**II.2.19 GEOGRAPHIC INFORMATION SYSTEM**

**A. Course description**

**1. Credit points: 2 ECTS**

**2. Time commitment**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Items | Lecture | Tutorial/Exercise | Practice/Assignment | Lab-work | Total |
| No. of hours | 4 |  |  | 16 | 20 |

**3. Prerequisites:**

Practicals: computer lab with ArcGIS 10.1 installation

**4. Recommended background knowledge**

Computer science, Environmental sciences

**5. Subject description**

Introduction into Geographic Information Systems (GIS) as important tool in environmental science and praxis, practical introduction in using the GIS-Software ArcGIS.

**6. Objectives & Outcome**

(1) Basic knowledge on GIS: terms and definitions, structural and functional components, environmental applications

(2) Basic knowledge on structure of ArcGIS software

(3) Basic ability using ArcGIS software: building maps, layouting maps, data management, creating new data, digitizing, editing data, analysing data, processing data, import & export of data.

**7. Assessment/ Evaluation**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Component | Attendance | Exercises | Assignments | Practicals | Midterm | Final |
| Percentage % | 10 |  |  | 30 |  | 60 |

**8. Prescribed Textbook(s)**

*[1]* Course Instructor’s Lecture Notes

*[2]* Ibrahim Mirsal. 2008. Soil Pollution: Origin, Monitoring and Remediation, 2nd ed., 312 p., ISBN 978-3-540-70775-2)

**B. Course content**

1. An Introduction to GIS

1.1. Definition of GIS, comparison with other technologies

1.2. Functional GIS components: data capture, data management, visualization, data analysis

1.3. Structural GIS components: data, user, hardware, software

2. Overview on GIS application fields

3. Introduction ArcGIS

First steps using ArcMap and ArcCatalog, source data formats, add data, symbology, basic tools

4. Attribute tables – part 1

Analysing fields, adding fields, field calculator, buffering

5. Vector data analysis – part 1

Selection of features by attributes and by location, analysis by selection, summarize

6. Attribute tables – part 2

Create and edit attributes, labeling

7. Vector data analysis - part 2

Relate and join, spatial join, dissolve

8. Coordinate systems, ArcToolbox

Projections, georeferencing, related tools

9. Editing

Create points, polylines, polygons, edit feature geometry

10. Vector data analysis- part 3

11. Raster data – part 1

Processing and analysis

12. Raster data- part 2

Analysis

13. Layout

Dataframes,grid, scale, symbology, legend

14. Review of the main functions in a mixed final exercise

**C. Reference Literature**

Michael Zeiler (1999). *Modeling our world*. The ESRI® Guide to Geodatabase Design. Environmental Systems Research Institute, Inc. 199 pages.

Tomlinson, Roger (2007). Thinking about GIS. 3rd Edition. 254 pages.

Scally, Robert (2006). GIS for Environmental Management. ESRI Press. 202 pages.