

COURSE OUTLINE

1. GENERAL

SCHOOL	APPLIED SCIENCES		
DEPARTMENT	ENVIRONMENTAL ENGINEERING		
LEVEL OF STUDY	UNDERGRADUATE		
COURSE UNIT CODE	GE5530	SEMESTER OF STUDY	5
COURSE TITLE	GEOSTATISTICS		
COURSEWORK BREAKDOWN		TEACHING WEEKLY HOURS	ECTS Credits
THEORY		2	2.5
LABORATORY EXERCISES		2	2.5
		4	5
COURSE UNIT TYPE	SBC		
PREREQUISITES :	N/A		
LANGUAGE OF INSTRUCTION/EXAMS:	GREEK/ENGLISH		
COURSE DELIVERED TO ERASMUS STUDENTS	YES		
MODULE WEB PAGE (URL)	http://geope.teikoz.gr/undergraduate/ug_studies.htm		

2. LEARNING OUTCOMES

Learning Outcomes
<p>The course aims to enable students to:</p> <ul style="list-style-type: none"> • Learn the theory and application field of geostatistics • Use specialised computer applications for problems that can be addressed with geostatistics • Develop exploration databases and perform statistical analysis and validation of data • Perform structural analysis (variography) of exploration data • Perform estimation using kriging and evaluate the results.
General Skills
<p><i>Upon successful completion of the programme students will:</i></p> <p><i>-have the basic theoretical and practical knowledge in the fields of the subject area of Geotechnology and Environmental Engineering</i></p> <p><i>-be able to properly apply the theoretical and practical knowledge acquired during the study period</i></p> <p><i>-be able to cover a wide spectrum of scientific and technical knowledge related to mining and geotechnical projects as well as the sector of environmental reclamation</i></p> <p><i>-have gained the necessary competencies to proceed to their second cycle study.</i></p>
<ul style="list-style-type: none"> • Search, analysis and synthesis of data and information, using the necessary technologies • Design and management of projects • Autonomous working • Team work • Generation of new research ideas • Working in a multidisciplinary scientific environment

3. COURSE CONTENTS

Introduction to statistics and probability theory, random variables and functions, probability distributions, distribution moments, least squares method, regression, correlation. Introduction to geostatistics, variograms, spatial distributions, support, dispersion, structural analysis, extension and estimation variances, kriging, multivariate analysis, classification, clustering, principal component analysis.

4. TEACHING METHODS - ASSESSMENT

MODE OF DELIVERY	Face to face	
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	Extensive use of computers, sophisticated geostatistical software, data projection system, internet.	
TEACHING METHODS	<i>Method description</i>	<i>Semester Workload</i>
	Laboratory computer exercises using Vulcan 3D mine planning software and the GSLIB geostatistical library	14 exercises X 2 hours per week = 28 hours
	Study of the software user manual	14 exercises X 1 hours per week = 14 hours
	Theoretical lectures	14 exercises X 2 hours per week = 28 hours
	Study of theory	14 exercises X 2 hours per week = 28 hours
	Final theoretical examination study	4 hours
	<i>Total</i>	<i>102</i>
ASSESSMENT METHODS	<p>Student assessment is carried out in Greek. Students watch through a projection screen and at the same time perform on their computer the steps of each laboratory exercise in the course laboratory. Their assessment includes examining the completion of a selected exercise steps as well as verbal examination on questions related to the exercise. The successful completion of the steps receives at most 5 marks and so does the verbal examination. Thus, the total top marks for the final lab exam is 10.</p> <p>Assessment in the theoretical part is based on a final written examination with 2 questions and three exercises.</p> <p>The assessment method for both laboratory and theoretical parts is made known to the students at the beginning of the semester. Additionally, for the theoretical part the students are provided with examples of past exam papers.</p>	

5. RESOURCES

- Recommended Book Resources:

- Kapageridis, I., *Introduction to Geostatistics*, ION Publications, 2006.
- Agterberg, FP, 1974. *Geomathematics. Developments in geomathematics 1*. Elsevier

(Amsterdam)

- David, M, 1977. *Geostatistical Ore Reserve Estimation. Developments in geomathematics 2.* Elsevier (Amsterdam).
- Gy, PM, 1979. *Sampling of Particulate Materials Theory and Practice. Developments in geomathematics 4.* Elsevier (Amsterdam).
- Clark, I, 1979. *Practical Geostatistics.* Elsevier (Amsterdam).
- Journel, AG and Huijbregts, ChJ, 1978. *Mining Geostatistics.* Academic Press (London).
- Hohn, ME, 1988. *Geostatistics and Petroleum Geology.* Van Nostrand Reinhold (New York).
- David, M, 1988. *Handbook of Applied Advanced Geostatistical Ore Reserve Estimation. Developments in geomathematics 6.* Elsevier (Amsterdam).
- Isaaks, EH, and Srivastava, RM, 1989. *An Introduction to Applied Geostatistics.* Oxford University Press (New York).
- Webster, R and Oliver, MA, 1990. *Statistical Methods in Soil and Land Resource Survey.* Oxford University Press (New York).
- Deutsch, CV and Journel, AG, 1992. *GSLIB Geostatistical Software Library and User's Guide.* Oxford University Press (New York).
- Goovaerts, P, 1997. *Geostatistics for Natural Resources Evaluation. Applied Geostatistics Series.* Oxford University Press (New York).
- Armstrong, M, 1998. *Basic Linear Geostatistics.* Springer-Verlag (Berlin).

- Recommended Article/Paper Resources:

- Computers & Geosciences
- Mathematical Geosciences

SBC: Specific Background Courses