COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	TECHNOLOGY			
DEPARTMENT	ENVIRONMENTAL SCIENCES			
LEVEL OF STUDY	*Undergraduate*			
COURSE UNIT CODE	NEW **COURSE**	**SEMESTER**	5°	
COURSE TITLE	Geographical Information Systems (GIS) and Spatial Analysis			
INDEPENDENT TEACHING ACTIVITIES in case credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the entire course, give the weekly teaching hours and the total credits			**WEEKLY TEACHNG HOURS**	**CREDITS**
THEORETICAL BACKGROUND			3	3
LABORATORY PRACTICE			3	3
TOTAL			6	6
COURSE TYPE Background knowledge, Scientific expertise, General Knowledge, Skills Development	Skills Development Scientific area: Geoinformatics and environmental management			
PREREQUISITE COURSES:	Computing and Databases			
LANGUAGE OF INSTRUCTION &EXAMINATION/ASSESSMENT:	Greek			
THE COURSE IS OFFERED TO ERASMUS STUDENTS	Yes			
COURSE WEBSITE (URL)				

(2) LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail.
It is necessary to consult:

APPENDIX A

- *Description of the level of learning outcomes for each level of study, in accordance with the European Higher Education Qualifications' Framework.*
- *Descriptive indicators for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and*

APPENDIX B

- *Guidelines for writing Learning Outcomes*

The aim of the course is for the students to gain knowledge and understanding of the topics in the scientific field of geographic information science. More specifically, students will acquire knowledge: (a)of modeling geospatial and descriptive data, (b) in the construction of spatial databases, (c) in the creation and analysis of complex spatial searches, (d) in the creation-composition of thematic (maps) and (e) in solving spatial problems.
Upon completion of the course, students will have acquired the basic theoretical and technical

knowledge for the use of Geographic Information Systems in Environmental Issues. They will also have acquired basic knowledge in the use of specialized, open source, GIS (QGIS) software.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aim?

Search for, analysis and synthesis of data and information by the use of appropriate technologies,	*Project planning and management*
Adapting to new situations	*Respect for diversity and multiculturalism*
Decision-making	*Environmental awareness*
Individual/Independent work	*Social, professional and ethical responsibility and sensitivity to gender issues*
Group/Team work	*Critical thinking*
Working in an international environment	*Development of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Introduction of innovative research	*(Other…….citizenship, spiritual freedom, social awareness, altruism etc.)*
	…….

- *Search for, analysis and synthesis of data and information by the use of appropriate technologies,*
- *Group/Team work*
- *Working in an interdisciplinary environment,*
- *Environmental awareness*
- *Critical thinking*

(3) COURSE CONTENT

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:

1. Introduction to GIS. Basic concepts of GIS. Data structures, vector – raster.
2. Geodata Sources & Open Source Software (QGIS-GRASS GIS).
3. Input data into a GIS. Symbols and methods for classifying vector information.
4. Georeference raster and vector data.
5. Geospatial Databases.
6. Digitalization and creation new geospatial models.
7. Cartographic concepts: Introduction to cartography and concepts such as thematic map, scale, projections and coordinate systems.
8. Creation of Maps: Learning to build maps, on various scales and layouts.
9. Spatial Analytical Processes: Implementation of basic spatial functions: Buffer zones, map overlay, select by location, select by attributes, etc.
10. Digital Elevation Model. Slope - Orientation models.
11. Spatial analysis and GIS in the Environment.
12. 3D applications in the Environment.
13. Repetition.

(4) TEACHING METHODS-ASSESSMENT

MODES OF DELIVERY **Face-to-face, in-class lecturing,**	• Lectures • Semester projects - homework

<table>
<tr><td>distance teaching and distance learning etc.</td><td></td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY
Use of ICT in teaching, Laboratory Education, Communication with students</td><td>• Powerpoint presentation.
• e-mail communication.
• e-class theory and exercises</td></tr>
<tr><td>COURSE DESIGN
Description of teaching techniques, practices and methods:
Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, Internship, Art Workshop, Interactive teaching, Educational visits, projects, Essay writing, Artistic creativity, etc.

The study hours for each learning activity as well as the hours of self-directed study are given following the principles of the ECTS.</td><td>
<table>
<tr><th>Activity/Method</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>26</td></tr>
<tr><td>Workshop</td><td>26</td></tr>
<tr><td>Laboratory work</td><td>30</td></tr>
<tr><td>Theory study</td><td>55</td></tr>
<tr><td>Weekly individual evaluation reports for laboratory exercises</td><td>13</td></tr>
<tr><td>Course total
(25 hours of workload per credit unit)</td><td>150</td></tr>
</table>
</td></tr>
<tr><td>STUDENT PERFORMANCE EVALUATION/ASSESSMENT METHODS
Detailed description of the evaluation procedures:
Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice tests, short- answer questions, open-ended questions, problem solving, written work, essay/report, oral exam, presentation, laboratory work, other……etc.
Specifically, defined evaluation criteria are stated, as well as if and where they are accessible by the students.</td><td>Final examinations
Students should attend at least 2/3 of the laboratory exercises
Work will be given during the semester to be assessed at a rate of 30% on the final grade.
Final Grade
70% in Final Exams + 30% in the semester projects (optional)</td></tr>
</table>

(5) SUGGESTED BIBLIOGRAPHY:

Suggested bibliography

•Longley P., Goodchild M., Maguire D., and D. Rhind, 2005, Geographical Information Systems and Science, Wiley, p. 517

•Burrough P. A., and R. McDonnell, 1998, Principles of Geographical Information Systems, Oxford University Press, p. 356.

•QGIS User guide – QGIS Training manual https://www.qgis.org/en/docs/index.html

•QGIS Training material https://www.qgis.org/en/site/forusers/trainingmaterial/index.html

•Στεφανάκης Ε, 2010, Βάσεις γεωγραφικών δεδομένων και συστήματα γεωγραφικών πληροφοριών, Παπασωτηρίου.

•Συγγρός Γ., 2004, Μετασχηματισμοί συντεταγμένων των γεωγραφικών δεδομένων στον Ελληνικό χώρο, συνέδριο Ελληνικής Εταιρίας γεωγραφικών πληροφοριών, Συνέδριο HellasGI.

-Complementary bibliography

Teacher's notes, full lecture material and tutorials.