

**GEOINFORMATIONAL SYSTEMS**
**1. About Course unit/module data**

<b>Faculty</b>	Construction, Geodesy and Cadastre				
<b>Department</b>	Civil Engineering and Geodesy				
<b>Cycle of studies</b>	License, cycle I.				
<b>Studies programme</b>	0731.2 Geodetic Engineering and Cadastre, 0731.5 Evaluation and development of the real estate, 521.8.1 Engineering and Management in Constructions, 0731.4 Urban and regional planning (Urbanism)				
<b>Year of study</b>	<b>Semester</b>	<b>Type of evaluation</b>	<b>Formative category</b>	<b>Optionality category</b>	<b>ECTS credits</b>
II (full-time and part-time education)	4	E	S - specialized course unit	O - compulsory course unit	5

**2. Estimated total time.**

Total hours in the curriculum	From which				
	Auditorium hours		Individual work		
	course	Laboratory / seminar	Year project	Study of theoretical material	Application preparation
120	30	30	0	30	30

**3. Prerequisites for access to the course unit / module**

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According to the competencies	Possess and apply knowledge on acquisitions, data collection specific to land sweepers, using calculation techniques

**4. Conditions for carrying out the educational process for**

course	For the presentation of the theoretical material in the classroom it must be equipped with multimedia techniques (projector, screen computer). Student delays, telephone conversations and other discussions during the course will not be tolerated.
Laboratory / seminar	The classes will take place in the Geoinformation Technologies laboratory, equipped with computer technology (specialized hardware and software). Deadline for submission of laboratory work - one week after its completion.

**5. Specific skills acquired**

Professional skills	<b>CP 2.</b> Acquisition, systematization and interpretation of information needed to solve professional problems <ul style="list-style-type: none"> <li>Defining basic concepts, theories and methods in GIS philosophy. GIS application in the field of digital technologies, mainly in the field of geodetic engineering, cadaster and environment;</li> <li>Application of basic principles and methods via GIS software in the field of geodetic engineering, cadastre and environment thru the data collecting, manipulation, systematization, integration, analysis and visualization under conditions of qualified assistance.</li> </ul>
Professional skills	<b>CP 3.</b> Implementation and use of GIS software and technologies for solving the specific task of geodesy, cadastre and environment (measurement and data processing). <ul style="list-style-type: none"> <li>Defining basic concepts, theories and methods in the field of GIS software and GIS</li> </ul>

	<p>applications.</p> <ul style="list-style-type: none"> <li>• Appropriate use of basic knowledge to explain and interpret the concepts, procedures, techniques and methods required in the use of GIS software applications and digital technologies to solve tasks specific to the field terrestrial measurement.</li> <li>• Application of basic principles and methods of the GIS software and digital technologies for database creation and operation, assisted graphics, modeling, computer aided design of works, computerized processing of data specific to geodetic engineering and cadastre.</li> </ul>
Transversal skills	<b>CT2.</b> Carrying out activities and exercising the specific roles of teamwork on different hierarchical levels. Promoting the spirit of initiative, dialogue, cooperation, positive attitude and respect for others, diversity and multiculturalism and continuous improvement of one's activity

#### 6. Course unit / module objectives

The general objective	Education theoretical knowledge and practical skill in the field of geographic information systems (GIS), the evolution, development dynamics, structure, functioning and operating.
Specific objectives	<p>To know the dynamics of GIS development.</p> <p>Know the structure and components of GIS.</p> <p>Master the methods of collecting, systematizing, storing, converting, viewing and analyzing data / information.</p> <p>To operate with specialized software (ArcGIS, MapINFO, OpenSource, etc.).</p> <p>To integrate and operate with GIS data / information.</p>

#### 7. 7. Content of the course unit / module

The theme of teaching activities	Number of hours	
	full-time education	part-time education
<b>The theme of the lectures</b>		
T1. Introduction. Generalities. Short history. Systems. General characteristics of the systems. Connections. Classification of information systems.	2	-
T2. GIS / GIS components (Data, software, hardware, staff, rules), implementation, and operation. GIS software package. ESRI software. Stages of implementation and use of a GIS.	4	-
T3. Date GIS. Database. Type of data. Data structures. Analog map. Digital map. Data models. Geo-referencing of data. Data layers.	4	-
T4. Geoinformational modeling. The geoinformatics model of the real world. Concept. Sources. Simplifications and idealizations. Reference systems and map projections. Vector and Raster models.	4	-
T5. Getting Started with ArcGIS Desktop Software. License level. Interface. Mode of function and operation. The main applications.	4	-
T6. Notions of geographical analysis. Significance and types of geographical analyzes.	4	
T7. Web GIS Technologies. Geoportal. Evolution, Functions, Services.	2	
T8. Open Source GIS. Generalities. Evolution. gvSIG, GisQUIT mode of operation	2	
T.9. INSPIRE Directive Significance. Objectives, definitions, conditions, services. The changes required by INSPIRE in Education	2	
T.10 GIS application projects. Examples of projects (territorial organization, cadastre, natural disasters, etc.)	2	
<b>Total lectures:</b>	<b>30</b>	

The theme of teaching activities	Number of hours	
	full-time education	full-time education
<b>The theme of laboratory works / seminars</b>		
LL1. Course synthesis (Structure, demanding). Laboratory study, hardware and software. Rules of conduct. Setting the ID, password. Software access mode.	2	
LL2. Study of the interface of ArcMap components. ArcCatalog. ArcToolbox. Initiation actions. ArcGIS operations.	2	
LL3. ArcGIS operations. The study of object-attribute relations. Exploring the benefits	2	
LL4. ArcGIS operations. Creating map layouts	2	
LL5. Geospatial identification of data. Using coordinates to find objects in space. Carrying out measurements on the map.	2	
LL6. Spatial data representation. Vector and raster data in ArcMap	4	
LL7. Data query. Creating queries in ArcMap. Location queries in ArcMap. Querying data based on attributes and locations.	4	
LL8. Analysis of spatial relations. Using the Intersect function to overlap entities. Using Buffer. Data analysis using Buffer and Overlay tools	4	
LL9. Digitization of paper urban planning maps. Preparation of maps and plans for digitization.	2	
LL10. Digitization of paper urban planning maps. Georeferencing	2	
LL11. Digitization of the environments spatial objects from different sources. Vectorization. Output formats	4	
<b>Total laboratory works / seminars:</b>	<b>30</b>	

## 8. Bibliographic references

Main	<ol style="list-style-type: none"> <li>1. Grama V., Dilan V, L. Nistor, A Iacovlev, Tehnologii GIS cu ArcGIS, 2006, UTM, 150 ex.</li> <li>2. Sorina Dumitru, Sisteme Informatice Geografice, Note de curs. Universitatea OVIDIUS Constanta, 2003, V:\Programe_de_invatamint_DT_2016_2017\Grama Vasile\Semestrul de primavara\SI_SIG\Materiale DID,</li> <li>3. Săvulescu C. Fundamente GIS. București 2000;</li> <li>4. Software ArcGIS ESRI – licentiat 2005, Server catedra GCG, instructiuni. V:\Programe_de_invatamint_DT_2016_2017\Grama Vasile\Semestrul de primavara\SI_SIG\Materiale DID,</li> <li>5. Курс лекций по дисциплине «Геоинформационные системы». «Сибирская Государственная Геодезическая Академия», 2008. Server catedra GCG, instructiuni. V:\Programe_de_invatamint_DT_2016_2017\Grama Vasile\Semestrul de primavara\SI_SIG\Materiale DID,</li> <li>6. GeoBIZ platform: <a href="http://geobiz.eu/moodle/login/index.php">http://geobiz.eu/moodle/login/index.php</a> ; <a href="http://geobiz.eu/moodle/">http://geobiz.eu/moodle/</a></li> </ol>
Additional	<ol style="list-style-type: none"> <li>1. Peter A. Burrough ... Principles of Geographical Information System Lzn Manole... Mapping our Word. 2002 ESRI</li> </ol>