World trends in Geoinformatics, Surveying and Land Administration

Course description sheet

Basic information

Field of study Geodesy, Surveying and Cartography **Major** Real Estate Taxation and Cadastre **Organisational unit** Faculty of Geo-Data Science, Geodesy, and Environmental Engineering **Study level** Second-cycle (engineer) programme **Form of study** Full-time studies **Profile** General academic	**Didactic cycle** 2024/2025 **Course code** DGIKGNS.IIi4.00771.24 **Lecture languages** English **Mandatoriness** Obligatory **Block** Major Modules **Course related to scientific research** Yes

Course coordinator	Jarosław Bydłosz
Lecturer	Jarosław Bydłosz

Period	**Method of verification of the learning outcomes**	**Number of ECTS credits**
Semester 3	Completing the classes **Activities and hours** Auditorium classes: 30	3

Goals

C1	The purpose of the course is to acquaint students with various aspects of geoinformatics, surveying and land administration,inter alia in the context of sustainable development.

Course's learning outcomes

Code	Outcomes in terms of	Learning outcomes prescribed to a field of study	Methods of verification
Knowledge – Student knows and understands:			
W1	extensive knowledge on courses concerning geodetic science and present world trends in geodetic science around the world.	GIK2A_W02, GIK2A_W04	Activity during classes, Participation in a discussion, Test results, Presentation
W2	knowledge concerning Land Administration, Cadastre and its international aspects.	GIK2A_W03	Activity during classes, Participation in a discussion, Test results, Presentation
W3	European and international standards and legal regulations concerning Land Administration and Cadastre.	GIK2A_W03	Activity during classes, Participation in a discussion, Test results, Presentation
W4	knowledge on land administration systems in various countries and data type included there.	GIK2A_W06	Activity during classes, Participation in a discussion, Test results, Presentation
Skills – Student can:			
U1	read literature in English language and prepare short presentation in English on subjects concerning various disciplines of geodetic science; analyze and compare methods, systems and procedures in various countries basing on literature in Polish and English.	GIK2A_U01, GIK2A_U02	Activity during classes, Participation in a discussion, Involvement in teamwork, Presentation
U2	apply communication and information technology in researches concerning geodetic science and other technical disciplines.	GIK2A_U06	Activity during classes, Participation in a discussion, Involvement in teamwork, Presentation
Social competences – Student is ready to:			
K1	popularization of modern science and technology achievements , including geodetic science.	GIK2A_K01, GIK2A_K02	Activity during classes, Participation in a discussion, Involvement in teamwork

Program content ensuring the achievement of the learning outcomes prescribed to the module

The purpose of the course is to acquaint students with various aspects of geoinformatics, surveying and land administration.

Student workload

Activity form	Average amount of hours* needed to complete each activity form
Auditorium classes	30
Preparation for classes	30
Realization of independently performed tasks	2

Preparation of project, presentation, essay, report	15
Contact hours	5
Examination or final test/colloquium	2

Student workload	**Hours** 84
Workload involving teacher	**Hours** 30

* hour means 45 minutes

Program content

No.	Program content	Course's learning outcomes	Activities
1.	Introduction and basic information on the course. Introduction. Describing the scope of "World trends in Geoinformatics, Surveying and Land Administration" course. Explaining the way of working and basis for completing the course.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
2.	Introduction to Land Administration.: Defining Land Administration. Introducing Land Administration Systems. Cadastre and Land Register vocabulary.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
3.	Land Administration and Sustainable Development.: The Land Administration Paradigm. The Butterfly Diagram. Land Administration for Sustainable Development.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
4.	Infrastructure for spatial information in Europe.: Establishing infrastructure for spatial information in Europe. INSPIRE directive, its scope themes, annexes and data specifications.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
5.	Geographic Information. Standardization.: Standardization in Geographic Information. ISO 19100 series standards.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
6.	Modern trends in GIS and cadastre.: Describing the trends that take place in GIS and cadastre nowadays and visions for the future.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
7.	The multipurpose cadastre.: Fiscal and legal cadastre. The ideas for developing multipurpose cadastres.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
8.	3D and 4D cadastres.: The development in 3D cadastres around the world. The ideas to develop 4D cadastre.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
9.	GIS and 5D modelling: Scale as fifth dimension. The issue of scale in GIS systems.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
10.	The development of surveying techniques .: Traditional surveying. GPS for surveying and GIS. Vocabulary and examples.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes
11.	Geodetic courses in various countries.: Describing courses on geodetic science at chosen universities.	W1, W2, W3, W4, U1, U2, K1	Auditorium classes

No.	Program content	Course's learning outcomes	Activities
12.	Augmented and virtual reality.	W1, W2, W4, U1, U2, K1	Auditorium classes
13.	Social media in geoinformation popularisation.	W1, U1, U2, K1	Auditorium classes
14.	Digital twins.	W1, W2, W4, U1, U2, K1	Auditorium classes

Extended information/Additional elements

Teaching methods and techniques :

Group work, Discussion, Project Based Learning, Gamification, Work with source text

Activities	Methods of verification	Credit conditions
Audit. classes	Activity during classes, Participation in a discussion, Involvement in teamwork, Test results, Presentation	

Conditions and the manner of completing each form of classes, including the rules of making retakes, as well as the conditions for admission to the exam

Every student prepares (and gives) presentation concerning professional subject. Every presentation is evaluated. It is possible to get some extra marks for activity during the course.

Method of determining the final grade

Students write short test. Auditory mark is a result of marks for test, presentation and activity during the course. The final mark equals the practice (auditory) mark (Ok=OA).

Manner and mode of making up for the backlog caused by a student justified absence from classes

If student fails the test, he/she is obliged to take it again. Student can be given the additional topic for elaboration and reporting.

Prerequisites and additional requirements

Basic knowledge of English language in reading and writing.

Rules of participation in given classes, indicating whether student presence at the lecture is obligatory

Auditorium classes: Students attending classes are required to prepare themselves in the manner specified by the lecturer (e.g. in the form of sets of tasks). Student performance may be assessed on the basis of oral or written statements in the form of a test, which, in accordance with the AGH University of Krakow regulations, translates into a final grade for this form of class.

Literature

Obligatory

1. 3rd Cadastral Congress. November 23-25, 2011, Warsaw, Poland.
2. http://www.eurocadastre.org/
3. http://www.fig.net/
4. http://www.geospatialworldforum.org/2012/modeling.htm
5. http://www.gdmc.nl/3DCadastres/
6. http://inspire.jrc.ec.europa.eu/
7. Williamson I., Enemark S., Wallace J., Rajabifard A.: Land Administration for Sustainable Development. ESRI Press Academic. Redlands. California. 2010.

Optional

1. Spatially Enabled Society. Joint publication of FIG-Task Force on Spatially Enabled Society in cooperation with GSDI Association and with the support of Working Group 3 of the PCGIAP. FIG Report 2012.ISBN 978-87-90907-97-6. Available also at http://www.fig.net/pub/figpub/index.htm

Scientific research and publications

Publications

1. Bieda A., Bydłosz J., Parzych P.: Actualization of data concerning surface flowing waters, based on INSPIRE directive requirements. Geomatics and Environmental Engineering. ISSN 1898-1135. 2013 vol. 7 no. 1, s. 25–36.
2. Bydłosz, J. (2015): The application of the Land Administration Domain Model in building a country profile for the Polish cadastre, Land Use Policy 49 (2015), Elsevier, pp. 598–605,
3. Bydłosz J.: Preliminary works on leading Polish cadastral model into conformance with LADM. GIS for geoscientists: scientific monograph. Editors: Davorin Kereković, Ryszard Źróbek. Published by University of Silesia and Hrvatski Informaticki Zbor – GIS Forum. 2012. ISBN 978-953-6129-34-8. S. 86–92.
4. Bydłosz J., Hanus P.: The impact of landslide areas on municipal spatial. Real Estate Management and Valuation. ISSN 2300-5289. 2013 vol. 21 no. 4, s. 5–10.
5. Bydłosz J., Parzych P., Dąbrowski J.: The possibilities of real estates market development in Poland in connection with INSPIRE directive. Geomatics and Environmental Engineering. ISSN 1898-1135. 2011 vol. 5 no. 1
6. Kalogianni, E., Janečka, K., Kalantari, M., Dimopoulou, E., Bydłosz, J., Radulović, A., ... & Van Oosterom, P. (2021). Methodology for the development of LADM country profiles. Land Use Policy, 105, 105380.
7. Bieda, A., Bydłosz, J., Parzych, P., Pukanská, K., & Wójciak, E. (2020). 3D technologies as the future of spatial planning: The example of Krakow. Geomatics and environmental engineering, 14(1), 15-33.
8. Bieda, A., Bydłosz, J., Warchoł, A., & Balawejder, M. (2020). Historical underground structures as 3D cadastral objects. Remote Sensing, 12(10), 1547.
9. Bydłosz, J., & Bieda, A. (2020). Developing a UML Model for the 3D Cadastre in Poland. Land, 9(11), 466.

Learning outcomes prescribed to a field of study

Code	Content
GIK2A_K01	działania w sposób kreatywny i przesiębiorczy z uwzględnieniem krytycznej oceny posiadanej wiedzy i potrzeby konsultacji eksperckich
GIK2A_K02	wypełniania zobowiązań społecznych, przekazywania społeczeństwu osiągnięć nauki i techniki w sposób zrozumiały i uwzględniający różne aspekty działalności inżynierskiej, a także działania na potrzeby interesu społecznego
GIK2A_U01	pozyskiwać, integrować i interpretować specjalistyczne informacje z literatury polskiej i obcej oraz z baz danych, szczególnie w zakresie geodezji i kartografii oraz formułować krytyczne oceny i wyczerpujące opinie
GIK2A_U02	przygotować opracowanie naukowe w języku polskim i krótką informację naukową w języku obcym, przedstawiające wyniki własnych badań naukowych oraz przygotować i przedstawić prezenetację zagadnień z zakresu geodezji i kartografii oraz wybranych zagadnień specjalistycznych
GIK2A_U06	posługiwać się technikami informacyjno-komunikacyjnymi właściwymi do realizacji zadań typowych dla działalności inżynierskiej,
GIK2A_W02	najnowsze osiągnięcia i trendy rozwojowe w dziedzinach i dyscyplinach naukowych, właściwych dla dyscypliny naukowej Inżynieria lądowa i transport
GIK2A_W03	specjalistyczne zagadnienia z zakresu geodezji i kartografii oraz uwarunkowania prawne, ekonomiczne i etyczne normujące działalność w dziedzinie geodezji i kartografii i w innych dziedzinach z nią związanych, w tym podstawowe zasady tworzenia i rozwoju różnych form indywidualnej przedsiębiorczości oraz ochrony własności przemysłowej i prawa autorskiego,
GIK2A_W04	podstawowe procesy cyklu życia urządzeń, obiektów i systemów techniczych, w szczególności aparatury rejestrującej i przetwarzającej informacje przestrzenne
GIK2A_W06	specjalistyczne metody pozyskiwania, analizowania, modelowania i wizualizowania danych przestrzennych i zmian tych danych spowodowanych procesami naturalnymi i technologicznymi