Course Title	Calculus I				
Course Code	BMS112				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	1st Year / 1st Semester				
Teacher's Name	TBA				
ECTS	5	Lectures / week	3 Hours	Laboratories / week	None
Course Purpose and Objectives	The course offers basic knowledge of the principles of calculus, which is a powerful tool in engineering and science.				
Learning Outcomes	Upon successful completion of the course, students will be able to: • Number the basic algebraic properties of various functions • Calculate the limit for a given function • Calculate the derivative of a function using various techniques • Apply the derivative to solve real problems • Use the derivative to study the characteristics of a function's graph • Recognize the antiderivative as the reverse process of differentiability and apply to various problems • Use the antiderivative (integration) in problem solving containing area calculation				
Prerequisites	None	Co-requisites	None		
Course Content	• Cartesian plane. Distance between two points. Graphs. Circle. Parabola. Slope of the line. Slope line. Parallel and perpendicular lines. Linear equation. Functions. Function symmetry. Composition of functions. Trigonometric functions. • Introduction to differentiation. Calculation of limits. One-sided limits. Limits theorems. Infinite limits and limits that tend to infinity. Tangent line and derivative. Derivative at a point. The derivative as a function. Differentiation in open interval. The derivative as a variance ratio. Instantaneous velocity. Continuous functions. Types of discontinuous functions. Theorem for the upper and lower limit. Intermediate value theorem. Rules on differentiability. The rules for multiplying and dividing. The derivative of complex functions: The chain rule. The power rule. The rule of power functions. Derivative of trigonometric functions. Indirect differentiability. High order derivatives.				

<table>
<tr><td></td><td>

Mean value theorem. Functions and graphs I: Increasing and decreasing functions, the first derivative-maxima and minima. Asymptotic behaviour of functions. Functions and graphs II: Concavity and Points of Inflection, finding local extrema using the second derivative. Applications in optimization problems. Undefined forms and L'Hopital's rule.
Antiderivative. Symbolism. Area under a curve. Definite integral. Fundamental theorem of calculus. Integration by substitution. Area between curves.
Recent developments and current issues related to the main objectives of the course.

</td></tr>
<tr><td>Teaching Methodology</td><td>Face- to- face</td></tr>
<tr><td>Bibliography</td><td>Weir, Hass, Giordano., THOMAS’ CALCULUS,
Pearson-Addison Wesley
Grossman, S., CALCULUS, Academic Press
Ayres Jr., F., CALCULUS SCHAUM'S SERIES, McGraw Hill
Anton, H., CALCULUS WITH ANALYTIC GEOMETRY
Wiley
Sherlock/Roebuck/ McGodfrey, CALCULUS,
Edward Arnold
Ellis/Gulick, CALCULUS WITH ANALYTIC GEOMETRY,
Academic Press
S Stein, CALCULUS AND ANALYTIC GEOMETRY,
McGraw Hill</td></tr>
<tr><td>Assessment</td><td>
<table>
<tr><td>Mid-Term Examination</td><td>30%</td></tr>
<tr><td>Final Examination</td><td>60%</td></tr>
<tr><td>Class participation</td><td>10%</td></tr>
<tr><td></td><td>100%</td></tr>
</table>
</td></tr>
<tr><td>Language</td><td>English</td></tr>
</table>