements of professional and civil safety, labor protection, social, environmental, ethical, economic aspects.

SC 09. Ability to use tools, instruments, equipment, facilities in the performance of geodetic and land management tasks.

SC 12. Ability to conduct technical control and assess the quality of topographic, geodetic and cartographic products.

SC 13. Ability to develop documentation on land management and land valuation, cadastral documentation, fill in the data of state land, urban and other cadastres

Program learning outcomes (PLO)

LR 1. Fluent in oral and written forms in state and foreign languages on professional matters.

LR 2. Organize and manage the professional development of individuals and groups.

LR 3. Communicate information, ideas, problems, solutions, personal experience and arguments to specialists and non-specialists.

LR 4. 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.

LR 7. Perform surveys and survey, topographic and geodetic, cartographic, design and design and survey work in the performance of professional tasks in geodesy and land management.

LR 9. Collect, evaluate, interpret and use geospatial data, metadata on 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.

LR 10. Choose and apply tools hardware, hardware and software supplies needed for remote, ground, field and in-house research in in the field of geodesy and land management.

LR 11. Organize and execute remote, ground, field and camera works in the field of geodesy and land management, draw up the results of work, prepare relevant reports.

LR 12. Develop documentation from land management, cadastral documentation and land valuation documentation with application computer technology, geoinformation systems and digital photogrammetry, to fill the state land with data, urban and other cadasters.

LR 13. Plan and execute geodetic, topographic and cadastral surveys, process the results in geographic information systems.

LR 15. Develop and adopt effective decisions on professional activities in the field geodesy and land management, including under conditions uncertainty.

The course Program and Structure

Topic	Hrs (lectures /laboratory/ individual)	Education result	Tasks	Grade
6 semestr				
SEMANTIC MODULE I. CARTOGRAPHY AND GEOINFORMATICS				
Theme 1. Terminology in digital mapping	2/2/5	Know the requirements for digital maps and plans Understand the possibilities of using digital plans and maps in their professional activities Recognize differences between digital and electronic maps	Submitting in eLearn Laboratory work: Work with layers of basic map Individual work: Professional terminology of digital maps and plans	12
Theme 2. Methods of displaying objects	2/12/5	Know the objects used in digital plans and maps Be able to form of a set of topographic symbols in ArcGIS-ArcMap and signs for individual thematic layers (including agricultural lands) Apply displaying and designing tools Use GIS to display objects on digital plans and maps	Submitting in eLearn Laboratory works: Designing digital symbols (points, lines, polygons) for maps of various scales Individual work: Cartographic symbols. Representation of relief	35
Theme 3. Standardization of geographic information	2/8/5	Know data formats and be able to use them correctly Apply ArcGIS-ArcMap tools for displaying numeric and text data	Submitting in eLearn Laboratory works: Data coding. Map composition Individual work: Geoinformation mapping data formats	23
Module control			Test	30
Total module 1	6/24/15			100
SEMANTIC MODULE II. TECHNOLOGIES OF DIGITAL MAPPING				
Theme 4. Sources for digital mapping and map design	2/6/5	Know the sources of information for creating maps Be able to create basic cartographic layers Analyze sources of information and their quality to create digital maps	Submitting in eLearn Laboratory work: Creating digital map by variant Editing digital map by variant Individual work: Data sources for	21

			creating digital maps and plans	
Theme 5. Technology of designing digital maps and plans	4/8/5	Know the technologies of geographic information mapping Be able to model and implement components of geographic information mapping Highlight the stages of construction of digital maps and plans Apply ArcGIS-ArcMap tools for editing vector data	Submitting in eLearn Laboratory work: Filling the knowledge base of digital maps by variant. Creating digital map by variant in ArcGIS Online Individual work: Analysis of the use of digital maps and plans in various sectors (according to scientific articles and publications)	28
Theme 6. Classification of electronic map	3/7/5	Know the purpose of classifiers and codifiers Be able to fill the knowledge base of the digital map Use ArcGIS-ArcMap in displaying and designing digital plans	Submitting on eLearn Laboratory work: Editing digital map by variant in ArcGIS Online. Map composition in ArcGIS Online Individual work: The knowledge base of digital maps	21
Module control			Test	30
Total module 2	9/21/15			100
Total 6 semester				70
Final test			Final test	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. Кохан С.С., Москаленко А.А. Цифрові плани і карти. Навчально-методичний посібник для студентів напряму підготовки «Геодезія, картографія та землеустрій». -К.: ЦК «КОМПРИНТ», 2015.
2. Кохан С.С., Москаленко А.А., Іванюта О.О., Новиков О.І. Цифрові плани і карти. Навчально-методичний посібник для студентів напряму підготовки «Геодезія, картографія та землеустрій». -К.: ЦК «КОМПРИНТ», 2014.
3. Кохан С.С., Москаленко А.А., Методичні вказівки до виконання лабораторних робіт з дисципліни «Digital Plans and Maps» (Цифрові плани та карти, англійською мовою) – К: "Компринт" – 2021. – 104 с.
4. ArcGIS for Environmental and Water Issues / William Bajjali. - 2018 - p.362
5. Manual of Digital Earth / Huadong Guo, Michael F. Goodchild, Alessandro Annoni – Springer Open 2020. – p.846 (<https://doi.org/10.1007/978-981-32-9915-3>)
6. Geoinformation mapping for providing the rational use and protection of soil / A Moskalenko // Mechanization in agriculture & Conserving of the resources 65 (Issue 5), 186-189
7. Quantitative Land Suitability Mapping for Crop Cultivation // Kokhan, A Moskalenko, O Drozdovskiy // ommunications - Scientific Letters of the University of Zilina, 77-83
8. Moskalenko A. GIS support of forming spatial decisions on land use // International Scientific Journal Mechanization in agriculture & Conserving of the resources, Vol. 67 (2021), Issue 3, p.79-81.
9. Бондаренко Е.Л. Геоінформаційне еколого-географічне картографування.– К.: Фітосоціоцентр, 2007.–272 с
10. 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. – 237 с
11. Козаченко Т. І. Геоінформаційне картографування малих підприємств України [Електронний ресурс] / Т. І. Козаченко, Т. С. Цокало // Вісник геодезії та картографії. - 2009. - № 4. - С. 17-27. - Режим доступу: http://nbuv.gov.ua/UJRN/vgtk_2009_4_5
12. Лященко А. А. Сервіс – орієнтована архітектура кадастрових геоінформаційних систем та кадастрових геопорталів / А. А. Лященко, Ж. В. Форосенко, А. Г. Черін // Вісн. геодезії та картографії. – 2011. – № 1. – С. 35 – 42.
13. Національний стандарт України «ДСТУ ISO 19101:2009 Географічна інформація. Еталонна модель (ISO 19101:2002, IDT)»// 2009-10-15.
14. СОУ ISO 19136:2009 "Обмінний формат геопросторових даних на основі географічної мови розмітки GML (ISO 19136:2007)" // 30.09.2010.
15. СОУ 742-33739540 0011:2010 "Комплекс стандартів База топографічних даних Каталог об'єктів і атрибутів" // 30.09.2010.
16. СОУ ISO 19113 "Комплекс стандартів База топографічних даних Принципи оцінки якості топографічних даних" // 30.09.2010.
17. СОУ 742-33739540 0012:2010 "Комплекс стандартів. База топографічних даних. Правила кодування та цифрового опису векторних даних" Том 2 // 30.09.2010.
18. СОУ 742-33739540 0012:2010 "Комплекс стандартів База топографічних даних Правила кодування та цифрового опису векторних даних" Том 2 // 30.09.2010.
19. СОУ 742-33739540 0012:2010 "Комплекс стандартів База топографічних даних Правила кодування та цифрового опису векторних даних" Том 1 // 30.09.2010.

20. СОУ ISO 19113 "Комплекс стандартів База топографічних даних Принципи оцінки якості топографічних даних" // 30.09.2010.
21. СОУ 742-33739540 0010:200 "Комплекс стандартів База топографічних даних Загальні вимоги" // 29.09.2010.
22. ISO 19103 – Мова концептуальної схеми.
23. ISO 19107 – Просторова схема.
24. ISO 19133 – Сервіси спостереження та навігація на основі інформації про місцезнаходження.
25. ISO 19136 – Geography mark up language.
26. **eLearn webpage** - <https://elearn.nubip.edu.ua/course/view.php?id=106>
27. Карпінський Ю. О., Лященко А. А. Режим доступу: <Http://ena.lp.edu.ua:8080/Bitstream/ntB/10582/1/37.pdf>
28. Grass GIS. [Електронний ресурс] // [сайт] / Режим доступу: <http://grass.osgeo.org/> – назва з екрану.
29. The ArcGIS Book [Електронний ресурс] // [сайт] / Режим доступу: <https://learn.arcgis.com/en/arcgis-book/> – назва з екрану.