

■ CE65 - Computational Statistics

GENERAL

SCHOOL	EXACT SCIENCES		
DEPARTMENT	MATHEMATICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	CE65	SEMESTER	F
COURSE TITLE	COMPUTATIONAL STATISTICS		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	ECTS	
Lectures	4	5	
COURSE TYPE	Scientific Field		
PREREQUISITE COURSES	-		
LANGUAGE OF TEACHING AND EXAMINATIONS	Greek/English		
THE COURSE IS OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	http://eclass.uowm.gr/		

LEARNING OUTCOMES

Learning Outcomes
<p>The purpose of the course is the familiarity of the students with the use of statistical software and introduced in the principles of Computational Statistics.</p> <p>With this course, the students will be able to:</p> <ul style="list-style-type: none"> • apply the most common methods of computational statistics, • use R programming language and SPSS statistical package for the above reason, • generate random numbers from both discrete and continuous distributions.
General Competencies

- Search for, analysis and synthesis of data and information, with the use of the necessary technology.
- Decision making.
- Production of free, creative and inductive thinking, which is based on mathematical processes.

CONTENT OF THE COURSE

R language is used. Introduction to R software environment. Variables-data. Data base connections. Programming with R language. Descriptive Statistics. Graphical Methods for data presentation. Hypothesis testing by use of R. Simulations. Generations of random numbers from discrete and continuous probability distributions. Monte Carlo integration. Visualization of classical results of statistical inference through simulating samples (e.g. asymptotic normality of sample mean, $(1-\alpha)100\%$ CI, significance and p-value of a statistical test).

TEACHING AND LEARNING METHODS - EVALUATION

TEACHING METHOD	In the classroom.	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Use of e-class. Communication through face-to-face discussions and e-mails.	
TEACHING ORGANIZATION	Activity	Semester Workload
	Lectures	52 hours
	Projects	20 hours
	Individual Study	53 hours
	Course Total (25 hours per ECTS)	125 hours
STUDENT EVALUATION	Projects 20%. Written final examination 80%.	

RECOMMENDED BIBLIOGRAPHY

1. Ntzoufras I., Karlis D., Introduction to programming and statistical analysis with R, Hellenic Academi EBooks-“Kallipos” repository, 2015 (Greek). Available at: <http://hdl.handle.net/11419/2601>
2. Fouskakis D., Data analysis by use of R, Tsotras publications, 2013 (Greek).

3. Tsantas N., Moysiadis P. Mpagiatis K., Xantzipantelis T., Data analysis with the help of statistical software, Ziti publications, 1999 (Greek).