UNIVERSITY of NICOSIA

Course Syllabus

Course Code	Course Title	ECTS Credits
IMGT-486	Quantitative Methods	6
Prerequisites	**Department**	**Semester**
MATH-220	Management and MIS	Fall, Spring
Type of Course	**Field**	**Language of Instruction**
Required	Management	English
Level of Course	**Lecturer(s)**	**Year of Study**
1st Cycle	Harry Kogetsidis	3rd or 4th
Mode of Delivery	**Work Placement**	**Corequisites**
Face to Face	N/A	None

Course Objectives:

The main objectives of the course are to:

- introduce students to the basic principles of operational research / management science and to familiarise them with its basic concepts
- introduce students to a range of quantitative methods and tools
- develop students' ability to build numerical models and use them to propose policy alternatives
- develop students' analytical skills
- develop students' ability to summarise and present data in a professional way
- develop students' skills in practical decision making
- develop students' ability to communicate effectively with non-technical managers
- provide a conceptual understanding of the role of the methods of science in decision making
- help students appreciate the limitations of the methods of science in decision making.

Learning Outcomes:

After completion of the course students are expected to be able to:

1. recognise the importance of operational research / management science in providing appropriate analytical and processual support to management
2. recognise the importance of quantitative methods in problem solving and decision making

3. structure business and management problems so that these can be solved by quantitative means
4. select appropriate quantitative methods to address particular types of business and management problems
5. use appropriate quantitative methods to solve business and management problems
6. formulate quantitative models to help propose policy alternatives
7. summarise and present data in a professional way
8. appreciate the limitations of the methods of science in decision making
9. communicate effectively with non-technical managers.

Course Content:

Project scheduling – part 1 (Drawing networks to represent projects. Rules for drawing project networks. Activities and events. Normal activities vs dummy activities).

Project scheduling – part 2 (Network analysis using the PERT/CPM method. Earliest start and earliest finish times. Latest start and latest finish times. Critical path and expected project duration. Slack times).

Decision analysis – part 1 (Decision alternatives and states of nature. Representing decision problems by payoff matrices. Decision making under conditions of uncertainty and risk. Laplace method. Maximax, Maximin and Expected Value methods. The use of probabilities in decision analysis. Sensitivity analysis on the recommended decision).

Decision analysis – part 2 (The concept of utility. Introduction to utility theory. Uncertainty and risk in decision analysis. Different styles of decision making).

Forecasting – part 1 (Introduction to time series forecasting. The basic components of time series).

Forecasting – part 2 (Time series forecasting using averaging methods. The method of simple moving averages. The method of weighted moving averages. Measuring forecast accuracy and applying simple simulation).

Linear programming – part 1 (Formulating maximisation linear programming problems and solving them using the graphical solution method).

Linear programming – part 2 (Formulating minimisation linear programming problems and solving them using the graphical solution method).

Linear programming – part 3 (Formulating and solving linear programming problems with mixed constraints using the graphical solution method).

Linear programming – part 4 (Special cases of linear programming and linear programming problems that cannot be solved – bioptimal problems, infeasible problems, unbounded problems).

Learning Activities and Teaching Methods:

Lectures, group work, case studies, solving problems in class, guest speakers, homework and background reading.

Assessment Methods:

Tests, homework activities, student projects, mid-term examination, final examination.

Recommended Textbooks / Readings:

Title	Author(s)	Publisher	Year	ISBN
An Introduction to Management Science – Quantitative Approaches to Decision Making (14th ed.)	D. R. Anderson, D. J. Sweeney, T. A. Williams, J. D. Camm, J. J. Cochran, M. J. Fry and J. W. Ohlmann	Cengage Learning	2022	9780357715468
Introduction to Operations Research (9th ed.)	F. Hillier and G. Lieberman	McGraw-Hill	2021	9781259872990