**COURSE OUTLINE**

1. **GENERAL**

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| **SCHOOL** | MANAGEMENT AND ECONOMY  |
| **DEPARTMENT** | BUSINESS ADMINISTRATION |
| **LEVEL OF STUDY**  | POST GRADUATE/ΜΒΑ |
| **Course Unit Code** |  | **SEMESTER OF STUDY** | B |
| **Course Title** | Operational Research/Management Science  |
| **Coursework Breakdown** | **TEACHING WEEKLY HOURS** | **ECTS Credits** |
| Lectures, Workshops and Laboratory Exercises | 4 | 7,5 |
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| **Course Unit Type** | SPECIALIZATION  |
| **Prerequisites :** |  |
| **Language of Instruction/Exams:** | GREEK  |
| **COURSE DELIVERED TO ERASMUS STUDENTS** | YES |
| **Module web page (URL)** | http://moodle.teipir.gr  |

1. **Learning Outcomes**

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| **Learning Outcomes** |
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| The Operations Research is an essential tool of management for solving executive and operational decision problems throughout the functionality of firms and organizations (production , marketing , services , financial management , etc ). The course provides the knowledge and main areas of Operational Research and the presentation 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 to identify the appropriate methodological frame and steps to solve the problem (modeling problem, methodological approaches and algorithms, exploitation of the results , implementation of the decision) .
* Describe the way to exploit the results of the data processes and to support with arguments the decision to recieve or propose
* To exploit the expierence or knowledge from the past cases which are relevant to the examined case and utilise with adaptations to the new conditions
* Analyze decision problems and develop the relative mathematical models, taking into account all the parameters and restrictions governing the decision problem.
* Select and apply the appropriate methodological approach and develop applications using the special software for the examined decision problems.
* Analyze the results and propose a solution or solutions (decisions) and arguments for his/her decision or proposal.
* To apply the techniques of sensitivity analysis and to answer questions of the form " what ..if .. " for alternative scenarios
* To evaluate the consequences of the decision and revise the model in dynamic decision environment.
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| **General Skills** |
| - Individual work- Teamwork- Decision Making- Search, analysis and aggregation of data and information with the utilisation of the required technology |

1. **Course Contents**

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| * Introduction to Operational Research
* Linear Programming,
* 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 Programing and Applications
* Bellman Theorem
* Recursive Functions
* Backwoard Method
* Forewoard Method
* Applications and case studies
* Multi Objective Linear Programming
* Payoff Table
* Method of Satisfactory Goals
* Method of Desired Goals
* Net Optimisation
* The problem of Maximum flow
* The transportation problem
* The Assignment Proble
* The covering of nodes
* Stochastic Linear Programming

 Description of Stochastic L.P.The two phases methodCase Studies* Queuing Theory and Applications

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, LPSOLVER) |

1. **Teaching Methods - Assessment**

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| **Mode of DeliverY** | In-Class |
| **USE OF INFORMATION AND COMMUNICATION TECHNOLOGY** | Support of the learning process through the e-class platform. Use the following Software SystemsMS EXCEL/SOLVERLPSOLVERMATLAB |
| **TEACHING METHODS** |

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| ***Method description*** | ***Semester Workload*** |
| Lectures | 39 |
| Tutorials and Labs | 13 |
| Group Projects | 60 |
| Personal Study | 60 |
| WorkShops | 28 |
| ***TOTAL*** | **200** |

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| **ASSESSMENT METHODS** | **Ι. Final Written Exam** (40%) (Summative Evaluation) includes:- Multiple choice questions and short answer questions in order to check the level of understanding of the concepts and essential elements of Operational Research - Exercises and small case studies with which is checked the level that the students can analyse the decision problem, the situation and conditions of the examined case, develop the appropriate mathematical models, identify the solutions and analyse the results.**ΙΙ. Teamwork** (60%) (Summative Evaluation): Course Work in groups of 2 or 3 students.Students obliged to conduct a study for real world problem in groups of 2 or 3. The study includes the description of the special issues of the case study, the selection of the methodological approach to be used (with arguments), the development of the mathematical model or models, the implementation of the processes to the problems data, the analysis of the results with criticism and finally the proposals for actions or decisions. Also, the use of the special software is examined in this teamwork activity. |

1. **Resources**

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| *-**Recommended Book and Journal Article Resources:** Μοσχονά Θ., Χαλικιάς Μ., Χελιδόνης Γ. (2010) Επιχειρησιακή Έρευνα, Σύγχρονη Εκδοτική
* Υψηλάντης Π. (2015) Επιχειρησιακή Έρευνα, Μέθοδοι και Τεχνικές Λήψης Αποφάσεων, 5η εκδοση, Εκδόσεις Προπομπός
* Albright, S.C. and Winston, W.L. (2005). Spreadsheet Modeling and Applications: Essentials of Practical Management Science, Thomson Brooks/Cole .
* Hillier, F. and G.J. Lieberman (2009), Introduction to Operational Research, Mc Graw-Hill.
* 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.
* Σισκος, Ι. (2000), Γραμμικός Προγραμματισμός, Εκδόσεις Νέων Τεχνολογιών.

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

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