**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** | |
| * 1. 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**

|  |  |
| --- | --- |
| **generic**  **Competenţe**  **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 |
| **specific**  **Competenţe 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 |
| **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.   \*\*\*, ***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 | 30% |
| Final evaluation | 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

05.05.2020 Conf.univ.dr Titus Man Conf.univ.dr Titus Man

………………….. …………………..

Date of departmental approval Signature department chair

......................... Conf.univ.dr. Cristian-Nicolae Boţan

…………………………..