

MODULE OUTLINE

1. GENERAL INFORMATION

SCHOOL	SOCIAL SCIENCES		
PROGRAM	DEO		
LEVEL OF STUDY	UNDERGRADUATE		
MODULE UNIT CODE	DEO13	YEAR IN WHICH IT IS OFFERED	FIRST (1 st)
MODULE TITLE	QUANTITATIVE METHODS		
INDEPENDENT TEACHING ACTIVITIES <i>In case in which credits are awarded for separate components/parts of the course, e.g. in lectures, laboratory exercises, etc. If credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		HOURS	ECTS
Weekly workload		17-19	20
Yearly workload		512-576	
MODULE TYPE <i>General background, special background, specialized general knowledge, skills development</i>	Special Background, Compulsory		
PREREQUISITE MODULES	-----		
LANGUAGE OF INSTRUCTION AND EXAMINATION / ASSESSMENT	Greek		
THE MODULE IS OFFERED TO ERASMUS STUDENTS	YES		
MODULE WEBSITE (URL)	https://www.eap.gr/en/undergraduate/business-administration/business-organizational-management-topics/#deo13 Each module has also its own site on the education website of HOU (http://study.eap.gr), with controlled access (use of password) for students and teaching staff.		

2. LEARNING OUTCOMES

Learning Outcomes

The course learning outcomes, specific knowledge, skills and competences of an appropriate (certain) level, which students will acquire upon successful completion of the course, are described in detail.

It is necessary to consult APPENDIX A

- *Description of the level of learning outcomes for each qualifications' cycle, according to the European Higher Education Area's Qualification Framework.*
- *Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning*

and APPENDIX B

- *Guidelines for writing Learning Outcomes*

After successful completion of the Module, the student will be able:

- With regards to Business Mathematics:
 1. To recognize the importance of Mathematics in tackling problems in Economics and Business Administration.
 2. To recognize the concept of the function, as well as of the derivative, the limit and the integral of a function, and their contribution to the solution of problems in Economics and Business Administration.
 3. To solve polynomial equations and inequalities of one variable.
 4. To calculate the limits, derivatives and integrals of one-variable functions.
 5. To solve optimization problems of one-variable functions using derivatives.
 6. To examine and interpret the behavior of one-variable functions.
 7. To draw graphs of one-variable functions through spreadsheets like Excel, and to use them in order to examine and interpret their behavior.
 8. To solve problems in Economics and Business Administration, using derivatives and integrals of one-variable functions.
- With regards to Business Statistics:
 1. To recognize the subject and the basic concepts of Statistics, as well as the role of Statistics in Business Administration.
 2. To recognize the graphical and arithmetic methods of data summarization, as well as the importance of their use in the organization and presentation of large data sets.
 3. To apply graphical methods of data summarization, such as the frequency distribution, the histogram and the bar chart, in order to organize and present large data sets, both as exercises of pedagogical nature and with the use of spreadsheets, such as Excel.
 4. To calculate and interpret arithmetic measures of data summarization, such as the measures of central tendency, location, dispersion, variability, asymmetry and kurtosis, both as exercises of pedagogical nature and with the use of spreadsheets, such as Excel.
 5. To recognize the basic principles of enumeration.
 6. To determine the number of elements of finite sets or subsets of finite sets with specific properties, using the basic principles of enumeration.
 7. To recognize the concept of probability and conditional probability, as well as the principles of the Probability Theory.
 8. To recognize the concept of the random variable and its probability distribution.
 9. To recognize the difference between discrete and continuous probability

distributions.

10. To solve problems in topics of Business Administration, based on the Probability Theory.
 11. To solve problems in topics of Business Administration, using discrete and continuous probability distributions.
 12. To estimate parameters of populations using confidence intervals.
 13. To carry out statistical hypothesis testing for parameters of populations.
 14. To recognize the concept of linear regression, as well as the applications of linear regression in problems of Economics and Business Administration.
 15. To develop, interpret and use simple linear regression models in problems of Economics and Business Administration, both as exercises of pedagogical nature and with the use of spreadsheets, such as Excel.
- With regards to Operational Research:
 1. To recognize the subject and the basic concepts of Operational Research, as well as the role of Operational Research in Business Administration.
 2. To model Business Administration problems as linear programming problems.
 3. To solve, as well as to interpret and investigate the solutions of small-scale linear programming problems, using the graphical solution method.
 4. To recognize the prerequisites for solving linear programming problems using the Simplex method.
 5. To solve, as well as to interpret and investigate the solutions of linear programming problems, using spreadsheets like Excel.
 6. To solve special cases of linear programming problems, like the assignment problem, using the Hungarian method.
 7. To recognize the subject and the basic concepts of Network Analysis, as well as the applications of Network Analysis in the representation and solution of Business Administration problems.
 8. To describe what a network is and to give examples of use in the representation of Business Administration problems.
 9. To solve network models that represent Business Administration problems, using Network Analysis techniques.
 10. To recognize the subject and the basic concepts of Game Theory, as well as the applications of Game Theory in the representation and solution of Business Administration problems.
 11. To describe what a game is and to give examples of its use to represent Business Administration problems in situations of competitive interdependence.
 12. To solve games that represent Business Administration problems, using appropriate techniques like the deletion of dominated strategies, the graphical representation, and the linear programming approach.
 13. To recognize the subject and the basic concepts of Queuing Theory, as well as the applications of Queuing Theory in the representation and solution of Business Administration problems.
 14. To describe the key components of a service system, and to recognize these components in real service systems.
 15. To develop models of service systems and to use them in order to study and improve the performance of these systems by estimating appropriate performance and cost metrics.

General Competences

Taking into consideration the general competences that students/graduates must acquire (as those are described in the Diploma Supplement and are mentioned below), at which of the following does the course attendance aims?

Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case
Adapting to new situations
Decision-making
Independent work
Team work
Working in an international environment
Working in an interdisciplinary environment
Introduction of innovative research

Project planning and management
Respect for difference and multiculturalism
Environmental awareness
Social, professional and ethical responsibility and sensitivity to gender issues
Critical consciousness, criticism and self-criticism
Development of free, creative and inductive thinking

Search for, analysis and synthesis of data and information, by the use of technologies that are necessary according the case

Adapting to new situations

Decision-making

Independent work

Working in an interdisciplinary environment

Project planning and management

Critical consciousness, criticism and self-criticism

Development of free, creative and inductive thinking

3. MODULE CONTENT

The aim of the Module is to introduce students to the systemic analysis and solution of problems of Business Administration, using mathematical methods, and to get them acquainted with basic *quantitative*, as they are called in the scientific terminology, methods, techniques and tools, which are applied in this frame. More specifically, DEO13 addresses the cognitive subjects of Business Mathematics, Business Statistics and Operational Research, which either independently or in combination with the knowledge that will be obtained from other Modules of the Program, will give the students the opportunity to analyze, compose and act on the complex conditions that characterize the modern world of business and organizations.

4. TEACHING METHODS – ASSESSMENT

TEACHING MODE <i>Face-to-face, in-class lecturing, on distance teaching and distance learning etc.</i>	Distance education, assisted by conducting five (5) Group Counseling Meetings (GCM) during the academic year, which take place on weekends (Saturday or Sunday). Each GCM lasts four (4) hours and may be either face to face, in classrooms of Greek University Institutions or delivered online.								
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY <i>Use of ICT in Teaching, Laboratory Education, Communication with students</i>	GCMs are conducted by means of: • <i>In online classes</i>: remote meeting tools (teleconferencing platforms). • <i>In face-to-face classes</i>: modern audiovisual media. The learning process is supported through the online study.eap.gr platform. For the preparation of their assignments, the students have at their disposal software provided by the University, but they can also use free access software. All submitted assignments are checked for plagiarism by the Turnitin plagiarism detection service. In addition, students use office automation tools, web browsers, and e-readers for digital books. Communication with the students takes place remotely (through the platform study.eap.gr, email, telephone or through tools of remote meetings) or face to face during the GCMs.								
MODULE DESIGN <i>Description of teaching techniques, practices and methods: Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, clinical practice, Art Workshop,</i>	<table> <tr> <th data-bbox="660 1758 1019 1809">Activity</th><th data-bbox="1019 1758 1299 1809">Yearly Workload</th></tr> <tr> <td data-bbox="660 1809 1019 1861">5 GCM (x 4 hours)</td><td data-bbox="1019 1809 1299 1861">20</td></tr> <tr> <td data-bbox="660 1861 1019 1955">Preparation of 4 Assignments (x 40 hours)</td><td data-bbox="1019 1861 1299 1955">160</td></tr> <tr> <td data-bbox="660 1955 1019 2013">Exams</td><td data-bbox="1019 1955 1299 2013">3</td></tr> </table>	Activity	Yearly Workload	5 GCM (x 4 hours)	20	Preparation of 4 Assignments (x 40 hours)	160	Exams	3
Activity	Yearly Workload								
5 GCM (x 4 hours)	20								
Preparation of 4 Assignments (x 40 hours)	160								
Exams	3								

<i>Interactive teaching, Educational visits, project, Essay writing, Artistic creativity, etc.</i> <i>The study hours for each learning activity as well as the hours of non- directed study are given according to the principles of the ECTS</i>	<table> <tr> <td>Self-study</td><td>329-393</td></tr> <tr> <td>Total Module Workload (hours)</td><td>512-576</td></tr> </table>	Self-study	329-393	Total Module Workload (hours)	512-576
Self-study	329-393				
Total Module Workload (hours)	512-576				
STUDENT PERFORMANCE EVALUATION/ ASSESSMENT METHODS <i>Detailed description of the evaluation procedures:</i> <i>Language of evaluation, assessment methods, formative or summative (conclusive), multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work, Essay/report, oral exam, public presentation, laboratory work, art interpretation, other, etc.</i> <i>Evaluation criteria are specifically defined and given as well as if and where they are reported and accessible to students.</i>	Language of evaluation: Greek Assessment Methods: The exam material is posted on the website of the Module in study.eap.gr at the start of the academic year. The final grade of the Module is formed by: • 70% from the grade of the written exam in the examination period (regular or re-sit) and • 30% (provided a pass in written exams) from the average of the grades of four (4) written assignments, prepared during the academic year. The written exam includes a series of topics relating to exercises and problems solving. Each topic includes questions that cover more than one of the Module's cognitive subjects. The examination is conducted with closed books, while the students have at their disposal lists of mathematical formulas that are distributed by the exam supervisors at the start of the examination. Each written assignment includes from four (4) to five (5) topics relating to exercises and problems solving, which should all be answered by the students. Students with special learning difficulties in writing and reading (as they are certified and characterized by a competent body) are evaluated according to the procedure dictated by the relevant University regulation. Disclosure of evaluation criteria: The evaluation criteria are quoted on the assignments and exams papers. In addition, indicative answers to the topics of the written assignments are posted on the website of the Module in study.eap.gr, after the submission deadline, as well as indicative answers to the exams topics, after exams completion. Students receive the grade of each assignment, as well as detailed evaluation and comments, while they have the opportunity to see their papers after the grading of the exams and to receive explanations				

about their grades. They also have the right to apply for re-assessment, according to the procedures dictated by the Regulations of Written Assignments and Examinations of PS DEO, which are posted on the website of the Module in study.eap.gr.

5. SUGGESTED BIBLIOGRAPHY

Suggested Bibliography:

- Blessios N. (2002). *Business Mathematics*, Quantitative Methods (ΔEO13/A), Hellenic Open University (in Greek).
- Aggelis V. and Dimaki K. (2008). *Statistics for Business Administration*, Applications of Mathematics and Statistics in Business Problems (ΔEO14/D), Hellenic Open University (in Greek).
- Psarakis S. and Kostaki A. (2008) *Econometrics* (Chapter 1), Operational Research and Applied Econometrics (ΔEO26/A), Hellenic Open University (in Greek).
- Aggelis V. (2008). *Linear Programming*, Operational Research and Applied Econometrics (ΔEO26/B), Hellenic Open University (in Greek).
- Georgiou A. and Oikonomou G. (2002). *Operational Research*, Quantitative Methods (ΔEO13/Γ), Hellenic Open University (in Greek).

Relevant Scientific Journals:

- The American Mathematical Monthly
- Mathematics of Computation
- Bulletin of the Hellenic Mathematical Society
- Journal of the American Statistical Association (JASA)
- Royal Statistical Society Series C: Applied Statistics
- Computational Statistics (CompStat)
- Journal of the Operational Research Society (JORS)
- European Journal of Operational Research (EJOR)
- Operational Research - An International Journal (ORIJ) (*journal of the Hellenic Operational Research Society*)

Additional Teaching Material (in study.eap.gr):

- Notes of Business Mathematics, Business Statistics and Operational Research (in Greek)
- Lists of mathematical formulas of Business Mathematics, Business Statistics and Operational Research (in Greek)
- Group Counseling Meetings' presentations in Business Mathematics, Business Statistics and Operational Research (in Greek)
- Video presentations in several topics, relevant to the content of the Module
- Topics and indicative answers of written assignments and exams of the last five years (in Greek)
- Alternative (interactive) teaching material with multiple choice questions and case studies (in Greek)
- Revision exercises with indicative solutions (in Greek)