

COURSE OUTLINE

1. Study programme information

1.1 Higher education institution	West University of Timisoara
1.2 Faculty / Department	Chemistry, Biology, Geography / Geography
1.3 Sub-department	
1.4 Field of study	Geography
1.5 Level of study	Master's degree
1.6 Study programme / Qualification	Geographic Information Systems

2. Course information

2.1 Course title	Spatial data acquisition methods						
2.2 Course convenor/ Lecturer	Dr. Alexandru Onaca						
2.3 Teaching assistant	Dr. Alexandru Onaca						
2.4 Year of study	I	2.5 Semester	I	2.6 Type of assessment	E	2.7 Course type	

3. Total estimated time (hours of didactic activities per semester)

3.1 Number of hours per week	4	of which: 3.2 lecture	2	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	56	of which: 3.5 lecture	28	3.6 seminar/laboratory	28
Time distribution:					hours
Studying textbooks, course materials, bibliography and notes					15
Further research in libraries, on electronic platforms and in the field					25
Preparing laboratories, homework, research papers, portfolios and essays					35
Tutoring					15
Assignments/Exams					4
Other activities					
3.7 Total hours of individual study	94				
3.8 Total hours per semester	150				
3.9 Number of credits	6				

4. Prerequisites (if applicable)

4.1 based on curriculum	•
4.2 based on competencies	• Basic knowledge of GIS concepts and related applications

5. Conditions (if applicable)

5.1 for the course	
5.2 for the seminar/laboratory	

6. Accumulated specific competencies

Professional competencies	<ul style="list-style-type: none"> • Knowledge of concepts in Geographic Information Systems • Understanding of the conceptual model of spatial data, concepts of scale, resolution and spatial data integration in GIS • Describe and implement data collection workflows • Capabilities to collect, record, and use the spatial data within a variety of environments • Knowledge and operational skills on DEM data analysis and integration in GIS projects • Knowledge and operational skills on satellite images processing and integration in GIS projects • Operational skills in ArcGIS, Agisoft Professional
Transversal competencies	<ul style="list-style-type: none"> • Understanding of ethics in academic conduct (correct citations, avoiding plagiarism) • Developing team working abilities.

7. Course objectives (as resulting from the accumulated specific competencies)

7.1 General objective	<ul style="list-style-type: none"> • Students are able to integrate and analyze appropriate spatial data types from different sources into a GIS project
7.2 Specific objectives	<ul style="list-style-type: none"> • Students are able to identify, acquire and integrate satellite imagery, aerial photos, DEMs, field data and other spatial data from various sources • Students are able to process and analyze different types of spatial data in a GIS project

8. Content

8.1 Lecture	Teaching methods	Observations
Introduction to spatial data and its acquisition; current trends in geographical data acquisition <i>Chen Q.Y., Lee, C.Y., 2001, Geographical Data Acquisition, New York, Springer-Verlag, 265 p.</i>	Lectures	2
Conceptual models of reality and data structures used in GIS <i>Chen Q.Y., Lee, C.Y., 2001, Geographical Data Acquisition, New York, Springer-Verlag, 265 p.</i>	Lectures	2
Structure of a GIS project – examples of data types, formats, attribute types, metadata, scale, resolution, accuracy http://www.spatialanalysisonline.com/HTML/index.html	Lectures	2
Primary and secondary spatial data acquisition methods <i>ch.9, 10, 12 from Chen Q.Y., Lee, C.Y., 2001, Geographical Data Acquisition, New York, Springer-Verlag, 265 p.</i>	Lectures	2
In situ measurements, GPS data, terrestrial scanning - characteristics and integration in a GIS projects	Lectures	4
Aerial photos and satellite images – types, sources, acquisition and processing <i>ch.9 from Chen Q.Y., Lee, C.Y., 2001, Geographical Data Acquisition, New York, Springer-Verlag, 265 p.</i>	Lectures	4

<i>Mather, P., Koch, M., 2011, Computer Processing of Remotely-Sensed Images: An Introduction, 4th Edition, Wiley, 460 p.</i>		
Digital Elevation Models – types, sources, acquisition and processing <i>Wilson, J., 2018, Environmental applications of digital terrain modelling, Wiley-Blackwell, 359 p.</i> <i>Fleming, C, Marsh, S.H., Cabrera, M.C., 2010, Elevation Models for Geoscience: Geological Society Special Publication 345, Geological Society of London, 146 p.</i>	Lectures	4
Type of climate data – acquisition and integration in a GIS project https://www.worldclim.org/data/index.html https://power.larc.nasa.gov/data-access-viewer/ https://www.ncdc.noaa.gov/IPS/mcdw/mcdw.html https://neo.sci.gsfc.nasa.gov/view.php?datasetId=GISS_TA_M https://climate.esa.int/en/odp/#/dashboard	Lectures	2
Administrative and statistical data https://www.naturalearthdata.com/downloads/ https://www.diva-gis.org/gdata http://download.geofabrik.de/europe/romania.html https://ec.europa.eu/eurostat/data/database	Lectures	2
Derived spatial data (digitizing, editing, indices, landcover, thematic classification)	Lectures	2
Online platforms and services for spatial data and maps https://earthengine.google.com/ https://www.globalforestwatch.org/ https://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1000	Lectures	2
References Casagrande, G., Sik, A., Szabo. G., 2017, Small Flying Drones: Applications for Geographic Observation, Springer, 168 p. Chen Q.Y., Lee, C.Y., 2001, Geographical Data Aquisition, New York, Springer-Verlang, 265 p. 2,,2,, Longley, P.A., Goodchild, M., Maguire, D.J., Rhind, D.W., 2010, Geographic Information Systems and Science, John Wiley & Sons, 560 p. Mather, P., Koch, M., 2011, Computer Processing of Remotely-Sensed Images: An Introduction, 4th Edition, Wiley, 460 p. Wilson, J., 2018, Environmental applications of digital terrain modelling, Wiley-Blackwell, 359 p. http://2012books.lardbucket.org/pdfs/geographic-information-system-basics.pdf http://www.spatialanalysisonline.com/HTML/index.html		
8.2 Seminar / laboratory	Teaching methods	Observations
Spatial data acquisition and integration in a GIS project – study area chosen by students (administrative, DEMs, satellite images, statistical data etc.)	Hands-on exercises	6
GPS data integration and analysis in a GIS project <i>Ch. 6 and 7 from Chen Q.Y., Lee, C.Y., 2001, Geographical Data Acquisition, New York, Springer-Verlag, 265 p.</i>	Data acquisition in the field and hands-on exercises	6
Digital elevation models: acquisition and processing <i>Tarolli, P., Mudd, S., 2020. Remote sensing of geomorphology (vol. 23), in Developments in Earth Surface Processes, Elsevier.</i>	Hands-on exercises	6

Data acquisition and processing using UAV <i>Casagrande, G., Sik, A., Szabo. G., 2017, Small Flying Drones: Applications for Geographic Observation, Springer, 168 p.</i>	Hands-on exercises	6
Student projects and exercises evaluation	Presentation of the project results	4

References

Casagrande, G., Sik, A., Szabo. G., 2017, *Small Flying Drones: Applications for Geographic Observation*, Springer, 168 p.

Chen Q.Y., Lee, C.Y., 2001, *Geographical Data Acquisition*, New York, Springer-Verlag, 265 p

Mather, P., Koch, M., 2011, *Computer Processing of Remotely-Sensed Images: An Introduction*, 4th Edition, Wiley, 460 p.

Telling, J., Lyda, A., Hartzell, P., Glennie, C., 2017. Review of Earth science research using terrestrial laser scanning. *Earth-Science Rev.* 169, 35–68. <https://doi.org/https://doi.org/10.1016/j.earscirev.2017.04.007>

Tarolli, P., Mudd, S., 2020. *Remote sensing of geomorphology (vol. 23)*, in *Developments in Earth Surface Processes*, Elsevier.

9. Corroborating course content with the expectations held by the representatives of the epistemic community, professional associations and typical employers in the field of the study programme

Course content will offer the students the necessary skills to acquire, integrate, process and analyze different types of spatial data in order to start-up GIS projects in the field of geosciences. The course will offer several software solutions (commercial and open-source) used by companies in the field of GIS.

10. Assessment

Type of activity	10.1 Assessment criteria	10.2 Assessment methods	10.3 Weight in the final mark
10.4 Course	Knowledge and understanding related to spatial data acquisition and integration	Intermediate evaluation: Written scientific report (Moodle platform https://elearning.e-uvt.ro/) – preliminary results Final presentation of the project	20% 20%
10.5 Laboratory	GPS data acquisition and processing	Intermediate evaluation: Oral evaluation of results and processing skills	10%
	Digital Elevation Models acquisition	Intermediate evaluation: Evaluation of results and processing skills (Moodle platform https://elearning.e-uvt.ro/)	10%
	Data acquisition and processing using UAV	Intermediate evaluation: Evaluation of results and processing skills (Moodle platform https://elearning.e-uvt.ro/)	10%

	GIS project (geodatabase and project presentation)	Intermediate evaluation: Presentation of the project results (Moodle platform https://elearning.e-uvt.ro/)	30%
10.6 Minimum performance standard			
<ul style="list-style-type: none"> grade 5 as a mean of evaluation from the above mentioned compulsory activities 			

Date

Course convenor's signature

Teaching assistant's signature

18.09.2022

Date of approval in the department

Head of department's signature