

Environmental Applications of GIS: Spatial Analysis and Modeling

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GENERAL

SCHOOL	School of Environment		
ACADEMIC UNIT	Department of Environment		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	ENV531	SEMESTER	Spring
COURSE TITLE	Environmental Applications of GIS: Spatial Analysis and Modeling		
INDEPENDENT TEACHING ACTIVITIES		WEEKLY TEACHING HOURS	CREDITS
Lectures		2	
Laboratory		4	
Course Total		6	3
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE	skills development		
PREREQUISITE COURSES:	Spatial Analysis with GIS in Winter Semester @ CEU (or equivalent)		
COURSE WEBSITE (URL)	https://aegeanmoodle.aegean.gr		

LEARNING OUTCOMES

Learning outcomes
<p>The postgraduate students will understand the overall concept of spatial analysis. In addition, the students will:</p> <ul style="list-style-type: none"> • Be familiar with large-scale spatio-temporal data • Learn about different techniques for spatial modeling using GIS tools and scripting languages • Learn about different methods for assessing changes and trends • Present their study in a large audience using a dynamic story builder with modern capabilities
General Competences
<p>Search for, analysis and synthesis of data and information, with the use of the necessary technology</p> <p>Working independently</p> <p>Team work</p>

SYLLABUS

The aim of the course "Environmental Applications of GIS: Spatial Analysis and Modeling" is to introduce the students to environmental applications using Spatial Analysis and Modeling. The content outline of the course comprises of the following lectures and laboratories:

- Spatial Analysis of Vector Data
- Spatial Analysis of Raster Data
- Spatial Modeling: Model Builder
- Environmental Application of GIS: Delineation of Climatic Zones, Changes and Trends
- Digital Storytelling with Maps - ArcGIS StoryMaps

The students will be assigned in groups to develop spatial models to analyze timeseries of large-scale spatial data.

Software Installation Prerequisites (ArcGIS, Python):

- Windows Based Desktop or Laptop (ArcGIS cannot be installed on Mac)
- Internet Connection that the ISP allows VPN connection with the University of the Aegean to share an ArcGIS license
- At least 1 GB hard disk storage for the software installation + 3 GB hard disk storage for data

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY	<i>Face-to Face</i>	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of ICT, communication with students	
TEACHING METHODS	Activity	Semester workload
	Lectures/Laboratories	30
	Practice at Home	20
	Study and Analysis of Bibliography	5
	Individual Project	20
	Course total	75
STUDENT PERFORMANCE EVALUATION	Students will be graded based on Individual Project (100%)	

ATTACHED BIBLIOGRAPHY

- Kottek M., Grieser J, Beck Ch., Rudolf B. and Ruble F. (2006). *World Map of the Köppen-Geiger climate classification updated*. Meteorologische Zeitschrift, 15(3), 259-263.
- Fathi Goma Al Sghair (2013). *Remote Sensing and GIS for Wetland Vegetation Study*. PhD Thesis, University of Glasgow
- Forkel M., Carvalhais N, Verbesselt J., Mahecha M., Neigh Ch, and Reichstein M. (2013). *Trend Change Detection in NDVI Time Series: Effects of Inter-Annual Variability and Methodology*. Remote Sensing, 5, 2113-2144.
- [Global Climate Resource Pages - University of Delaware](#)
- [ArcGIS StoryMaps](#)