

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	Assoc. Prof. Alexandru Onaca						
2.3 Teaching assistant	Assoc. Prof. Alexandru Onaca						
2.4 Year of study	I	2.5 Semester	I	2.6 Type of assessment	E	2.7 Course type	DF/DOB

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

3.1 Number of hours per week	4	of which: 3.2 lecture	1	3.3 seminar/laboratory	2
3.4 Total hours in the curriculum	42	of which: 3.5 lecture	14	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					27
Preparing laboratories, homework, research papers, portfolios and essays					40
Tutoring					20
Assignments/Exams					6
Other activities					
3.7 Total hours of individual study	102				
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	• Computer / laptop for the teacher and students • internet access; access to the E-learning UVT platform; video projector
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5.2 for the seminar/laboratory	• Computer / laptop for the teacher and students • internet access; access to the E-learning UVT platform; video projector • Several applications will be done in the field using data acquisitions equipment and the others online;
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6. Specific skills acquired

Knowledge	• 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 spatial data within a variety of environments • Knowledge on DEM data analysis and integration in GIS projects • Knowledge on satellite images processing and integration in GIS projects
Skills	• Capabilities to identify, acquire and integrate satellite imagery, aerial photos, DEMs, field data and other spatial data from various sources • Process and analyse different types of spatial data in a GIS project • Process and analyse DEM data analysis and integration in GIS projects • Integrate and analyze appropriate spatial data types from different sources into a GIS project • Operational skills in ArcGIS, ENVI, QGIS, Agisoft Professional
Responsibility and autonomy	• Development of a critical and analytical spirit among students; appreciating the advantages of using spatial analysis in the assessment of natural hazards and risk • The ability to correctly/effectively identify and plan tasks specific to a particular GIS project • The application of effective and responsible work strategies, based on the principles, norms, and values of the code of professional ethics • Application of effective work techniques in a multidisciplinary team, ethical attitude, respect for diversity and multiculturalism, acceptance of diversity of opinion • Self-assessment of the need for continuous professional training for insertion and adaptability to the requirements of the labor market

7. Content

7.1 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
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	2

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> <i>Mather, P., Koch, M., 2011, Computer Processing of Remotely-Sensed Images: An Introduction, 4th Edition, Wiley, 460 p.</i>	Lectures	2
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	2
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
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. Fleming, C, Marsh, S.H., Cabrera, M.C., 2010, Elevation Models for Geoscience: Geological Society Special Publication 345, Geological Society of London, 146 p. 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		
7.2 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.)	Lecture and 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>	Lecture, data acquisition in the field (field excursion) and 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>	Lecture and hands-on exercises	6
Data acquisition and processing using terrestrial laser scanner <i>Telling, J., Lyda, A., Hartzell, P., Glennie, C., 2017. Review of Earth science research using terrestrial laser scanning. Earth-Science Rev. 169, 35–68, doi.org/https://doi.org/10.1016/j.earscirev.2017.04.00</i>	Lecture, data acquisition in the field and hands-on exercises	6
Student projects and exercises evaluation	Presentation of the	4

	project results	
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		

8. 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 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.

9. Assessment

Type of activity	9.1 Assessment criteria	9.2 Assessment methods	9.3 Weight in the final mark
9.4 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 on-line presentation of the project (Google Meet)	20% 20%
9.5 Laboratory	GPS data acquisition and processing	Intermediate evaluation: Oral evaluation of results and processing skills (Google Meet)	10%
	Data acquisition and processing using UAV	Intermediate evaluation: Oral evaluation of results and processing skills (Google Meet)	10%
	Data acquisition and processing using terrestrial laser scanner	Intermediate evaluation: Oral evaluation of results and processing skills (Google Meet)	10%
	GIS project (geodatabase and project presentation)	Intermediate evaluation: Presentation of the project results (Moodle platform https://elearning.e-uvt.ro/ and Google Meet)	30%
9.6 Minimum performance standard			
grade 5 as a mean of evaluation from the above-mentioned compulsory activities			

10. Use of Generative Artificial Intelligence (GenAI) tools

The use of GenAI tools (ChatGPT, Google Gemini, Copilot, MidJourney, etc.) is strictly prohibited for any coursework and assessment tasks (both lectures and lab/practical sessions).

Date

15.09.2026

Course convenor's signature

Assoc. prof. Alexandru Onaca

Date of approval in the department

Head of department's signature

Assoc. prof. Sebastian Jucu