COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**AY503**	**SEMESTER**	**5th**
COURSE TITLE	**GEOGRAPHIC INFORMATION SYSTEMS (GIS) and SPATIAL ANALYSIS**		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**		**CREDITS**
Teaching Hours	5		5
COURSE TYPE	Special background		
PREREQUISITE COURSES	None		
LANGUAGE OF INSTRUCTION and EXAMINATIONS	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes		
COURSE WEBSITE (URL)	https://eclass.uth.gr/courses/ENV_U_132/		

(2) LEARNING OUTCOMES

Learning outcomes

The aim of the course is to help students acquire proven knowledge and understanding of issues in the field of geographic information science. The course presents Geographical Information Science and focuses on Geographical Information Systems (GIS). The course is oriented towards information related to environmental applications in space. Laboratory exercises are performed using open-source GIS software (QGIS).

Upon successful completion of the course, students will have acquired the necessary knowledge, skills and competence, and will be able to:

- Model geospatial and descriptive data
- Construct spatial databases
- Create and analyse complex spatial queries
- Create map compositions (maps)
- Solve spatial problems
- Use on a basic level GIS in Environmental issues
- Use on a basic level specialized, open source, GIS software (QGIS)

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- Working independently
- Team work
- Respect for the natural environment
- Showing social, professional and ethical responsibility and sensitivity to gender issues
- Criticism and self-criticism
- Production of free, creative and inductive thinking

(3) SYLLABUS

The course refers to Geographical Information Science and focuses on Geographical Information Systems (GIS). The focus of the course is on spatial information related to environmental applications. Laboratory exercises are being developed with open-source GIS software (QGIS). The course includes the following topics:

- Introduction to GIS. Basic concepts of GIS. Data structures, vector – raster.
- Geodata Sources & Open-Source Software (QGIS-GRASS GIS).
- Input data into a GIS. Symbols and methods for classifying vector information.

- Georeference raster and vector data.
- Geospatial Databases.
- Digitalization and creation new geospatial models.
- Cartographic concepts: Introduction to cartography and concepts such as thematic map, scale, projections and coordinate systems.
- Creation of Maps: Learning to build maps, on various scales and layouts.
- Spatial Analytical Processes: Implementation of basic spatial functions: Buffer zones, map overlay, select by location, select by attributes, etc.
- Digital Elevation Model. Slope - Orientation models.
- Spatial analysis and GIS in the Environment.
- 3D applications in the Environment.
- Revision.

(4) TEACHING and LEARNING METHODS – EVALUATION

<table>
<tr><td>DELIVERY</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>• Use of PowerPoint slides
• View material in video
• Communication with students via e-mail
• Use of asynchronous distance learning (e-class)</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>Laboratory practice</td><td>39</td></tr>
<tr><td>Study and analysis of bibliography</td><td>40</td></tr>
<tr><td>Essay writing</td><td>20</td></tr>
<tr><td>Course total
(25 hours workload per credit)</td><td>125</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>Students' performance is evaluated in the Greek language. The final grade is determined by:
• A written exam (at the end of the semester) that contributes 80% to the final grade, applying one or more of the following evaluation methods: Multiple choice questions, short-answer questions, problem solving.
• Students' participation in laboratory practice activities and the preparation and delivery of related assignments (during the semester) that contribute 20% to the final grade.
Final Grade =80% Exam Grade + 20% Assignments Grade</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Longley, P. A., Goodchild, M. F., Maguire, D. J., Rhind, D. W. (2005) *Geographic Information Systems and Science.* Chichester: John Wiley & Sons, Ltd.
- QGIS Training material, https://www.qgis.org/en/site/forusers/trainingmaterial/index.html
- Stefanakis, E. (2010) *Geographic Databases and Geographic Information Systems.* Athens: Papasotiriou Publications (in Greek)