

COURSE OUTLINE

ADVANCED APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS IN FOREST ECOSYSTEM MANAGEMENT

(1) GENERAL

SCHOOL	TECHNOLOGY		
DEPARTMENT	FORESTRY, WOOD SCIENCES & DESIGN		
LEVEL	POSTGRADUATE		
COURSE CODE	MB124	SEMESTER	2 nd
COURSE TITLE	ADVANCED APPLICATIONS OF GEOGRAPHIC INFORMATION SYSTEMS IN FOREST ECOSYSTEM MANAGEMENT		
ACTIVITIES		WEEKLY HOURS	ECTS
	Lectures	2	6
	TOTAL	2	6
TYPE OF COURSE	ELECTIVE		
PREREQUISITES	NO		
LANGUAGE OF TEACHING AND EXAMINATION	GREEK		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	NO		
WEBPAGE COURSE (URL)	https://eclass.uth.gr/courses/GD-LARISSA237/		

(2) LEARNING OUTCOMES

Learning Outcomes
<p>The purpose of the course is to understand the operation of Geographical Information Systems (GIS) and their contribution to the management of natural ecosystems. In this context, knowledge of the available advanced software and the advanced application of GIS in the management of forest recreation - ecotourism areas, forest, meadow and wetland areas, and wild fauna are sought. Finally, knowledge of the application of GIS as a management decision-making tool is sought.</p> <p>Upon completion of the course, the student should</p> <ul style="list-style-type: none"> • It applies the modern principles of advanced use of Geographical Information Systems (GIS) for the effective management of forest ecosystems and the natural resources associated with them. • Practicing the management of GIS databases and becoming familiar with the available and most popular software. • Understands how to prepare integrated studies using GIS for the management and identification of suitable places for recreation - ecotourism activities. • Understands how comprehensive studies using GIS are developed on the temporal changes in forest, grassland and wetland ecosystems. He is trained in the recognition and analysis of the causes and consequences of these changes. It is problematic in the search for management suggestions. • Knows the modern applications of GIS in wildlife management. Practice assessing habitat suitability for wildlife and learn to operate advanced models. • Continue his training in the use of GIS as a decision-making tool for the management, protection and utilization of forest ecosystems and the natural resources associated with them.
General Skills

(3) COURSE CONTENT

The content of the theoretical part of the course includes the following:

- **Introduction to geographic information systems (GIS).** Basic spatial concepts. Formats and structure of geographic data. Collecting, sourcing and importing spatial data into a GIS environment.
- **GIS software – Googleearth and their applications.** Presentation of GIS software (emphasis on ARCGIS) and GoogleEarth. Applications of GIS in the management of forest ecosystems and the natural resources associated with them.
- **Familiarity with the basic tools of ARCGIS.** ArcMap (zoom, select, add, editor, etc.). Basic toolkits. Geoanalysis Tools.
- **Management of databases in GIS.** Table of properties of GIS (ARCGIS). Simple and complex database queries. Using Select Query Language (SQL).
- **Application of GIS in forest recreation - ecotourism.** Modern tools in Forest Recreation. Applications of GIS in Forest Recreation – Ecotourism Activities. Choice of recreation location with simple criteria.
- **Application of GIS in forest recreation - ecotourism.** Selection of suitable places for Forest Recreation with complex criteria (Euclidian distances, raster analysis, classification, viewshed). Visualization in ArcScene and path selection.
- **Application of GIS in forest recreation - ecotourism.** Introduction to Cartography – Basic principles of map composition. Mapping of leisure activities.
- **Application of GIS in grassland and forest landscape management.** Basic principles of ecology and landscape management. The use of GIS in the study of temporal changes in forest, grassland and wetland ecosystems. Cause and effect analysis.
- **Application of GIS in grassland and forest landscape management.** Presentation of the digital Corine Land Cover data and digitized forest maps. Their utilization for the long-term mapping of land uses in the GIS.
- **Application of GIS in grassland and forest landscape management.** Calculation and interpretation of the results of the long-term evolution of land uses using landscape metrics. Using the patch analyst application in ArcGIS.
- **Application of GSPs in wildlife management.** Applications of GSPs in wildlife management. Assessment of habitat suitability. Presentation of Maxent and Biomapper models.
- **Application of GIS as a decision-making tool for forest ecosystem management.** Presentation of the synergy of GIS and the CLUE-S model as a decision-making tool for environmental management, protection and development.
- **Presentations of final course assignments.**

Assignments are given to practice subjects related to the subject of the course, while the student (individually) must undertake and prepare a final assignment by the end of the semester of the MSc. The relevant directions are given, while rich material and instructions are posted on E-class <https://eclass.uth.gr/courses/GD-LARISSA237/>. The final work includes, in addition to its delivery in printed and electronic form, a public oral presentation on the chosen topic, on a set date (usually the 12th or 13th week of classes). The presentation lasts 15 minutes and is followed by 5 minutes of questions from the students present. The teacher intervenes – if necessary – to comment, comments, corrections.

Students are graded on the overall performance of their final paper: 70% on content and editorial specifications and 30% on the preparation of the online presentation and its oral support. These grades count for a total of 40% of the overall grade that students will receive after the final written theory exam.

(4) TEACHING AND LEARNING METHODS - EVALUATION

COURSE DELIVERY METHOD	In class and remotely	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES	Use of PCs, ppt slides, projector. <ul style="list-style-type: none"> • Interactive Whiteboard • Eight (8) PCs in the Laboratory for training students in the GSP program • Support of the learning process through the e-class electronic platform. 	
MANAGEMENT OF TEACHING	Activity	Semester Workload
	Lectures	26
	Three (3) individual assignments related to the subject of the course	44
	Small individual practice tasks	10
	Independent Study	70
	Course Total (25 workload hours per credit unit)	150
STUDENT EVALUATION	I. Final written exam (60%) on the course material including lecture material. II. Successful delivery of three (3) assignments and presentation of the individual final (3rd) assignment (40%).	

(5) RECOMMENDED-BIBLIOGRAPHY

<p>-Recommended Books:</p> <p>Leitao A.B., J. Miller, J. Ahern and K. McGarical. 2006. <i>Measuring Landscapes. A planner's Handbook</i>. Island Press, Washington DC.</p> <p>Ευελπίδου Ν. και Β. Αντωνίου. 2015. <i>Γεωγραφικά συστήματα πληροφοριών</i>. [ηλεκτρ. βιβλ.] Αθήνα: Σύνδεσμος Ελληνικών Ακαδημαϊκών Βιβλιοθηκών. Διαθέσιμο στο: http://hdl.handle.net/11419/1044.</p> <p>Καραμέρης Α. 2013. <i>Αναψυχή στη φύση</i>. Εκδόσεις Γιαχούδη. Θεσσαλονίκη.</p> <p>Χατζηχρήστος Θ. και Κ. Μαρσελή 2011. <i>Τα Βασικά του ARCGIS10</i>. Αθήνα.</p> <p>Κατά τη διάρκεια των μαθημάτων θα διανεμηθούν στους φοιτητές και οι εργαστηριακές σημειώσεις των Σιδηροπούλου και Χουβαρδά (2017). <i>Σημειώσεις Δασικής Αναψυχής Α.Π.Θ.</i></p> <p>- Recommended tasks:</p> <p>Chouvardas D. and M.S. Vrahnakis. 2009. <i>A Semi-empirical model for the near future evolution of the lake's Koronia landscape</i>. <i>Journal of Environmental Protection and Ecology</i>, 10(3):867–876.</p> <p>Chouvardas D., I. Ispikoudis and K. Mitka, C. Evangelou and V.P. Papanastasis. 2013. <i>Diachronic evolution of land use/ cover changes in pastoral landscapes of Greece</i>. In: Vrahnakis M., Kyriazopoulos A.P., Chouvardas D. and G. Fotiadis (eds), <i>Dry Grasslands of Europe: Grazing and Ecosystem Services</i>. Hellenic Range and Pasture Society (HERPAS). pp. 277- 282.</p>
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Chouvardas D., M.S. Vrahnakis, D. Bousbouras, C. Evangelou, E. Lamprou and L. Georgiadis. 2013. Modelling habitat suitability of agro-silvopastoral landscapes for brown bear (Ursus arctos). Journal of Environmental Protection and Ecology, 14 (1):162–171.

Χουβαρδάς Δ., Δ. Μπούσμπουρας, Ι. Ισπικούδης, Π. Κουράκλη και Μ. Δαγλάρογλου. 2011. Εφαρμογή συστήματος παρακολούθησης του περιβάλλοντος στον Νομό Καστοριάς με τη χρήση δεικτών υγείας τοπίου. Επιστημονική επετηρίδα της Σχολής Δασολογίας και Φυσικού Περιβάλλοντος. Τόμος - Αφιέρωμα προς τιμή του αείμνηστου Καθηγητή Νικόλαου Ι. Στάμου. ΤΟΜΟΣ ΜΕ/2002/45, σελίδες 16.

- Related Scientific Journals:

- *Journal of Environmental Protection and Ecology*
- *Journal of Landscape and Urban Planning*
- *Journal of Landscape Ecology*