COURSE OUTLINE

1. GENERAL

SCHOOL	SCHOOL OF ENVIRONMENT AND AGRICULTURAL ENGINEERING		
ACADEMIC UNIT	DEPARTMENT OF NATURAL RESOURCES DEVELOPMENT AND AGRICULTURAL ENGINEERING		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**630307**	**SEMESTER**	**2o**
COURSE TITLE	Advanced GIS Applications in Hydrology and Hydraulic Works		

INDEPENDENT TEACHING ACTIVITIES *if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits*	**WEEKLY TEACHING HOURS**	**CREDITS**
Theory: Lectures	3	5
Laboratory: Use of Software Tools	2	
Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).		

COURSE TYPE *general background, special background, specialised general knowledge, skills development*	General knowledge, Scientific Area, Skills development
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (in English)
COURSE WEBSITE (URL)	

2. LEARNING OUTCOMES

Learning outcomes
The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will

acquire with the successful completion of the course are described.

Consult Appendix A

- *Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B*
- *Guidelines for writing Learning Outcomes*

The purpose of this course is to familiarize and help students understand advanced methods of geoinformatics that are applied in hydrology and the study of hydraulic works. Hydrological processes evolve in space and their analysis is based on the use of spatial data. Geographic Information Systems (GIS) are the basis of many analysis and design methods in hydrology and hydraulic works.
In this context, the students study: Data sources, processing, and analysis; Spatial analysis methods in water resources problems; Hydrological watershed delineation and analysis Hydrometeorological data analysis; Application of hydrological models in GIS environment And many other related applications

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

Search for, analysis and synthesis of data and information, with the use of the necessary technology	*Project planning and management*
Adapting to new situations	*Respect for difference and multiculturalism*
Decision-making	*Respect for the natural environment*
Working independently	*Showing social, professional and ethical responsibility and sensitivity to gender issues*
Team work	*Criticism and self-criticism*
Working in an international environment	*Production of free, creative and inductive thinking*
Working in an interdisciplinary environment	*……*
Production of new research ideas	*Others…*
	…….

1. Search, Analysis and Synthesis of Data and Information, using the Necessary Technologies
2. Adapting to New Situations
3. Decision-making
4. Autonomous Work
5. Teamwork
6. Project planning and management
7. Respect for the natural environment

3. SYLLABUS

Data sources, scales, accuracy, and sources of errors.

Digital elevation models (DEM, DTM, DSM), creation, properties, processing, and their use in hydrology.

Hydrological correction of digital elevation models (identify and FILL SINKS).

Hydrological basin / watershed – water-divide in GIS environment.

Analysis of geomorphological characteristics of a watershed using GIS software.

Hydrographic network, mapping - analysis of the hydrographic network.

Spatial analysis of hydrometeorological data.

Runoff estimation and GIS.

SCS-CN method, estimation of spatial distribution of parameters, applications.

Runoff routing – Spatial Distributed Unit Hydrograph.

Hydrological modeling in GIS.

Aridity index analysis.

4. TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>In classroom and in laboratory (face-to-face)</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY
Use of ICT in teaching, laboratory education, communication with students</td><td>Exploitation of Information and Communication Technologies in teaching, in laboratory training and in communication with students.
Use of dedicated software.
Use of integrated e-learning system.
Communication with students via open eclass platform and e-mail.</td></tr>
<tr><td>TEACHING METHODS

The manner and methods of teaching are described in detail.

Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.

The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>35 hours</td></tr>
<tr><td>Laboratory work and case studies</td><td>75 hours</td></tr>
<tr><td>Exercises and presentations</td><td>15 hours</td></tr>
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<tr><td>Course total</td><td>125</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION

Description of the evaluation procedure

Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other

Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</td><td>Four written laboratory exercises (40%) of study cases (development of spatial data, their processing, modeling, calculations, cartography).
Oral examination (60%) on how to deal with and implement the study cases that each student (or group of students) faced.

Marking Scale: 0-10.
Minimum Passing Mark: 5.</td></tr>
</table>

5. ATTACHED BIBLIOGRAPHY

Proposed literature:

1. Nikolakopoulos, K., Katsanou, K., & Lamprakis, N. (2015). Υδρολογία με χρήση γεωγραφικών συστημάτων πληροφοριών και δεδομένων τηλεπισκόπησης [Undergraduate textbook]. Kallipos, Open Academic Editions. https://hdl.handle.net/11419/2520