COURSE OUTLINE

(1) GENERAL

SCHOOL	School of Environment		
ACADEMIC UNIT	Department of Environment		
LEVEL OF STUDIES	Undergraduate		
COURSE CODE	**338KEY**	**SEMESTER**	**6**
COURSE TITLE	Environmental Applications of Remote Sensing		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	2	
Laboratories	4	
Total credits		**6**

COURSE TYPE	Skills development
PREREQUISITE COURSES:	Introduction to Topographic Mapping and GIS Introduction to Remote Sensing
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek
IS THE COURSE OFFERED TO ERASMUS STUDENTS	Yes (tutorials)
COURSE WEBSITE (URL)	http://www.env.aegean.gr/studies/undergraduate-degree/curriculum/environmental-applications-of-remote-sensing/

(2) LEARNING OUTCOMES

Learning outcomes
• Knowledge and use of modern methods of Satellite Remote Sensing implementing them with software such as ILWIS, GRASS και Erdas Imagine. • Knowledge and understanding of present research in Remote Sensing by supplementary seminar lectures from PhD candidates working on Remote Sensing Applications. • Analysis of environmental applications with modern methods of Satellite Remote Sensing, which cover areas such as: Land and marine environment, atmosphere, land cover, land use, settlements and industrial areas, agriculture and forestry, archaeology, geology, etc. • Composition based on the knowledge of modern methods of Satellite Remote Sensing into a final project, worked out either individually or in groups, related to an environmental application from current research projects in the Department of the Environment. Software systems such as ILWIS, GRASS και Erdas Imagine, are available for the final project in combination with field measurements • Evaluation of the results of the individual or group final project and presentation in a written report and oral lecture.

General Competences
Search for, analysis and synthesis of data and information, with the use of the necessary technology.

(3) SYLLABUS

Lectures

1. Characteristics of digital images, imaging systems
2. Digital image processing, enhancement, ortho correction, fusion
3. Image classification
4. Vegetation, agriculture
5. Land cover, land use
6. Natural environment
7. Urban environment
8. Atmosphere
9. Marine environment
10. Natural disasters
11. Environmental impact studies
12. Material review
13. Presentation of projects

Lab assignments

1. Visualization of a single band
2. Enhancement of a digital image
3. Visualization of a multiband image
4. Geometric correction
5. Multiband processing
6. Image classification. Final project: select the topic
7. Orthorectification. Final project: work flow design
8. Final project: Image processing
9. Final project: Ground samples
10. Final project: Classification
11. Final project: Production of results
12. Final project: Discussion / Evaluation of results
13. Final project: Final report, oral presentation

(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>Software: ILWIS, GRASS and Erdas Imagine. All laboratory classes are held at the GIS Laboratory of the Dept. of Environment.</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>Laboratories</td><td>52</td></tr>
<tr><td>Homework</td><td>50</td></tr>
<tr><td>Analysis of literature</td><td>26</td></tr>
<tr><td>Field samples</td><td>15</td></tr>
<tr><td>Supplementary lectures, seminars</td><td>6</td></tr>
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<tr><td></td><td></td></tr>
<tr><td>Course total</td><td>175</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>Language of evaluation: Greek
Evaluation methods:
Multiple choice test 15%
Questions with short answers 15%
Questions on report development 15%
Written exam 20%
Laboratory exercises 35%</td></tr>
</table>

(5) ATTACHED BIBLIOGRAPHY

- Suggested bibliography:

Kartalis K., Feidas X., (2012), (in Greek) “Princiles and Applications of Satellite Remote Sensing”, TZIOLAS Publishers, Thessaloniki.

ASPRS: Editor-in-Chief: Andrew B. Rencz, Volume 4: “Remote Sensing for Natural -Resource Management & Environmental Monitoring”, 0-471-31793-4, Published with John Wiley & Sons, Inc., 2004

ASP, (1983), "Manual of Remote Sensing", 2nd Ed

Hatzopoulos J. N., 2008, "Topographic Mapping: Covering the wider field of Geospatial Information Science & Technology (GIS&T)", ISBN 1-58112-988-6, Universal Publishers, 740 pp.

Morton John Canty, 2010, "Image Analysis, Classification, and Change Detection in Remote Sensing: With Algorithms for ENVI/IDL", Second Edition,CRC Press, 2nd edition, 471pp

Russell G. Congalton and Kass Green “Assessing the Accuracy of Remotely Sensed Data: Principles and Practices”, 873719867, Published by Lewis Publishers, 1998

Ian G. Cumming and Frank H. Wong, 2005, "Digital Processing Of Synthetic Aperture Radar Data: Algorithms And Implementation", Artech House, 660pp

Ned Horning, Julie A. Robinson, Eleanor J. Sterling and Woody Turner, 2010, "Remote Sensing for Ecology and Conservation: A

Handbook of Techniques (Techniques in Ecology & Conservation)", Oxford University Press, USA, 448pp

Hamlyn G. Jones, and Robin A Vaughan, 2010, "Remote Sensing of Vegetation: Principles, Techniques, and Applications", Oxford University Press, USA, 1 edition, 400pp

https://landsat.usgs.gov/
http://www.usda.gov/
http://www.usgs.gov/
http://www.earthpace.com/index.php/about/our-projects/45-environmental-applications-of-satellite-remote-sensing
http://www.hexagongeospatial.com/
http://podaac-www.jpl.nasa.gov/
http://www.spotimage.f r
http://www.esa.int/esaEO/SEMWNICUHTG_index_0.html

- Related academic journals:

The application of remote sensing to environmental management
http://www.tandfonline.com/doi/abs/10.1080/01431168008547555

Environmental Applications of Remote Sensing
https://www.intechopen.com/books/environmental-applications-of-remote-sensing

Remote Sensing Applications: Society and Environment
https://www.journals.elsevier.com/remote-sensing-applications-society-and-environment