COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Technology		
ACADEMIC UNIT	Department of Environmental Sciences		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**AE801**	**SEMESTER**	**8th**
COURSE TITLE	**PHOTOINTERPRETATION and REMOTE SENSING**		
INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**	
Teaching Hours	4	4	
COURSE TYPE	Skills development		
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_143/		

(2) LEARNING OUTCOMES

Learning outcomes

The aim of the course is to provide students with general knowledge and basic professional skills in Photo-interpretation of Aerial Photos and in analysis of satellite images by means of Remote Sensing techniques. Students will learn to implement different methodologies in multitemporal satellite data in order to deal with environmental spatial issues. The basic knowledge of remote sensing will help students 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.

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

- 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 on various scales. This is mainly achieved by searching on well-known websites of world-wide organizations.
- Comprehend with accuracy the problem they are facing, assess it spatially and quantitatively and generalize their conclusions beyond the study area.
- Handle successfully open-source software for processing satellite images and aerial photos, such as QGIS, SNAP and GRASS-GIS.
- Handle logical operations between digital images, using the acquired knowledge on data processing.
- Produce land use – land cover thematic maps through the classification process of satellite data.

General Competences

- Search for, analysis and synthesis of data and information, with the use of the necessary technology
- Decision-making
- 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

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 devoted to the process of satellite data using Remote Sensing methods. Knowledge on satellite systems, multispectral satellite data and their geometric and radiometric

errors, spectral signatures, methods of supervised and unsupervised classification, and classification accuracy complement the theoretical background of the course. 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 topics covered 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 image resolution. 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 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

- Cartalis, C., Feidas, H. (2019) *Principles and Applications of Satellite Remote Sensing,* Thessaloniki: TZIOLA Publications. (in Greek)
- Lillesand, T., Kiefer, R.W., Chipman, J. (2015) *Remote sensing and image interpretation,* (7th Ed). New York: John Wiley & Sons.
- Perakis, K., Faraslis, I., Moisiadis A. (2007) *Remote Sensing in 13 Sections,* https://www.ebooks4greeks.gr/h-thlepiskophsh-se-13-enothtes-thewria-methodoi-kai-efarmoges. (in Greek)
- Richards, J. A. (2006) *Remote Sensing Digital Image Analysis: An Introduction.* Berlin: Springer.