GIS ANALYSIS FOR ENVIRONMENTAL STUDIES
(SYLLABUS)

1. Information regarding the programme

1.1 Higher education institution	Babeş-Bolyai University
1.2 Faculty	Faculty of Environmental Science and Engineering
1.3 Department	Environmental Analysis and Engineering
1.4 Field of study	Environmental Engineering
1.5 Study cycle	MA
1.6 Study programme / Qualification	Sustainable Development and Environmental Management/ Environmental Engineering

2. Information regarding the discipline

2.1 Name of the discipline		**GIS analysis for environmental studies**					
2.2 Course coordinator		Lecturer, PhD Cristian V. Malos					
2.3 Seminar coordinator		Lecturer, PhD Cristian V. Malos					
2.4. Year of study	1	2.5 Semester	1	2.6. Type of evaluation	E	2.7 Type of discipline	Mandatory

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

3.1 Hours per week	2	3.2 Of which: course	1	3.3 seminar/laboratory	1+1
3.4 Total hours in the curriculum	28	3.5 Of which: course	14	3.6 seminar/laboratory	28

Time allotment:	hours
Learning using manual, course support, bibliography, course notes	4
Additional documentation (in libraries, on electronic platforms, field documentation)	4
Preparation for seminars/labs, homework, papers, portfolios and essays	4
Tutorship	2
Evaluations	2
Other activities: visits, workshops, and other academic activities	7

3.7 Total individual study hours	12
3.8 Total hours per semester	23
3.9 Number of ECTS credits	6

4. Prerequisites (if necessary)

4.1. curriculum	-	no requirements
4.2. competencies	-	no requirements

5. Conditions (if necessary)

5.1. for the course	- Class room with a video projector device
5.2. for the seminar /lab activities	- Computer laboratory

6. Specific competencies acquired

Professional competencies	Through this course, students will acquire basic knowledge and skills in the field of GIS and spatial statistics. • Understand how geographic and spatial methods contribute to the understanding of problems in environment, health, and healthcare • Locate, create, collect and manage geographic data (using GPS and other tools) • Utilize basic GIS and spatial analysis functions for data processing • How to write a scientific paper related to GIS and spatial analysis
	- Work successfully in a team by performing practical tasks; - Develop communication skills; - Field mapping skills - Knowledge about tools and methodologies in environmental studies

7. Objectives of the discipline (outcome of the acquired competencies)

7.1 General objective of the discipline	- To provide general knowledge related to concepts and methods applied in the area of poGIS and spatial statistics
7.2 Specific objective of the discipline	- To provide the basic and advanced GIS concepts - To develop the analytical skills of students - To acquire knowledge about spatial statistics - To acquire professional competences in the field

8. Content

8.1 Course **Course 1 Introduction to GIS** Introduction to GIS and basic GIC concepts. What is a GIS? What spatial statistics is ? **Course 2 Raster and Vector; Spatial objects and databases** Defining raster and vector data. Specific usage of the formats for different types of data processing **Course 3 Geodesy and Projections** Map projections and mapmaking history. Mapping the Earth **Course 4 Linking attribute data to spatial data** Making attributes visible and understanding how attributes can be analyzed **Course 5 Spatial relationships and spatial analysis** Topology, spatial analysis models **Course 6 Spatial clustering and other spatial data analyses** Understanding the distribution of spatial data **Course 7 Regression Models** **Course 8 Regression analysis with spatial data**	**Teaching methods** Exposure: description, explanation, conversation.	**Remarks** Students are encouraged to move his/her participation to the next level by not just answering questions, but asking them, by not just making comments, but specifically responding to things other students say in courses.

Bibliography

1. Bonham-Carter Graeme F., Geographic information systems for geoscientists : modelling with GIS. Kidlington : Pergamon, 1994.*

2.Chrisman Nick, Charting the unknown : how computer mapping at Harvard became GIS. Redlands, Calif : ESRI Press, 2006.*

3.Grafarend, Erik W., Rey-Jer You, and Rainer Syffus. Map Projections: Cartographic Information Systems. second ed. Berlin: Springer, 2014

4.Hengl, Tomislav. Eur. Vol. 22904EN, A Practical Guide to Geostatistical Mapping of Environmental Variables. Luxembourg: Publications Office, 2007.

5 Heywood, D Ian, Sarah Cornelius, and Steve Carver. An Introduction to Geographical Information Systems. 4th ed. Harlow, England: Prentice Hall, 2011.

6.O'Sullivan, David, and D Unwin. Geographic Information Analysis. second ed. Hoboken, New Jersey: John Wiley & Sons, Inc., 2010

7.Wade Tasha, A to Z GIS : an illustrated dictionary of geographic information systems. Redlands, Calif : ESRI Press, 2006.

8.2 Seminar / laboratory	**Teaching methods**	**Remarks**
The goal of the seminars is to encourage students to work themselves with data provided. After each couse module there would be laboratory excersisis performing task associated with the new knowledge acquired	Case studies, debate	Laboratory exercises can sometimes be more important that course activities. During laboratory hours students learn how to work and analyze data by themselves
Seminar 1 Introduction to QGIS and open source GIS		
Seminar 2 Editing spatial data		
Seminar 3 Query Builder and Field calculator		
Seminar 4 Working with raster data		
Seminar 5 Spatial analysis		
Seminar 6 Working with data tables in R		
Seminar 7 Regression models in R		

Bibliography

Lecture notes and documentations for the following programs: QGIS, GRASS GIS, SAGA GIS, R statistics

9. Corroborating the content of the discipline with the expectations of the epistemic community, professional associations and representative employers within the field of the program

The course "GIS analysis for environmental studies" enables the graduates to continue their carrier in public and private companies, managing spatial data and integrating geographical data processing and analysis in the general activity framework of the company

10. Evaluation

Type of activity	10.1 Evaluation criteria	10.2 Evaluation methods	10.3 Share in the grade (%)
10.4 Course	Knowing the milestones in the GIS field: e.g., concepts, data types, Coordinate systems	Examination	30%
10.5 Seminar/lab activities	Computer exercise	A specific exercise (using the computer), involving skills developed during the seminar activities	55%
	Active participation in seminars	Participation in the seminar activities by actively trying to solve the exercises provided	15%
10.6 Minimum performance standards: minimum 5. Knowledge about GIS, georeferencing techniques, spatial analysis, cartography			

Signature of course and seminar coordinator:

Cristian V. Malos, PhD Lecturer

Date of approval:
4.04.2018

Signature of the head of department