COURSE OUTLINE

1. GENERAL

SCHOOL	Business, Economical and Social Sciences
DEPARTMENT	BUSINESS ADMINISTRATION
LEVEL OF STUDY	UNDERGRADUATE

COURSE UNIT CODE		**SEMESTER OF STUDY**	3th

COURSE TITLE	Operational Research

COURSEWORK BREAKDOWN	**TEACHING WEEKLY HOURS**	**ECTS Credits**
Lectures, Workshops and Laboratory Exercises	5	6

COURSE UNIT TYPE	Special Background Course
PREREQUISITES :	
LANGUAGE OF INSTRUCTION/EXAMS:	GREEK
COURSE DELIVERED TO ERASMUS STUDENTS	YES
MODULE WEB PAGE (URL)	http://moodle.teipir.gr

2. LEARNING OUTCOMES

Learning Outcomes

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.

After completing the course, students will be able to:

- 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).

- Describe how can be used the results of the analyses.

- Identify previous cases which are relevant and can help to solve the problem.

- Analyze decision problems and construct mathematical models describing them, taking into account all the parameters and restrictions governing the decision problem .

- Select and apply the appropriate methodological approach for solving decision problems.

- Use appropriate mathematical software and develop applications to solve problems.

- Analyze the results and propose a solution or solutions (decisions) and argue for the choice of the proposed decision.

General Skills

- Individual work
- Teamwork
- Decision Making
- Improvement of free, creative and inference thinking
- Search, analysis and aggregation of data and information with the utilisation of the required technology

3. COURSE CONTENTS

- Introduction to Operational Research
- Linear ProgrammingΓραμμικός 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
  - Backwoard Method
  - Forewoard 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

- Decision Making Analysis Under Uncertainty
  Decision Analysis with Unknown Probabilities
  Decision Analysis with Known Probabilities
  Decision Trees Analysis

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

MODE OF DELIVERY	In-Class
USE OF INFORMATION AND COMMUNICATION TECHNOLOGY	Support of the learning process through the e-class platform. Use of the MS EXCEL, LINDO and ENVI/IDL software

	Use of software developed by the Teaching Team.	
TEACHING METHODS	*Method description*	*Semester Workload*
	Lectures	39
	Class Work/Workshop	13
	Preparation of Group Projects	45
	Lab Excursuses	13
	Independed and Directed Learning	40
	TOTAL	**150**
ASSESSMENT METHODS	**Theoretical Part (60%)** **I. Final Examination** (60%) (Summative Evaluation) includes: - Multiple choice questions - Short answer questions - Problems solutions with the taught methods **II. Group Project** (30%) (Summative Evaluation): Evaluation Criteria: • Completeness - 35% • Clearness - 25% • Documentation - 30% • Critical Evaluation- 10% **III. Laboratory - Oral presentaion** (10%) (Formative Evaluation): Oral Examination.	

5. RESOURCES

- Recommended Book and Journal Article Resources:
- Moschona Th. , Chaalikias M., Chelidonis G. (2010). Operational , Sychroni Ekdotiki Publishers
- Ipsilantis P. (2010) Operational Research, Propompos Publishers.
- 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 Publisshers.

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

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