Course unit title:	Calculus and Analytic Geometry I		
Course unit code:	AMAT111		
Type of course unit:	Compulsory		
Level of course unit:	Bachelor (1st Cycle)		
Year of study:	First year		
Semester when the unit is delivered:	First or second semester		
Number of ECTS credits allocated :	5		
Name of lecturer(s):			
Learning outcomes of the course unit:	1. Explain the notion of a function of a real variable. Sketch the graph of linear, quadratic, and cubic functions. 2. Define the Logarithm of a positive real number, state the properties of Logarithms, and solve Logarithmic equations. 3. Define, sketch the graph, and describe the properties of the exponential function, the logarithmic function and the basic trigonometric functions. 4. Define the basic trigonometric functions and sketch their graphs. State and use fundamental trigonometric identities. Use basic identities of trigonometric functions of sums and differences of two angles. Use the unit circle to find values of trigonometric function for angels not on the first and second quadrant. 5. Explain the notion of limits and continuity of functions, identify and verify limits and points of discontinuity from a graph. 6. *Describe the derivative as a limit of finite differences, find the derivative of specific categories of functions, state and apply the general rules of differentiation to calculate derivatives, use the first and second derivative of a function to find its local extrema , points of inflection, and regions in which it is increasing, decreasing, concaving upwards or downwards.* 7. Apply the knowledge of derivatives in the field of engineering and in optimization problems. 8. Explain in broad terms the concept of the integral of a function of a real variable. Basic integration formulas. The definite integral.		
Mode of delivery:	Face-to-face		
Prerequisites:	Success on Placement test	Co-requisites:	AMAT100
Recommended optional program components:	None		
Course contents:	. • Exponents, roots and their properties. The concept of the logarithm and its properties. Exponential and logarithmic equations. • Basic trigonometric functions and their graphs (sinx, cosx, tanx, cotx, secx, cscx), The unite circle. Basic identities of trigonometric functions including trigonometric functions of sums and differences of two angles. • Real valued functions of one variable: functions**,** operations of functions, inverse functions, logarithmic and exponential functions and their properties. Graphs of linear, quadratic, cubic, square root, exponential and logarithmic functions.		

	• Limits and continuity: introduction to calculus, limits, and continuity. • Differentiation: The derivative as a function, the derivative as a rate of change and as the slope of a graph, techniques of differentiation, chain rule, derivatives of trigonometric, exponential, and logarithmic functions, higher derivatives, implicit differentiation, and differentials. • Applications of differentiation: related rates, increase, decrease, and concavity, relative extrema, first and second derivative tests, curve sketching, absolute minimum and maximum values of functions, applied maximum and minimum value problems. • Introduction to the concept of integration. Basic integration formulas. The definite integral.
Recommended and/or required reading:	
Textbooks:	Anton H, Bivens I, and Davis S: “Calculus”, 7th Edition, John Wiley & Sons, 2002.
References:	• C. Henry Edwards, David E. Penney, Calculus, Matrix Version, Pearson Education, 6th edition, August 2002. • James Stewart, Calculus: Concepts and Context, Thomson Learning, 3rd Bk & CD edition, November 1, 2004.
Planned learning activities and teaching methods:	The taught part of course is delivered to the students by means of lectures and several examples are solved on the white board. Students are asked to work on their own during class hours on practice problems, and they are encouraged to ask questions. Many additional exercises are given to students to work at home, and analytic solutions are provided. Students are encouraged to attend office hours for extra help.
Assessment methods and criteria:	• Tests: 40% • Final Exam: 60%
Language of instruction:	English
Work placement(s):	No