Code: 1421 **Operational Research**
Degree: 2nd cycle – Mathematics Applied to Biological Sciences
Curricular Year: 1st/2nd **Semester Course: 2nd/1st**
Credits: 6 ECTS **Optional**
Language: Portuguese/English
Responsible: Marta Guerreiro Duarte Mesquita de Oliveira
Other lecturer(s): Isabel Maria de Jesus Martins
Web Site: http://www.isa.utl.pt/home/node/3891

1. Contact hours:
Lecture/Practicals 70 **Others** 14 **Total** 84

2. Objectives:

This course is an introduction to Operations Research. It includes methodologies that provide a possible one-semester exposure to this broad area of Mathematics – linear, integer and non-linear programming. Each of the methodologies is enriched by illustrative applications, drawn from the Biological Sciences. Software currently available for solving the types of problems studied in the course will be used. At the end, the students should be in a position to identify and formulate a wide variety of problems that can be solved with the methodologies presented.

3. Programme:

Linear programming – formulation of problems in linear programming form, study the simplex method, study of duality and sensitivity analysis.

Integer programming - formulation of problems in integer programming form, study the branch-and-bound method and introduction to some other ways to find exact solutions to such problems.

Non-linear programming – formulation of problems whose objective or constraints cannot be expressed as linear functions of the decisions variables. Several representative and useful solution methods are presented.

4. Bibliography:

Main Bibliography

Hillier, F. S. and Lieberman G.J. (2005) Introduction to Operations Research. McGraw-Hill.

Other Bibliography

Carter M.W. and Price C.C. (2001) Operations Research. A Practical Introduction. CRC PRESS.
Meerschaert M.M. (2007) Mathematical Modeling. Elsevier AP.

5. Assessment:

Either: 2 tests (8 points each) and one assignment (4 points).
Or final exam (20 points).

6. Estimated Workload: 168 Hours

7. Last Update: 15/7/2010