

## COURSE OUTLINE

### 1. GENERAL

<b>SCHOOL:</b>	BUSINESS AND ECONOMICS		
<b>DEPARTMENT</b>	BUSINESS ADMINISTRATION		
<b>DIVISION</b>	TOURISM AND HOSPITALITY MANAGEMENT		
<b>LEVEL OF STUDY</b>	UNDERGRADUATE		
<b>COURSE UNIT CODE</b>	<b>3104301</b>	<b>SEMESTER OF STUDY</b>	<b>3</b>
<b>COURSE TITLE</b>	Operational Research		
<b>COURSEWORK BREAKDOWN</b>		<b>TEACHING WEEKLY HOURS</b>	<b>ECTS Credits</b>
Lectures, Workshops and Laboratory Exercises		5	6
<b>COURSE UNIT TYPE</b>	Special Background Course		
<b>PREREQUISITES :</b>			
<b>LANGUAGE OF INSTRUCTION/EXAMS:</b>	GREEK		
<b>COURSE DELIVERED TO ERASMUS STUDENTS</b>	YES		
<b>MODULE WEB PAGE (URL)</b>	<a href="http://moodle.teipir.gr/course/info.php?id=85">http://moodle.teipir.gr/course/info.php?id=85</a>		

### 2. LEARNING OUTCOMES

<b>Learning Outcomes</b>
<p>The Operations Research is an essential tool of management for solving executive and operational decision problems throughout the functionality of enterprises and organizations (production, marketing, services, financial management, etc.). The course provides the fundamental knowledge and main areas of Operational Research and the description of methods and applications that cover all the range of functions of enterprises and organisations.</p> <p>After completing this course the student should be able to:</p> <ul style="list-style-type: none"> <li>• Describe real world decision problems and identify the steps to solve them (problem formulation, modeling, methodological approaches and algorithms, exploitation of the results , implementation of the decision).</li> <li>• Describe how can be used the results of the analyses.</li> <li>• Identify previous cases which are relevant and can help to solve the problem.</li> <li>• Analyze decision problems and construct mathematical models describing them, taking into account all the parameters and restrictions governing the decision problem .</li> <li>• Select and apply the appropriate methodological approach for solving decision problems.</li> <li>• Use appropriate mathematical software and develop applications to solve problems.</li> <li>• Analyze the results and propose a solution or solutions (decisions) and argue for the choice of the proposed decision.</li> </ul>
<b>General Skills</b>
<ul style="list-style-type: none"> <li>- Individual work</li> <li>- Teamwork</li> <li>- Decision Making</li> <li>- Improvement of free, creative and inference thinking</li> <li>- Search, analysis and aggregation of data and information with the utilisation of the required</li> </ul>

### 3. COURSE CONTENTS

- Introduction to Operational Research
- Linear Programming Γραμμικός προγραμματισμός,
  - Description and Problem Formulation,
  - Graphical Solution of Linear Programme for two variables
  - SIMPLEX method
  - Sensitivity Analysis
  - Economical Interpretation of the results
  - Use SIMPEX method for minimisation problems
  - Case Studies, Exercises
- Integer Programming and Applications
- Branch and Bound algorithm
- Integer Programming 0/1 and Applications
- Dynamic Programming and Applications
  - Bellman Theorem
  - Recursive Functions
  - Backward Method
  - Foreward Method
  - Applications and case studies
- Multicriteria Decision Aid Analysis
  - Fundamentals of Multicriteria Decision Aid Analysis
  - Criteria Modelling
  - Decision Problems with Discrete Alternative actions
  - Alternative actions' evaluation on the criteria
  - The Analytical Hierarchical Method
  - Methods of Disaggregation - Aggregation Approach
  - Applications and case Studies

The practical part of the course includes the teaching of real world application and the development of applications with specific software (MS EXCEL/SOLVER, LINDO, MATLAB, ENVI)

### 4. TEACHING METHODS - ASSESSMENT

<b>MODE OF DELIVERY</b>	In-Class	
<b>USE OF INFORMATION AND COMMUNICATION TECHNOLOGY</b>	Support of the learning process through the LMS platform of PUAS.# Use of the MS EXCEL, LINDO and ENVI/IDL software Use of software developed by the Teaching Team.	
<b>TEACHING METHODS</b>	<i>Method description</i>	<i>Semester Workload</i>
	Lectures	39
	Class Work/Workshop	13
	Preparation of Group Projects	45
	Lab Exercises	13
	Independent and Directed Learning	40
	<b>TOTAL</b>	<b>150</b>
<b>ASSESSMENT METHODS</b>	<b>Theoretical Part (60%)</b> <b>I. Final Examination (60%)</b> (Summative Evaluation) includes: <ul style="list-style-type: none"> <li>- Multiple choice questions</li> </ul>	

	<ul style="list-style-type: none"> <li>- Short answer questions</li> <li>- Problems solutions with the taught methods</li> </ul> <p><b>II. Group Project (30%) (Summative Evaluation):</b></p> <p><u>Evaluation Criteria:</u></p> <ul style="list-style-type: none"> <li>• Completeness - 35%</li> <li>• Clearness - 25%</li> <li>• Documentation - 30%</li> <li>• Critical Evaluation- 10%</li> </ul> <p><b>III. Individual Oral Presentation (10%)</b> (Formative Evaluation): Oral individual presentation at the laboratory.</p>
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## 5. RESOURCES

- *Recommended Book and Journal Article Resources:*

- Moschona Th. , Chaalikias M., Chelidonis G. (2010). Operational Research, Synchroni Ekdotiki Publishers (in Greek)
- Ipsilantis P. (2010) Operational Research, Propompos Publishers (in Greek)
- Albright, S.C. and Winston, W.L. (2005). Spreadsheet Modeling and Applications: Essentials of Practical Management Science, Thomson Brooks/Cole .
- Anderson, D.R., Sweeney, D.J., Williams, T.A., Camm, J.D. and Martin, K. (2010). An Introduction to Management Science, Quantitative Approaches to Decision Making, 10th ed., Delmar Cengage Learning.
- Siskos, I. (1999), Linear Programming, New Technology Publishshers (in Greek).

-*Recommended Journals:*

- European Journal of Operational Research, Elsevier
- Operational Research: An International Journal, Springer
- Annals of Operations Research, Springer