AFMA102 - Mathematics II

Course Title	Mathematics II
Course Code	AFMA102
Course Type	Compulsory
Level	Bachelor (1st Cycle)
Year / Semester	1 / Spring
Teacher's Name	Petroula Mavrikiou

ECTS	6	Lectures / week	3	Laboratories / week	

Course Purpose	The purpose of the course is to introduce students with calculus and its application in the business environment. During the course students learn the introductory theory of functions, derivatives of functions of both one and two variables and calculate derivatives of polynomial, logarithmic, rational and exponential functions. The students cover additional topics which include partial derivatives of functions of two variables and use the Lagrange multiplier method for the solution of optimisation problems. In addition, students are introduced to the concept of definite and indefinite integrals. Throughout the course students learn to analyse industry models and suggest implications of industry techniques in production, cost, revenue and profit functions. Students learn to evaluate the mathematical implications of the above techniques applied in industry models and offer suggestions for their better operation. Finally, they are enabled to formulate optimization problems for a particular production model and solve the problem using the appropriate mathematical technique, evaluate the numerical findings and make suggestions for optimal operation.
Learning Outcomes	- Understand the concept of the derivative and implement basic differentiation properties of a function. Calculate derivatives of products and quotients. Recognise and calculate the chain rule. - Calculate the derivatives of polynomial, logarithmic and rational functions. - Understand and calculate second and higher order derivatives. - Apply derivatives in optimization problems with emphasis in business problems. Be able to calculate the marginal cost, marginal revenue, and marginal profit. Calculate the maximization of profit and minimization of cost. - Calculate the partial derivatives of functions of two or more variables and apply them for the calculation of the maxima and minima. Apply partial derivatives in optimization problems with emphasis in business problems.

	• Understand and apply the Lagrange multipliers method for constrained optimization and use Lagrange multipliers in business problems. • Understand the models of exponential growth and decay problems with emphasis to business applications. • Understand the concept of the indefinite integral, to integrate simple functions and to apply integral calculus in business problems.		
Prerequisites	AFMA101	Corequisites	AFMA101
Course Content	• Derivatives The concept of the derivative of a function. Basic differentiation properties. Derivative of a product and a quotient. The chain rule. Derivatives of polynomial, logarithmic and rational functions. Second and higher order derivatives. Maximum and minimum of a function. • Application of Derivatives in Business problems. Derivatives in optimization problems with emphasis in business problems (marginal cost, marginal revenue, and marginal profit). Maximization of profit and minimization of cost. Graphical interpretation of loss and profit area. • Partial derivatives Partial derivatives of functions of two or more variables and apply them for the calculation of the maxima and minima. Applications in business problems. • Lagrange multipliers Non-linear optimisation. Understand and apply the Lagrange multipliers method for constrained optimization. Application in business problems. • Exponential growth and decay problems To understand the models of exponential growth and decay problems with emphasis to business applications • Integrals Understand the concept of the indefinite and definite integral, to integrate simple functions and to apply integral calculus in business problems.		
Teaching Methodology	The course is structured around lectures and tutorials on topics related to calculus for business and social sciences. During the lectures, students are encouraged to participate in discussions and class work. At the same time, students are given problems and exercises to solve at home.		
Bibliography	(a) Textbook • Barnett R., Ziegler M., Byleen K., College Mathematics for Business, Economics, Life Sciences and Social Sciences. Pearson Prentice Hall 2018, 14th Edition (Latest Edition). (b) References • Anton, H., and Kolman, A., Mathematics with Applications for the Management, Life and Social Sciences, 4th edition, Wiley, 2018, 12th Edition (Latest Edition) • Anderson, D., Sweeney D., Williams, T., Quantitative Methods for Business, 9th Edition, West Publishing Company 2006		

	• Edward Dowling, Introduction to Mathematical Economics, McGraw-Hill 2001. • Mizrahi and Sullivan, Finite Mathematics with Applications, John Wiley and Sons
Assessment	Students are assessed with the Coursework which is consisted of two Mid-term exams carrying 40% weight, and a Final exam which carries 60% weight.
Language	English