

COURSE OUTLINE: MANAGEMENT SCIENCE

GENERAL

SCHOOL	ECONOMICS AND BUSINESS		
ACADEMIC UNIT	ECONOMICS		
LEVEL OF STUDIES	UNDERGRADUATE		
COURSE CODE	OE701	SEMESTER	7th (Major B)
COURSE TITLE	MANAGEMENT SCIENCE		
INDEPENDENT TEACHING ACTIVITIES <i>if credits are awarded for separate components of the course, e.g. lectures, laboratory exercises, etc. If the credits are awarded for the whole of the course, give the weekly teaching hours and the total credits</i>		WEEKLY TEACHING HOURS	CREDITS
		3	6
<i>Add rows if necessary. The organisation of teaching and the teaching methods used are described in detail at (d).</i>			
COURSE TYPE <i>general background, special background, specialized general knowledge, skills development</i>	Special background – Compulsory, Major: Business Economics		
PREREQUISITE COURSES:	MICROECONOMIC ANALYSIS II		
LANGUAGE OF INSTRUCTION and EXAMINATIONS:	Greek		
IS THE COURSE OFFERED TO ERASMUS STUDENTS	YES		
COURSE WEBSITE (URL)	https://www.econ.uth.gr/en/studies/undergraduate-studies/courses-description/7th-semester/major-business-economics/management-science		

LEARNING OUTCOMES

Learning outcomes <i>The course learning outcomes, specific knowledge, skills and competences of an appropriate level, which the students will acquire with the successful completion of the course are described.</i> <i>Consult Appendix A</i> <i>Description of the level of learning outcomes for each qualifications cycle, according to the Qualifications Framework of the European Higher Education Area</i> <i>Descriptors for Levels 6, 7 & 8 of the European Qualifications Framework for Lifelong Learning and Appendix B</i> <i>Guidelines for writing Learning Outcomes</i>
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By the end of this course, students will be able to:

1. Apply the Maximin, Maximax, and Minimax regret criteria and analyze the results obtained in decision-making problems under conditions of uncertainty,
2. Understand a complex operational decision-making problem in such a way that, under risk conditions, to construct the necessary decision-making tree, apply the criteria of maximum expected payoff and/or minimum expected regret and evaluate the results obtained by carrying out the appropriate sensitivity analysis,
3. Apply Bayes' theorem for the calculation of posterior conditional probabilities of events as a next step to the prior analysis in decision-making problems, construct posterior payoff tables when additional information is obtained, and evaluate the value of additional information by determining its expected value,
4. Develop linear and integer programming models for a number of "almost" real operational decision-making problems, solve them using appropriate software, evaluate the results obtained by carrying out the necessary sensitivity analysis and make substantive proposals at the decision-making stages,
5. Select the appropriate queueing model according to the characteristics of a service system, calculate the required service system assessment sizes, and estimate the direct and indirect operating costs of that system in order to make substantive proposals at the decision-making stages,
6. Formulate the "best" inventory policy in Newsvendor models, and in continuous and periodic review inventory models.

General Competences

Taking into consideration the general competences that the degree-holder must acquire (as these appear in the Diploma Supplement and appear below), at which of the following does the course aim?

<i>Search for, analysis and synthesis of data and information, with the use of the necessary technology</i>	<i>Project planning and management</i>
<i>Adapting to new situations</i>	<i>Respect for difference and multiculturalism</i>
<i>Decision-making</i>	<i>Respect for the natural environment</i>
<i>Working independently</i>	<i>Showing social, professional and ethical responsibility and sensitivity to gender issues</i>
<i>Team work</i>	<i>Criticism and self-criticism</i>
<i>Working in an international environment</i>	<i>Production of free, creative and inductive thinking</i>
<i>Working in an interdisciplinary environment</i>	<i>.....</i>
<i>Production of new research ideas</i>	<i>Others...</i>
	<i>.....</i>

The course aims at the following general competencies:

- Search for, analysis and synthesis of data and information with the use of the necessary technology,
- Decision making,
- Autonomous work,

- Promotion of free, creative and inductive thinking,

and the following specific objectives:

- (a) Understand the usefulness of management science techniques in decision-making problems in businesses and organizations,
- (b) Become familiar with procedures for developing and/or using appropriate models, methodologies, techniques, etc. which will help them in the systematic development and application of the analytical ability required for decision making,
- (c) Understand the conditions and limitations in the use and application of each technique depending on the nature of the business problem and the decision to be taken.

SYLLABUS

1. PRIOR AND POSTERIOR ANALYSIS IN DECISION MAKING: Construction of Payoff tables, Maximin and Maximax payoff criteria, Minimax regret criterion, Payoff tables with and without additional information, Decision trees with additional information.
2. LINEAR AND INTEGER PROGRAMMING: Problem formulation, Interpreting the solution – sensitivity analysis, Linear and Integer programming applications to business problems, Solving problems using computer software.
3. QUEUING MODELS: Elements of a queuing model and its dynamic evolution, Evaluation criteria of a queuing model in steady-state conditions, Cost models, Capacity determination of a queuing system.
4. INVENTORY MODELS: Inventory systems with stochastic demand, Single period inventory models – The newsvendor problem, Continuous review inventory systems (Q,R), Periodic review inventory systems.
5. PROJECT MANAGEMENT: PERT and CPM methods, Gantt charts, Economic dimension of project planning, Theoretical and diagrammatic analysis.

TEACHING and LEARNING METHODS - EVALUATION

DELIVERY <i>Face-to-face, Distance learning, etc.</i>	Face-to-face
USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY <i>Use of ICT in teaching, laboratory education, communication with students</i>	The learning process is supported through the use of (a) the electronic platform e-class and the institutional email, (b) Microsoft EXCEL
TEACHING METHODS <i>The manner and methods of teaching are described in detail.</i>	The lectures are delivered in the classrooms of the Department of Economics through the use of Microsoft Office 365 tools (Word, EXCEL, Power-Point). Before each lecture, slides and supporting

<i>Lectures, seminars, laboratory practice, fieldwork, study and analysis of bibliography, tutorials, placements, clinical practice, art workshop, interactive teaching, educational visits, project, essay writing, artistic creativity, etc.</i> <i>The student's study hours for each learning activity are given as well as the hours of non-directed study according to the principles of the ECTS</i>	material have already been posted on the course electronic platform “e-class”, so that students can have access to them during the lecture. The existing technological equipment of the above rooms also enables the use of an electronic whiteboard through a WACOM device, which allows writing in presentations and texts with storage capabilities of rich texts and presentations. The enriched texts containing comments on the lectures and solutions to exercises and problems are also posted in the e-class after the end of each lecture. This uploaded material on e-class includes also files containing additional problems and exercises that students are invited to solve in order to practice and understand the taught material. Solutions and comments on these problems are given either during lectures or during office hours announced by the teacher responsible (in special cases even via e-mail using students’ institutional accounts) More specifically, the workload of the module is analyzed as follows:																
	<table border="1"> <thead> <tr> <th>Activity</th><th>Semester workload</th></tr> </thead> <tbody> <tr> <td>Lectures</td><td>39 hours</td></tr> <tr> <td>Study at home</td><td>85 hours</td></tr> <tr> <td>Completion of assignment</td><td>30 hours</td></tr> <tr> <td>Preparation for the final exam</td><td>24 hours</td></tr> <tr> <td>Exams</td><td>2 hours</td></tr> <tr> <td></td><td></td></tr> <tr> <td>Course total</td><td>180</td></tr> </tbody> </table>	Activity	Semester workload	Lectures	39 hours	Study at home	85 hours	Completion of assignment	30 hours	Preparation for the final exam	24 hours	Exams	2 hours			Course total	180
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STUDENT PERFORMANCE EVALUATION <i>Description of the evaluation procedure</i> <i>Language of evaluation, methods of evaluation, summative or conclusive, multiple choice questionnaires, short-answer questions, open-ended questions, problem solving, written work,</i>	WINTER SEMESTER EXAMINATION PERIOD Individual Assignment: 20% Final Written Exam: 80% REPEAT SEPTEMBER EXAM: Written exam: 100% The problems of the assignment and the written examination are broken down into individual questions, where each question indicates the grade received in the completed answer. The																

<i>essay/report, oral examination, public presentation, laboratory work, clinical examination of patient, art interpretation, other. Specifically-defined evaluation criteria are given, and if and where they are accessible to students.</i>	correction of the assignment and the written examination is based on a special marking scheme, for which students are informed during the lectures.
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ATTACHED BIBLIOGRAPHY

T. Bernard, 2017. «**Introduction to Management Science**», BROKEN HILL PUBLISHERS LTD

T.A. Taha, 2017, 10η Έκδοση. «**Operations Research**», Macmillan

D.R. Anderson, S.J.Sweeney, W.A.Thomas, M. Kipp, 2017, « **An Introduction to Management Science: Quantitative Approaches to Decision Making**», Cengage Learning, 2011.

Indicative Papers:

Kevork, I. S. (2010). Estimating the optimal order quantity and the maximum expected profit for single period inventory decisions. OMEGA, The International Journal of Management Science, Vol. 38, pp. 218-227.

Halkos, G.E., Kevork, I.S., Tziourtzioumis, C.N. (2018). On the existence of unique minimum for the cost function in a (Q,R) inventory model with backorders. IMA Journal of Management Mathematics, Vol. 29, pp. 1-21. (ISI-Web of Science, AJG, SCOPUS)

Lee, H.L., SO, K.C., Tang, C.S., (2000). The value of information sharing in a two-level supply chain. *Management Science* 46(2), 626-643