

## COURSE OUTLINE

### (1) GENERAL

<b>SCHOOL</b>	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
<b>ACADEMIC UNIT</b>	DEPARTMENT OF STATISTICS		
<b>LEVEL OF STUDIES</b>	1st Cycle (UNDERGRADUATE)		
<b>COURSE CODE</b>	<b>6023</b>	<b>SEMESTER</b>	<b>6<sup>th</sup></b>
<b>COURSE TITLE</b>	<b>DATA ANALYSIS</b>		
<b>INDEPENDENT TEACHING ACTIVITIES</b>		<b>WEEKLY TEACHING HOURS</b>	<b>CREDITS</b>
Lectures		4	8
Labs		2	
<b>COURSE TYPE</b>	Core - GENERAL BACKGROUND		
<b>PREREQUISITE COURSES:</b>	6012 – ESTIMATION – HYPOTHESIS TESTING 6023 LINEAR MODELS		
<b>LANGUAGE OF INSTRUCTION and EXAMINATIONS:</b>	GREEK		
<b>IS THE COURSE OFFERED TO ERASMUS STUDENTS</b>	NO		
<b>COURSE WEBSITE (URL)</b>	<a href="https://www.dept.aueb.gr/en/stat/content/data-analysis-8-ects">https://www.dept.aueb.gr/en/stat/content/data-analysis-8-ects</a>		

### (2) LEARNING OUTCOMES

<b>Learning outcomes</b>
<p>Upon completion of the course, students will be able to:</p> <ol style="list-style-type: none"> <li>1) To manipulate and analyze data in R</li> <li>2) To perform basic hypothesis tests</li> <li>3) To build and interpret regression models</li> <li>4) To write statistical reports in a professional way.</li> </ol>
<b>General Competences</b>
<p>Search for, analysis and synthesis of data and information, with the use of the necessary technology</p> <p>Adapting to new situations</p> <p>Decision-making</p> <p>Working independently</p> <p>Working in an interdisciplinary environment</p> <p>Production of free, creative and inductive thinking</p>

### (3) SYLLABUS

--

Primary aim of this course is the understanding and the application of statistical method in real life problems of various scientific fields such as Management, Marketing, Psychology, Medicine, Sports and Social Sciences. Focus is given on the review of parametric and non-parametric hypothesis tests for one and two samples (t-tests και Wilcoxon tests), analysis of variance and regression models. Emphasis is given in the implementation of all methods using statistical software (R) and in problem solving. Interesting real life datasets and problems are analyzed during this course with aim to provoke their attention and motivate them.

The teaching material is as follows:

PART A: Statistical methods for simple problems with the use of statistical software (Descriptive analysis, Statistical charts, graphs and figures, random number simulation, confidence intervals, hypothesis testing for 1 and 2 independent samples, hypothesis tests for 2 dependent samples, two-way contingency tables, simple and multiple regression, analysis of variances).

PART B: Case studies – Analysis of real life problems.

(some indicative examples are the following: The eruptions of Old faithful geyser. The explosion of Challenger Space Shuttle. Analysis of Euro–Basketball 2004 Data. Schizotypy and Consumer Behaviour).

#### (4) TEACHING and LEARNING METHODS - EVALUATION

<b>DELIVERY</b>	Face to Face	
<b>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</b>	YES	
<b>TEACHING METHODS</b>	<i>Activity</i>	<i>Semester workload</i>
	Lectures	52
	Laboratory exercises	30
	study and analysis of bibliography	10
	tutorials	20
	project	88
	Course total	<b>200</b>
<b>STUDENT PERFORMANCE EVALUATION</b>	WRITTEN EXAMINATION AT THE END OF THE SEMESTER: 50% ORAL EXAMINATION: 10% PROJECT: 40%	

#### (5) ATTACHED BIBLIOGRAPHY

- Ντζούφρας Ι., Καρλής Δ., Εισαγωγή στον Προγραμματισμό και στη Στατιστική Ανάλυση με R, Εκδόσεις Ελληνικά Ακαδημαϊκά Ηλεκτρονικά Συγγράμματα και Βοηθήματα-Αποθετήριο “Κάλλιπος”, 2016.
- Φουσκάκης Δ. (2013). Ανάλυση Δεδομένων με Χρήση της R. Εκδόσεις Τσότρας. Αθήνα.
- Marques de Sa, Joaquim P., Applied Statistics Using SPSS, STATISTICA, MATLAB and R, Editions Springer-Verlag, 2008.
- Chatterjee S., Handcock M.S., Simonoff J.S. (1995). A Casebook for a First Course in Statistics and Data Analysis. John Wiley & Sons.
- Faraway J.J. (2002). Practical Regression and Anova using R. Free electronic book available at <http://cran.r-project.org/doc/contrib/Faraway-PRA.pdf>.
- Fox J. & Weisberg H.S. (2011). An R Companion to Applied Regression. 2nd edition. SAGE Publications Inc.