

## REMOTE SENSING

### 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				
<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>
IV (full-time and part-time education)	7	E	S - specialized course unit	A - optional course unit	6

### 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
180	30	60	0	30	60

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

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According to the competencies	Possess and apply knowledge of image formation, processing, interpretation and extraction of spatial information

### 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 3.</b> Implementation and use of new software and technologies for solving the specific task of geodesy, cadaster and environment (measurement and data processing). <ul style="list-style-type: none"> <li>Defining basic concepts, theories and methods in the field remote sensing to identify the position, shape and dimensions of objects in space.</li> <li>Appropriate use of basic knowledge to explain and interpret the concepts, procedures, techniques and methods required the remote sensing technologies.</li> <li>Application of methods and special software for data collections, database integration in GIS systemse.</li> </ul>
Transversal skills	<b>CP5.</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: <ul style="list-style-type: none"> <li>Description of specific procedures, techniques and methods for planning, coordinating and monitoring works in the field of geodetic engineering and cadastre,</li> </ul>

	<ul style="list-style-type: none"> <li>• Use of basic knowledge to explain and interpret projects and technical and technological files specific to the professional field, including the use of modern topogeodetic technologies specific to the field,</li> <li>• Application of basic principles and methods for the realization of projects and technical and technological files specific to the field, in conditions of qualified assistance,</li> <li>• Appropriate use of standard assessment criteria and methods for the adoption of specific procedures, techniques and methods applied for the planning, coordination and monitoring of works in the field of geodetic engineering and cadastre,</li> <li>• Development of professional projects using procedures, techniques and methods established in the field for planning, coordinating and monitoring works in the field of geodetic engineering and cadastre</li> </ul>
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#### 6. Course unit / module objectives

The general objective	Deep knowledge and understanding of the basic concepts, theories and methods of remote sensing techniques, which is the subject of satellite investigation in order to know the resources of the planet.
Specific objectives	<ul style="list-style-type: none"> <li>· Understanding the meaning of the fundamental notions of remote sensing and aerial photo interpretation,</li> <li>· Knowledge of remote sensing applications in determining spatial objects,</li> <li>· Electromagnetic spectrum, as a carrier of information,</li> <li>· Mastering the chain of acquisition, transmission and preprocessing of remote sensing data. Satellite systems and their instruments (sensors, sensors),</li> <li>· Knowledge of satellites and satellite programs (LANDSAT, SPOT, Sentinel).</li> </ul>

#### 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>		
T.1. Synthesis of the photogrammetry discipline. Comparative analyzes in the evolution of remote sensing and photogrammetry. History of remote sensing developments	2	-
T. 2. Remote sensing data source for cartography. Notions, characteristic definitions. Areas and field of application (examples).	2	-
T3. Electromagnetic spectrum. Electromagnetic radiation. Remote sensing sensors	4	
T.4. Remote sensing systems. Principles of image acquisition (passive and active). The concept of a remote sensing system	4	-
T5. Characteristics of satellite and aerial images. Classification. Resolution in remote sensing	6	-
T.6. Image interpretation techniques. Spatial information. Radiometric characteristics	4	-
T.7. Satellites, Satellite Programs (LANDSAT, SPOT, SENTINEL)	4	
T.8 Projects, specific remote sensing applications (LIDAR, UAV). About "Moldavian satellite" project.	4	
<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 /</b>		
LL.1 Synthesis of terms and definitions from remote sensing. Laboratory structure. Working methodologies	2	
LL.2. Specialized software features. Presentation of the MultiPlex software	4	
LL.3. Introduction to ENVI remote sensing software	2	
L.L.4. Remote sensing data sources. Basic operations in satellite image processing	2	
LL.5. Mapping and monitoring of aquatic environments using geospatial intelligence - Generation of models for automatic identification of water quality parameters from remote sensing data	4	
LL.6. Mapping and monitoring of aquatic environments using geospatial intelligence - Cartographic visualisation of time series of water quality maps	2	
LL.7. UAV in urban planning and management - UAV data acquisition and image processing	6	
LL.8. UAV in urban planning and management - Import and processing data in GIS software	4	
LL.9 Remote sensing data operation using Sentinel images	4	
<b>Total laboratory works:</b>	<b>30</b>	

## 8. Bibliographic references

Main	<ol style="list-style-type: none"> <li>1. Badea A., Nistor-Lopatenco L., Dialn V., Teledetectie, curs universitar. Chişinău 2012. ISBN 978-9975-4401-5-8.</li> <li>2. Badea A., Nistor-Lopatenco L., Dialn V., Teledetectie, Ghid metodic. Chişinău 2012. ISBN 978-9975-4401-6-5.</li> <li>3. Bogdan- Andrei MIHAI. Teledetectie. Noţiuni Generale. Universitatea din Bucuresti. 2008.</li> <li>4. <a href="https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Europe_s_Copernicus_programme">https://www.esa.int/Applications/Observing_the_Earth/Copernicus/Europe_s_Copernicus_programme</a></li> <li>5. 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. Lexiconul Cadastral, UTM, 2010.</li> </ol>