Course Title	**Quantitative Methods**				
Course Code	**MB683**				
Course Type	**Major Elective**				
Level	BSc/1st Cycle				
Year / Semester	4th/8th				
Teacher's Name	Dimitrios Gkritzapis				
ECTS	7.5	Lectures / week	3 hours	Laboratories / week	2 hours
Course Purpose and 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.		
Prerequisites		Required	
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). 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).		
Teaching Methodology	Lectures, group work, case studies, solving problems in class, guest speakers, homework and background reading.		
Bibliography	D. R. Anderson, D. J. Sweeney, T. A. Williams, J. D. Camm, J. J. Cochran, M. J. Fry and J. W. Ohlmann, An Introduction to Management Science – Quantitative Approaches to Decision Making (14th ed.) Cengage Learning 2016 9781111823610 F. Hillier and G. Lieberman, Introduction to Operations Research (9th ed.) McGrawHill 2010 9780073376295		

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