Centre	**University College of Engineering of Vitoria-Gasteiz**
Name of subject	**26023 – Operations Research**
Qualification	**Degree in Computer Management and Information Systems Engineering**
Type	**Basic branch subject**
Credits	**6 ECTS**
Year	**2**
Term(s)	**1st**
Department	**Applied Mathematics**
Language	**Spanish**

Outcomes / Objectives

Deterministic methods in Operations Research for the solution and treatment of linear models.

Syllabus

Unit 1: Introduction.

Definition of Operations Research. Phases of Operations Research. Critique of the method.

Unit 2: Basic linear programming concepts.

Definition of linear program. Geometric resolution: intuitive approach to the problem and to its resolution. Prior mathematical concepts. Basic definitions of linear programming.

Unit 3: Linear programming: The simplex method.

The simplex method for the common problem of the maximum. The simplex method for a linear problem with general restrictions: two-phase method and penalisation method. Observations on the simplex method: individual cases and computational aspects.

Unit 4: Duality theory.

Formulation of the dual problem. Properties of duality. Dual simplex method.

Unit 5: Sensitivity analysis.

Analysis of changes to the optimal solution of linear models when discrete changes occur in the model parameters.

Unit 6: Integer linear programming.

Solution of linear problems in which some or all of the variables are integers. Branch and bound algorithm. Cutting algorithms: Gomory's fractional cuts method.

Unit 7: Transportation model.

Study of the transportation problem and adaptation of the simplex algorithm to generate the transportation method.

Unit 8: Variants of the transportation model.

The transhipment problem. The assignment problem. The matching problem.

Methodology

Teaching Method

Face-to-Face Teaching Hours								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
48		12						
Student Hours of Non Face-To-Face Activities								
Lectures	Seminars	Classroom practice	Lab. practice	Computer sessions	Clinical practice	Workshops	Industrial workshops	Field practice
72		18						

Assessment System

General criteria

Written essay exam

Practical activities (exercises, case studies or problems)

Clarification regarding assessment

In the ordinary examination session:

The written exam will account for 80% of the final grade.

The practice will account for 20% of the final grade.

To be given a grade in the ordinary examination session, students must sit the written exam accounting for 80%, otherwise it will be regarded as not sat.

Extraordinary examination session:

The written exam will account for 100% of the final grade.

Bibliography

Basic Bibliography

"Investigación operativa: Programación lineal y aplicaciones" Rios Insua, S. Centro de Estudios Ramón-Areces

"Investigación de operaciones. Teoría y 310 problemas resueltos" Bronson, R. Mc. Graw-Hill (Schaum series)

In-depth Bibliography

"Investigación de Operaciones. Aplicaciones y algoritmos." Winston, W. Thomson

"Investigación de Operaciones: Una introducción" Taha, Hamdy A. Prentice-Hall

"Programación Lineal y flujo en redes" Bazaraa, M.S. y Jarvis, J.J. Limusa

Websites

- http://moodle.ehu.es/moodle/login/warning.php
- http://www.lindo.com
- http://www.sc.ehu.es/ccwikera/principal.html
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- http://www.maximal-usa.com