COURSE DISCRIPTION

1. GENERAL

SCHOOL	ENVIRONMENT, GEOGRAPHY AND APPLIED ECONOMICS		
DEPARTMENT	GEOGRAPHY		
LEVEL OF COURSE	Undergraduate		
COURSE CODE	ΓΦ0520	**SEMESTER**	5TH
COURSE TITLE	SPATIAL ANALYSIS		

STRUCTURE OF TEACHING ACTIVITIES	**TEACHING HOURS PER WEEK**	**NUMBER OF CREDITS ALLOCATED (ECTS)**
Lectures and Laboratory Classes	3	5

TYPE OF COURSE	Compulsory
PREREQUISITES	-
LANGUAGE OF INSTRUCTION	GREEK
COURSE OFFERED TO ERASMUS STUDENTS	YES (in English if required)
(URL)	

2. EXPECTED LEARNING OUTCOMES

Learning outcomes

Describe the objectives of the course as well as the expected learning outcomes

Spatial Analysis is a module in the scientific fields of quantitative geography and geoinformatics. The module aims to advance the student knowledge on quantitative spatial data analysis methods and their application to real data. Special attention is paid to Tobler's first law of geography, the study of spatial autocorrelation and linear regression. At the same time this module provides the necessary technical tools and skills to study the spatial dimension of various phenomena from a geographic perspective. These include the teaching of open source software: the statistical programming language R and OpenGeoDa. This module also aims to inform students about current trends in spatial analysis and to give them the theoretical foundations to be able to address contemporary research issues in the science of geography.

At the end of the module students should:

- have understood what spatial analysis is, what methods can be used to perform spatial analysis and how some of these methods should be applied
- be able to select the appropriate data and appropriate methods of analysis in order to study a simple phenomenon with a spatial dimension
- have practical experience in applying spatial analysis methods in addressing geographical issues in the real world using special software
- have a clear understanding of the theoretical and practical problems concerning the

application of spatial analysis methods
- have learned Tobler's first law of Geography and the concept of spatial autocorrelation
- have skills in the use of R and OpenGeoDa software
- have an overview of modern methods of spatial analysis used in the industry and in research projects in which the science of geography plays an important role

3. COURSE CONTENTS

Spatial analysis is a broad field. This module focuses on teaching quantitative methods of exploratory and explanatory spatial data analysis. The process of analysis that adds value to spatial data in order to extract information that leads to knowledge is being taught. In this way, it is possible to understand the spatial dimension of a phenomenon. The examples / applications discussed refer primarily to human activity in space and to a lesser extent to the natural processes in space. For example, the spatial distribution, spatial inequality and spatial variation in factors affecting issues on the labour market (unemployment and income), population (aging, internal migration), public services (health, education), retail (socioeconomic profile areas) and the environment (recycling, climate conditions) are examined.

Indicative Lectures:

- Introduction to spatial analysis
- Historical trends and schools of thought (epistemology)
- The role of GIS and Remote Sensing
- The visualization of spatial data as an analysis method
- Spatial Inequalities
- Classification, Clustering and Geodemographics
- Factor and Principal Components Analysis
- Spatial Correlation and Multicollinearity
- Spatial Autocorrelation
- Linear Regression
- Generalised Linear Models
- Discussion of advanced spatial analysis methods and research issues
- Applications in public administration and private sector

4. TEACHING AND ASSESSMENT METHODS

<table>
<tr><td>TYPE OF LECTURES</td><td>In class lectures
Laboratory Lectures and Practice</td></tr>
<tr><td>ICT USE</td><td>Internet use and e-class, use of software (R, Rstudio, QGIS, GeoDa, ArcGIS)</td></tr>
<tr><td>TEACHING STRUCTURE</td><td>
<table>
<tr><th>Activity</th><th>Hours per semester</th></tr>
<tr><td>Lectures</td><td>30</td></tr>
<tr><td>Laboratory</td><td>9</td></tr>
<tr><td></td><td></td></tr>
<tr><td>Project</td><td>30</td></tr>
<tr><td>Studying</td><td>60</td></tr>
<tr><td>TOTAL</td><td>129</td></tr>
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<tr><td>ASSESSMENT METHODS</td><td>Assessment Language: Greek</td></tr>
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	Assessment Methods The final rate of the course is computed by two parts as follows: Final written exams (50 - 100%) Optional project (50%)

5. RECOMMENDED READING

Suggested Reading:

- *Kalogirou, S., 2015, SPATIAL ANALYSIS: METHODOLOGY AND APPLICATIONS WITH R.* https://repository.kallipos.gr/handle/11419/5029
- *P. A. Rogerson, 2010, Statistical Methods for Geography: A Student's Guide, 3rd Edition, Sage: London and Los Angeles*
- *Fotheringham, A.S., Brunsdon, C., and Charlton, M.E, 2000, Quantitative Geography, London: Sage Publications.*
- *Fotheringham, A.S., Brunsdon, C., and Charlton, M., 2002, Geographically Weighted Regression: the analysis of spatially varying relationships, Chichester: John Wiley and Sons.*

Scientific Journals:

- Journal of Maps, Spatial Economic Analysis, Environment and Planning A, Geographical Analysis, Applied Spatial Analysis and Policy