



Course title: Fundamentals of GIS

Form of teaching: lecture - 26 hrs., 5p. ECTS; practices - 52 hrs., 10, ECTS, **total - 78 hrs., 15p. ECTS**
 Course completion requirements: lecture - finale exam; practices - projects evaluation,

Language of instruction: English

1. Short description, objectives:

Objective of the course is to acquaint students with GIS methods used in climatology and mastering the skills of working with applications ArcGIS (ESRI), QGIS, GRASS, R

2. Prerequisites:

- reading and writing in English,
- basics of PCs

3. Learnin outcomes

W01 - knows the basic issues of the construction of different thematic maps (14K-1A_W02, 14K-1A_W03, 14K-1A_W04)

W02 - possess a knowledge about to use GIS technics in different fields of earth sciences (14K-1A_W02, 14K-1A_W06, 14K-1A_W07)

W03 - knows the techniques and research tools used GIS technics in environmental research (14K-1A_W02, 14K-1A_W04, 14K-1A_W07)

W04 - possess a knowledge about planning and organizing of research on natural and anthropogenic environmental using basic GIS tools (14K-1A_W06, 14K-1A_W08)

W05 - in the investigations and practical applications consistently uses the rules of exact, based on empirical data, interpretation of the process in geographical environmental (14K-1A_W02)

U01 – get skills of use GIS software for spatial analysis (14K – 1A_U01, 14K–1A_U02)

U02 – get skills of visualize the results of spatial analysis in the different thematic maps (14K – 1A_U01, 14K – 1A_U02, 14K – 1A_U07)

U03 – is able to plan and use a simple database of GIS for selected issue of environmental research (14K – 1A_U04, 14K – 1A_U07)

U04 - freely uses scientific literature on GIS technic; reads complex scientific texts in English (14K-1A_U06)

K01 - understands of needs for continuous education for all life (14K-1A_K01)

K02 - can organize individual and group work during the execution of the project GIS (14K-1A_K05)



K03 - systematically updates knowledge in natural science and knows its practical applications (14K-1A_K02)

4. Course description:

- Basic issues of Geographical Information Systems and their application in environmental sciences
- Basics of Cartography: map elements, types of maps, geographic coordinate systems and their transformations, distortions on maps, map scale
- GIS data: vector data, raster data, acquisition and data management, digitization of data, data attributes - management and basic logic operations,
- Basic analysis of spatial data: Identification and selection of objects using query, create a new layer, create a buffer, the function of coverage, data classification.
- Thematic maps and data presentation: presentation of data using symbols and its modification, presentation of data by modifying colors and textures, modification of data labels
- Create a composition map: setting and modifying the page layout, (scale, legend, title, map orientation), export maps for different types of files.

5. Course evaluation

Finale test (lecture) - 50% total score, (final test can be taken by individuals who have passed practices)
 projects evaluation (practices) - 50% total score,

6. Teaching methods

Teaching methods: lecture, multimedia presentations, discussion, work with the source material (book, article), methods of practical exercises

7. Recommended reading list

Urbański, J., 2008, GIS w badaniach przyrodniczych. Wydawnictwo Uniwersytetu Gdańskiego

Magnuszewski A., 2013, GIS w geografii fizycznej. Wydawnictwo Naukowe PWN

W.L. Gorr & K.S. Kurland (2010), *GIS Tutorial 1 Basic Workbook*, 4th Edition for ArcGIS 10, Esri Press, ISBN: 9781589482593

Buckley, D.J., 1997, An introduction to GIS. Pacific Meridian Resources, Inc.
 [http://bgis.sanbi.org/Introduction_to_GIS.pdf]

Bivand S.R., Pebesma E.J., Gomez-Rubio V., 2008, Applied spatial data Analysis with R. Springer ISBN 978-0-387-78170-9