

COURSE OUTLINE [QUANTITATIVE METHODS IN DECISION ANALYTICS]

(1) GENERAL

SCHOOL	Business Administration		
ACADEMIC UNIT	Business Administration		
LEVEL OF STUDIES	Postgraduate		
COURSE CODE	DE0102-2	SEMESTER	A
COURSE TITLE	QUANTITATIVE METHODS IN DECISION ANALYTICS		
INDEPENDENT TEACHING ACTIVITIES	WEEKLY TEACHING HOURS	CREDITS	
Lectures, Essay, Presentation	3	6	
COURSE TYPE	Special background		
PREREQUISITE COURSES:	-		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek – English terminology and reading material		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	NO		
COURSE WEBSITE (URL)	eclass		

(2) LEARNING OUTCOMES

Learning outcomes
Upon completion of the course, it is expected that the students will be able to estimate key descriptive indicators of a data set and present their results using basic visualization techniques, develop elementary forecasting models, formulate a quantitative optimization model on the occasion of a real operational situation in order to process solutions that may provide alternative values of performance measures, to compare alternative scenarios based on those measures, and to systematically explore the structure of those solutions by analyzing the functionality of a system.
General Competences
<p>The course aims at developing the following competences:</p> <ul style="list-style-type: none"> • Search for, analysis and synthesis of data and information, with the use of the necessary technology • Adapting to new situations • Decision-making • Working independently • Team work • Working in an interdisciplinary environment • Production of new research ideas • Project planning and management • Criticism and self-criticism • Production of free, creative and inductive thinking

(3) SYLLABUS

<p>The process of optimal business decision making based on the collection, classification, processing and analysis of data is nothing new. It has been the subject of Statistics (collection, classification, investigation, prediction) and then of Operations Research (classification, investigation, optimization) for many decades. The changes observed in recent years concern mainly (a) the variety of data sources, (b) the close coupling of Statistical and Operational Research methodologies with IT, thus automating the modeling and decision-making processes (machine learning) but especially c) the diversity of the data as such, presenting one or more of the following characteristics: large volume (volume), greater variety of sources (variety), speed of generation (velocity), ambiguity or variability (variability, veracity) and at the same of greater value, highlighting lots of challenges for decision makers. Business Analytics is divided into three main levels of analysis: Descriptive/Explanatory/Diagnostic Analytics (processing data and extracting information from past and present data), Predictive Analytics (based on the past and present to develop prediction models - predictive or classify) and Prescriptive Analytics (uses models based on previous analyses to suggest best practices – prescriptions).</p>

In the introductory part of the course (1st lecture) an acquaintance with the basic Quantitative methods of Business Analytics (Descriptive/Diagnostic, Predictive, Prescriptive Analytics) is attempted. Then, the first part of the lectures (2nd to 5th lectures) is devoted to the presentation of the fundamental techniques of exploratory statistics and of some popular quantitative methods in the context of predictive analytics. In this way, the students acquire a general aspect about the management of the data required to analyze leading smoothly to the second part of the course (lectures 6th to 10th) which is a general approach to the most important quantitative modeling techniques of business processes. Linear programming and network case studies are analyzed using appropriate software. Finally, in the 3rd part of the course (lectures 11 and 12) we provide an introduction to decision theory, which is directly linked to competitive situations of stochastic nature and introduces students to extremely interesting concepts of behavioral economics.

Lecture Outline

1. Introductory information on Business Decision Analytics
2. Quantitative models in Exploratory Statistics – Data visualization
3. Statistical inference and hypothesis testing
4. Prediction models with linear regression
5. Forecasting models with time series and data mining
6. Prescriptive Analytics – Introduction to Linear Programming
7. Applications of Linear Programming
8. Sensitivity Analysis
9. Special Cases of Linear Models
10. Introduction to Network Analysis Theory
11. Decision Theory in an environment of uncertainty and risk
12. Applications and examples with decision theory
13. Written Examinations

(4) TEACHING and LEARNING METHODS - EVALUATION

DELIVERY.	Face-to-face, Distance learning, Lab lectures	
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY	Email, eclass, Excel, POM/QM	
TEACHING METHODS	<i>Activity</i>	<i>Semester workload</i>
	Lectures/lab exercises	150
	Assignments	75
	Course total	225
STUDENT PERFORMANCE EVALUATION	Written exams, problem solving coursework, Bonus self-evaluation exercises	

(5) ATTACHED BIBLIOGRAPHY

- Camm J., Cochran J., Fry M., Ohlmann J., Anderson D., Sweeney D., Williams T., Essentials of Business Analytics, Cengage Learning, 2015
- Anderson D. R., D. J. Sweeney and T. A. Williams, An introduction to Management Science: Quantitative Approaches to Decision Making, 8th – 13th ed. Thomson.
- Keller, G., Στατιστική για Οικονομικά & Διοίκηση Επιχειρήσεων, Εκδόσεις Επίκεντρο, 8^η έκδοση 2010.
- Γεωργίου Α., Οικονόμου Γ. και Γ. Τσιότρας, Κ. Καπάρης, «Μελέτες Περιπτώσεων Επιχειρησιακής Έρευνας», Εκδόσεις Μπένου 2019.