COURSE OUTLINE

(1) General information

FACULTY/SCHOOL	TECHNOLOGY			
DEPARTMENT	ENVIRONMENTAL SCIENCES			
LEVEL OF STUDY	*Undergraduate*			
COURSE UNIT CODE	NEW **COURSE**	**SEMESTER**	6^0, 7^0, 8^0	
COURSE TITLE	Photointerpretation and Remote Sensing			
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			2	2
TOTAL			5	5
COURSE TYPE Background knowledge, Scientific expertise, General Knowledge, Skills Development	Skills Development Scientific area: Geoinformatics and environmental management			
PREREQUISITE COURSES:	Geographical Information Systems (GIS) and Spatial Analysis			
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 objectives of the course are to provide general knowledge and basic professional skills in photo-interpretation of Aerial Photos and in analysis of satellite images by means of Remote Sensing science. Students will learn how to implement different methodologies in multitemporal satellite data in order to deal with environmental spatial issues. At the end of the course students will be able to:

(a) identify, collect and combine the necessary satellite data (free of charge for educational purposes) at different spatio-temporal resolutions, in order to analyze environmental issues with various scales. This is mainly achieved by searching in well-known websites of world-wide organizations.
(b) have awareness of the problem that they are facing and will be able to assess spatially and quantitatively and generalize their conclusions beyond of the study area.
(c) handle successfully open source software for processing satellite images and aerial photos, such as QGIS, SNAP and GRASS-GIS. They acquire basic knowledge in data processing and are able to handle logical operations between digital images.
(d) to produce land use – land cover thematic maps through the classification process of satellite data.

The basic knowledge of remote sensing will help students, to gain skills on cutting edge technologies and how to implement them in order to solve environmental issues and monitor the sustainability of ecosystems. This course will open new technological fields of interest to students and offer them useful skills for their future academic or professional career.

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

About 20% of the total course analyzes the characteristics of aerial photography, the advantages and disadvantages and the key elements of stereoscopic vision. Practical exercises in photo interpretation will be also realized. The rest and most of the course is considered the process of satellite data using Remote Sensing methods. Knowledge such as satellite systems, multispectral satellite data, their geometric and radiometric errors, spectral signatures, methods of supervised and unsupervised classification, and classification accuracy, complement the theoretical background. The practical training in the analysis of satellite data will be carried out with laboratory exercises using open source remotely sensing software such as SNAP and QGIS.

The covered topics are:

- Aerial photography. Flying means. Photo-cameras. Geometry of vertical aerial photography.

- Introduction to Photointerpretation, Stereoscopy, Photogrammetry.
- Remote Sensing, introduction to Electromagnetic Radiation and Electromagnetic Spectrum.
- Types of satellites and their characteristics. Spectral bands.
- Digital image structure. Types of resolution of images. Color compositions of spectral bands.
- Histograms of satellite imagery and their analysis.
- Filters and radiometric corrections for satellite imagery.
- Indices: Vegetation - Dryness - Soil moisture, etc. Algebraic and logical operations of digital images.
- Spectral signatures. Export of spectral signatures from each land cover and analysis.
- Techniques of Supervised and Unsupervised classification of satellite images. Creation of thematic maps and precision.
- Brief presentation of environmental satellite image processing applications and important topics.

(4) TEACHING METHODS-ASSESSMENT

<table>
<tr><td>MODES OF DELIVERY
Face-to-face, in-class lecturing, distance teaching and distance learning etc.</td><td>• Lectures
• Semester projects - homework</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
• Use open source software such as SNAP, Qgis</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>39</td></tr>
<tr><td>Workshop</td><td>26</td></tr>
<tr><td>Laboratory work</td><td>15</td></tr>
<tr><td>Theory study</td><td>45</td></tr>
<tr><td>Weekly individual evaluation reports for laboratory exercises</td><td></td></tr>
<tr><td>Course total
(25 hours of workload per credit unit)</td><td>125</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</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>

students.	

(5) SUGGESTED BIBLIOGRAPHY:

-***Suggested bibliography***

•Thomas M. Lillesand; Ralph W. Kiefer; Jonathan W. Chipman, 2015, Remote sensing and image interpretation, 7th Edition, WILEY.

•Richards john, 2006 'Remote Sensing Digital Image Analysis', Springer, Verlag

•Καρτάλης Κ. και Φείδας Χ., 2019, Αρχές και Εφαρμογές Δορυφορικής Τηλεπισκόπησης, εκδόσεις Τζιόλα.

•Περάκης Κ., Φαρασλής Ι., Μωισιάδης Αθ., 2007, Η Τηλεπισκόπηση σε 13 Ενότητες. Δωρεάν διάθεση. https://www.ebooks4greeks.gr/h-thlepiskophsh-se-13-enothtes-thewria-methodoi-kai-efarmoges

•Μηλιαρέσης Γ. 2003, 'Φωτοερμηνεία – Τηλεπισκόπηση' εκδόσεις Ίων.

•Μερτίκας, 1999, Τηλεπισκόπηση και ψηφιακή ανάλυση εικόνας, εκδόσεις «ΙΩΝ».

-***Complementary bibliography***

Teacher's notes, full lecture material and tutorials.