COURSE OUTLINE

(1) GENERAL

SCHOOL	SCHOOL OF INFORMATION SCIENCES & TECHNOLOGY		
ACADEMIC UNIT	DEPARTMENT OF STATISTICS		
LEVEL OF STUDIES	1st Cycle (UNDERGRADUATE)		
COURSE CODE	**6168**	**SEMESTER**	**7th**
COURSE TITLE	**Methods of Bayesian Inference**		

INDEPENDENT TEACHING ACTIVITIES	**WEEKLY TEACHING HOURS**	**CREDITS**
Lectures	4	7
Workshops		
Labs		

COURSE TYPE	Elective – Scientific Field
PREREQUISITE COURSES:	
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	GREEK
IS THE COURSE OFFERED TO ERASMUS STUDENTS	
COURSE WEBSITE (URL)	https://www.dept.aueb.gr/en/stat/content/methods-bayesian-inference-7-ects

(2) LEARNING OUTCOMES

Learning outcomes
After successful completion of the course the students should be able to: • Understand the differences between classic and Bayesian approach • Know the basic principles of the Bayesian approach • Apply contemporary Bayesian analysis methods to real problems • Know the tools that will assist them in implementing these analyses
General Competences

(3) SYLLABUS

Repetition of the basic principles of Bayesian inference. Multivariate Bayesian Inference. Markov chain, Monte Carlo and its use in Bayesian Statistics. Variations of this method and extensions. Building algorithms MCMC in R. Bayesian

regression. Bayesian models using R. . Deviance information criterion and model complexity. Hierarchical models. Basic principles of Bayesian hypothesis testing, comparing and weighing models.

(4) TEACHING and LEARNING METHODS - EVALUATION

<table>
<tr><td>DELIVERY
Face-to-face, Distance learning, etc.</td><td>Face-to-face</td></tr>
<tr><td>USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY</td><td>YES</td></tr>
<tr><td>TEACHING METHODS</td><td>
<table>
<tr><th>Activity</th><th>Semester workload</th></tr>
<tr><td>Lectures</td><td>100</td></tr>
<tr><td>Lab Exercise</td><td>25</td></tr>
<tr><td>Studying and Analyzing Bibliography</td><td>25</td></tr>
<tr><td>Assignment</td><td>25</td></tr>
<tr><td>Course Total</td><td>175</td></tr>
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<tr><td>STUDENT PERFORMANCE EVALUATION</td><td>Regular examination period (January/February): Two written assignments (Projects) + oral presentation: 100%
Rexamination (September): Written examination: 100%</td></tr>
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(5) ATTACHED BIBLIOGRAPHY

- Ntzoufras, I. (2009). Bayesian Modeling Using WinBUGS. Wiley. Hoboken. USA.
- Carlin B. and Louis T. (2008), Bayes and Empirical Bayes Methods for Data Analysis. 3rd Edition, London: Chapman and Hall.
- Gelman A., Carlin J.B., Stern H.S., Dunson, D.B., Vehtari, A. and Rubin D.B. (2013). Bayesian Data Analysis. Third Edition. Chapman and Hall/CRC.