SYLLABUS

1. Information about the program

1.1 Institution of higher education	„Babeş-Bolyai" University, Cluj-Napoca
1.2 Faculty	Geography
1.3 Department	Regional Geography andTerritorial Planning
1.4 Study area	Geography
1.5 Level of study	Master
1.6 Program of study	**Geomatics**

2. Information about the course

2.1 Title of the course	**ADVANCED GIS**						
2.2 Course taught by:			Dr. Titus MAN, Associate Professor				
2.3 Seminar by:			Dr. Titus MAN, Associate Professor				
2.4 Year of study	**I**	2.5 Semester	**2**	2.6 Method of assessment	**E**	2.7 Type of course	**DA**

3. Time allocation (hours per semester of pedagogical activities)

3.1 Hours per week	4	Of wich: 3.2 course	2	3.3 seminar	2
3.4 Total hours - semester	56	Of wich: 3.5 course	28	3.6 seminar	28
Time allocation					hours
Study for exams					45
Additional documentation in the library, on the internet and in the field and working on the semester project and presentation					45
Reading for the seminar and writing the projects					40
Tutoring					6
Exam					4
Other					4

3.7 Total hours for individual study	**144**
3.8 Total hours per semester	**200**
3.9 Number of credits	**8**

4. Prerequisites (if any)

4.1 curriculum-related	
4.2 competence-related	

5. Other requirements (if any)

5.1 for the course	• Classroom with desktop/laptop, projector and power point software, access to internet.
5.2 for the seminar	• Computer room, Internet connection, specific software: ArcGIS, QGIS

6. Competencies

Competențe profesionale	• Using advanced concepts and methods of modeling using ArcGIS principles and technology, and integrating results into other GIS software. • Appropriate use of specialized applications to solve geographic modeling problems. • The ability to capitalize the results obtained in complex projects
Competențe transversale	• Knowledge of the methods and methodologies used to model GIS • Developing the skills needed for multidisciplinary cooperation, communication and building of partnership based on the application of the acquired knowledge and the development of transdisciplinary scientific reasoning.

7. Course objectives

7.1 General goals	• Assimilation of the necessary operational basis for the use of GIS. • Knowledge and application of established principles and methods in the field.
7.2 Specific objectives	• Understanding basic principles, tools and methods used in GIS modeling. • The ability to carry out a complex research project from data acquisition to post-processing and integration phases in GIS modeling.

8. Outline

8.1 Course	**Teaching methods**	**Observations**
1. **Creating and editing data in ArcGIS:** **editing tools,** **edit attributes,** **georeferencing**	• lecturing	6 hours
2. **Construction of the map:** **symbolizing thematic layers,** **organizing data on the layout,** **personalization of the legend,** **embed graphics on the map**	• lecturing	4 hours
3. **Data processing and querying in ArcToolbox:** **spatial query,** **converting data from CAD formats,** **geodatabase and raster,** **importing tabular data**	• lecturing	4 hours
4. **Model Builder:** **model interface,** **establishing links between processes,** **setting parameters and model variables,** **generating a model**	• lecturing	4 hours
5. **Using images in ArcGIS:** **georeferencing and mosaic imaging,** **presenting special techniques for image enhancement (Histogram, Enhance, Resample, Clipping, Pyramids),** **image management (Rotate, Shift, Rescale)**	• lecturing	4 hours
6. **Spatial Analysis and Database Management:** **Buffer queries,** **overlay,** **extracting items for analysis,** **methods and analytical tools**	• lecturing	4 hours

7. **Modeling geographic data in GIS - introductory notes: landform analysis, DEM, primary and secondary topographic indicators, hydrological modeling in GIS**	• lecturing	2 hours

References (provided by the instructor)

1. Bernhardsen, T. - ***Geographical Information System***, Viak IT, Arendal, Norway, 1997.
2. Heywood I., Cornelius S., Carver S., (1995), ***An Introduction to Geographical Information Systemms***, Longman, Harlow, England
3. Imbroane A.M., Moore D. – ***Iniţiere în GIS şi Teledetecţie***, Presa Universitară Clujană, Cluj-Napoca, 1999.
4. Kennedy Melita, Kopp S., ***Understanding Map Projection***, ESRI press, Redland, CA, USA, 2002.
5. Minami M., ***Using ArcMap***, ESRI press, Redland, CA, USA, 2002
6. Vieneau Aleta, ***Using ArcCatalog***, ESRI press, Redland, CA, USA, 2002.
7. Zeiler M., ***Modeling our world***, ESRI press, Redland, CA, USA, 2002.
8. ***, ***What is ArcGIS***, ESRI press, Redland, CA, USA, 2002.

8.2 Seminar	**Teaching methods**	**Observations**
1. **Creating and editing data in ArcGIS: editing tools, edit attributes, georeferencing**	Instructor-led seminar	6 hours
2. **Construction of the map: symbolizing thematic layers, organizing data on the layout, personalization of the legend, embed graphics on the map**	Instructor-led seminar	4 hours
3. **Data processing and querying in ArcToolbox: spatial query, converting data from CAD formats, geodatabase and raster, importing tabular data**	Instructor-led seminar	4 hours
4. **Model Builder: model interface, establishing links between processes, setting parameters and model variables, generating a model**	Instructor-led seminar	4 hours
5. **Using images in ArcGIS: georeferencing and mosaic imaging, presenting special techniques for image enhancement (Histogram, Enhance, Resample, Clipping, Pyramids), image management (Rotate, Shift, Rescale)**	Instructor-led seminar	4 hours
6. **Spatial Analysis and Database Management: Buffer queries, overlay, extracting items for analysis, methods and analytical tools**	Instructor-led seminar	4 hours
7. **Modeling geographic data in GIS - introductory notes: landform analysis, DEM, primary and secondary topographic indicators, hydrological modeling in GIS**	Instructor-led seminar	2 hours

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1. Bernhardsen, T. - ***Geographical Information System***, Viak IT, Arendal, Norway, 1997.
2. Heywood I., Cornelius S., Carver S., (1995), ***An Introduction to Geographical Information Systemms***, Longman, Harlow, England
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7. Zeiler M., ***Modeling our world***, ESRI press, Redland, CA, USA, 2002.
, ***What is ArcGIS, ESRI press, Redland, CA, USA, 2002.

9. Harmonize the content of the discipline with the expectations of representatives of the epistemic community, professional associations and representative employers in the field of the program

- The content of the discipline is consistent with what is done in other university centers in the country and abroad.
- The analysis of the employers' opinions on the preferential attributes of the specialists group has resulted in a high degree of appreciation of their professionalism, which confirms that the structure and content of the curriculum built for this study program is fair, comprehensive and effective.

10. Assessment and evaluation

Type of activity	10.1 Criteria for assessment	10.2 Method of assessment	10.3 Percent of final grade
10.4 Course	• Verifying the degree of systematization and use of the acquired concepts • degree of assimilation of specialized terminology • the ability to operate with new assimilated knowledge	Exam	60%
10.5 Seminar	• the ability to apply theoretical knowledge in practice • the ability to operate with assimilated knowledge • the ability to operate with GIS software	Practical evaluation during the semester Final evaluation	30% 10%
10.6 Minimum performance standard • the level of knowledge of theoretical and practical GIS modeling using ArcGIS			

Date	Signature course lecturer	Signature seminar instructor
20.04.2022	Associate Professor Titus Man, PhD	Associate Professor Titus Man, PhD

Date departmental approval	Signature department chair
28.04.2022	Associate Professor Iuliu Vescan, PhD