

COURSE OUTLINE

1. Study programme information

1.1 Higher education institution	Universitatea de Vest din Timișoara
1.2 Faculty / Department	Chimie, Biologie, Geografie / Departamentul de Geografie
1.3 Sub-department	Geografie
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	Geostatistics						
2.2 Course convenor/ Lecturer	Conf. univ. Dr. ȘANDRIC Ionuț						
2.3 Teaching assistant	Conf. univ. Dr. ȘANDRIC Ionuț						
2.4 Year of study	1	2.5 Semester	2	2.6 Type of assessment	E	2.7 Course type	DS/DOP

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

3.1 Number of hours per week	3	of which: 3.2 lecture	1	3.3 practical activity	2
3.4 Total hours in the curriculum	42	of which: 3.5 lecture	14	3.6 practical activity	28
Time distribution:					hours
Studying textbooks, course materials, bibliography and notes					25
Further research in libraries, on electronic platforms and in the field					25
Preparing seminars/ laboratories, homework, research papers, portfolios and essays					15
Tutoring					9
Examinations					9
Other activities					
3.7 Total hours of individual study	83				
3.8 Total hours per semester	125				
3.9 Number of credits	5				

4. Prerequisites (if applicable)

4.1 based on curriculum	Basic knowledge of statistics
4.2 based on competencies	Basic knowledge of GIS software

5. Conditions (if applicable)

5.1 for the course	- Computer / laptop for the teacher and students - internet access; access to the e-learning.uvt.ro platform. - video projector - Compulsory presence at half of the meetings
5.2 for the practical activity	- complete fulfilment of tasks of laboratory work and projects - Computer / laptop for the teacher and students. - internet access; access to the e-learning.uvt.ro platform; - video projector - Compulsory presence at half of the meetings

6. Objectives of the discipline - expected learning outcomes to the formation of which contribute to the completion and promotion of the discipline

Knowledges	• Knowledge of the basic concepts of statistics and probability with focus on Geoscience applications • Characterize formations using statistical approaches where access to deterministic models is limited. • Understand basic concepts in probability and univariate, bivariate, multivariate statistics and spatial relationship, covariance and correlation, and regression and curve fitting. • Understand the basics of confidence tests. • Knowledge of 2D and 3D interpolation methods • Explain the mathematical and statistical principles behind Kriging, Co-kriging and stochastic simulations
Skills	• Apply statistics in characterizing spatial heterogeneity. • The ability to identify/select appropriate interpolation methods. • Apply variogram analysis, spatial estimation, kriging, and uncertainty analysis. • Apply different geostatistical methods in spatial interpolation based on a set of 2D and 3D sampled data.
Responsibility and autonomy	• Development of a critical and analytical spirit among students; appreciating the advantages of using algorithmic thinking for GIS • The ability to solve specific geostatistic tasks autonomously. • The application of effective and responsible work strategies, based on the principles, norms and values of the code of professional ethics. • Self-assessment of the need for continuous professional training for the purpose of insertion and adaptability to the requirements of the labor market • Capitalizing on the results obtained to analyses, studies and GIS projects

7. Content

7.1 Lecture	Teaching methods	Observations
Introduction in geostatistics	Lecture, Interactive presentations, heuristic conversation, problematization and hands-on examples	2 hours
Visualization of geostatistics datasets		2 hours
Interpolation methods - deterministic		2 hours
Interpolation methods - probabilistic		2 hours
Kriging interpolation methods		2 hours
3D interpolation methods		2 hours
Evaluation, Feedback		2 hours
Bibliography • Isaaks E., Srivastava R. (1989), Introduction to Applied Geostatistics, Ed. Oxford • Scărădeanu D., Popa R., 2001, Geostatistică aplicată, București (2001) • Christakos G., Bogaert P., Serre M. (2001), Temporal GIS, Springer • Hengl T. (2009) A Practical Guide to Geostatistical Mapping • https://learn.arcgis.com • Course and practical activity materials, presentations and references posted on Elearning UVT Platform (https://elearning.e-uvt.ro/)		
7.2 Practical activity	Teaching methods	Observations
Introduction in Geostatistics	Hands-on exercises, case studies, scientific explanation and demonstration.	4 hours
Datasets used in Geostatistics		4 hours
Deterministic interpolation methods		4 hours
Probabilistic interpolation methods		4 hours
Semivariogram		4 hours
Various kriging interpolation methods		6 hours

3D interpolation methods		2 hours
Bibliography • Isaaks E., Srivastava R. (1989), Introduction to Applied Geostatistics, Ed. Oxford • Scrădeanu D., Popa R., 2001, Geostatistică aplicată, București (2001) • Christakos G., Bogaert P., Serre M. (2001), Temporal GIS, Springer • Hengl T. (2009) A Practical Guide to Geostatistical Mapping • https://learn.arcgis.com		

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.

The content of the discipline was developed in accordance with the curriculum and meets the didactic and scientific requirements corresponding to similar specializations in other university centers. Geostatistics facilitates the acquisition of knowledge in carrying out a research project, both from a theoretical point of view and from the point of view of working methods in the field, developing students' analytical thinking, the ability to problematize, to manage a scientific approach, of a database and its operation. The software used in the practical applications are among the most modern and frequently used in specialized institutions. Such applied training makes students compatible with the job market in the field of geographic information systems, or research activity.

9. Assessment

Type of activity	9.1 Assessment criteria	9.2 Assessment methods	9.3 Weight in the final mark
9.4 Lecture	Understanding and assimilation of knowledge	Oral online evaluation	50%
9.5 Practical activity	Geostatistic project	Written report	20%
	Final project in Geostatistics	Presentation of results generated in the practical project (oral evaluation)	30%
9.6 Minimum performance standard			
• Minimum mark 5 at course evaluation. • Minimum mark 5 at practical activities.			
Additional information The course will be taught and organized modular intensive during one week at the beginning of the semester. The online courses will be held using Google meet.			

Date

22.01.2024

Course convenor's signature

Conf. univ. Dr. Șandric Ionuț

Date of approval in the department

Head of department's signature