Course Title	Calculus and Analytic Geometry II				
Course Code	AMAT122				
Course Type	Required				
Level	BSc (Level 1)				
Year / Semester	1st Year/2nd Semester				
Teacher's Name	Dr. Savvas Pericleous				
ECTS	5	Lectures / week	3	Laboratories/week	
Course Purpose	The purpose of the course is to introduce students with additional mathematics concepts that are considered essential for engineering studies in general, as a continuation of the prerequisite class AMAT111. We begin the class by explaining the notion of integration and introducing a number of techniques for integral evaluation. We use this to make an important connection between mathematics and engineering practice. In addition students are introduced to the general setting of several variables. The notion of the derivative and integral is then studied in the new setting mainly with applications in two variables. Additional topics are also studied.				
Learning Outcomes	• Explain the notion of definite and indefinite integrals. • Solve simple definite and indefinite integrals of polynomials, functions involving rational powers of the variable, exponential, trigonometric, and rational functions. • Solve more complicated integrals by using the methods of integration by parts, u-substitution, partial fraction decomposition, and trigonometric substitution. • Explain the concept of functions of two variables, find partial derivatives, and evaluate double integrals. • Explain the concept of infinite series, state Taylor's and MacLaurin's Theorems, and expand simple functions in such series. • Explain the concept of Fourier series, and expand simple periodic functions in such series. • Explain the notion of complex numbers, evaluate simple expressions involving complex numbers, and express complex numbers in polar form. • Apply definite integration in order to compute areas between curves, and volumes of solids of revolution by using the methods of slices.				
Prerequisites	AMAT111		Corequisites	None	
Course Content	• Definite and Indefinite Integrals: The notion of definite and indefinite integrals. • Applications of the Definite Integral: Areas between Two Curves, Volumes of solids by revolution using the method of Slices. • Techniques of Integration: U-substitution method, Integrals of				

	Trigonometric and Inverse Trigonometric Functions, Integration of rational functions using partial fractions decomposition, Integration by Parts, • Partial Derivatives and Double Integrals: The notion of a function of two variables. An Introduction to Partial Derivatives and Double Integrals. • Series: Infinite Series, Power Series, Taylor, MacClaurin Series and Fourier Series. • Polar Coordinates: Polar Coordinates and conversion of Cartesian to Polar Coordinates. Areas in polar coordinates. • An introduction to complex numbers: Geometric interpretation, Polar Form, Exponential Form, De Moivre's formula.
Teaching Methodology	The course is delivered to the students by means of lectures, conducted with use of the board. The students are also engaged in the course through questions by the lecturer which are discussed in class. Several examples are solved on the white board, with the participation of students. Students are encouraged to leave their seats and solve examples on the board as well. Students are asked to work on their own during class hours on practice problems, and they are encouraged to ask questions. Many additional exercise sheets and material is available to students through the e-learning platform. Students are encouraged to attend office hours for extra help. Students are encouraged to attend the peer tutoring center for extra help.
Bibliography	(a) Textbooks: • Anton H., Bivens I and Davis S, *Calculus: Early Transcendentals*, 11th edition, Wiley, 2016. (b) References: • C. Henry Edwards, David E. Penney, *Calculus, Matrix Version*, Pearson Education; 6th edition, 2002. • James Stewart, *Calculus, Concepts and Context*, Thomson Learning; 3rd Bk & CD edition, 2004.
Assessment	(a) Methods: Students will be assessed with coursework that involves two in class written tests and a final exam. (b) Criteria: Assessment criteria are available in each test or in the final exam (c) Weights: Tests 40% Final Exam 60%
Language	English language