

Course Title	Calculus I				
Course Code	MAT150				
Course Type	Compulsory				
Level	Bachelor (1st Cycle)				
Year / Semester	1 <sup>st</sup> Year / 2 <sup>nd</sup> Semester				
Teacher's Name	TBA				
ECTS	6	Lectures / week	3 hours / 14 weeks	Laboratories / week	N/A
Course Purpose and Objectives	The objective of this course is to provide, together with Calculus II, a good working knowledge of calculus, a powerful mathematical instrument in engineering and science.				
Learning Outcomes	<p>Upon successful completion of the course, students will be able to:</p> <ul style="list-style-type: none"> <li>Recall the essential algebraic properties of functions</li> <li>Evaluate the limit of a function</li> <li>Calculate the derivative of a function using various techniques</li> <li>Manipulate derivatives to solve real life problems</li> <li>Use derivatives to describe the characteristics of the graph of a function</li> <li>Recognize antidifferentiation as the reverse of the differentiation process and apply it in appropriate circumstances</li> <li>Employ antiderivatives (integrals) in the solution of area problems</li> </ul>				
Prerequisites	MAT140	Co-requisites	None		
Course Content	<p>Introduction to Limits. One-Sided Limits. The Limit Theorems. Infinite Limits and Limits at Infinity.</p> <p>Introduction to the Derivative. Tangent Lines and Derivatives. Derivative at a Point. The Derivative Function. Differentiability on an Open Interval.</p> <p>The Derivative as a Rate of Change. Instantaneous Velocity.</p> <p>Continuity. Types of Discontinuity. Upper and Lower Bound Theorem. Intermediate Value Theorem.</p> <p>Differentiation Rules. The Product and Quotient Rules. The Derivative of Composite Functions: The Chain Rule. The Power Rule. The</p>				

	<p>Derivative of a Power Function. The Derivatives of the Trigonometric Functions. Implicit Differentiation. Higher-Order Derivatives. Related Rates of Change. The Mean Value Theorem.</p> <p>Elementary Curve Sketching I: Increasing and Decreasing Function and the First Derivative Test. Asymptotes.</p> <p>Elementary Curve Sketching II: Concavity and the Second Derivative Test. The Theory of Maxima and Minima. Maxima and Minima; Applied Optimization Problems. Indeterminate Forms and L'Hôpital's Rule.</p> <p>Antiderivatives. The Sigma-Notation. Approximations to Area. The Definite Integral. Existence of Definite Integrals. The Fundamental Theorem of Calculus. Integration by Substitution. The Area Between Curves.</p> <p>Recent developments and contemporary issues pertaining to the subject matter of the course</p>						
Teaching Methodology	Face- to- face						
Bibliography	<p>Weir/Hass/Giordano., THOMAS' CALCULUS , Pearson/Addison Wesley (Latest edition)</p> <p>Stewart J, SINGLE VARIABLE CALCULUS, Thomson Brooks/Cole (Latest Edition)</p> <p>Anton, H., CALCULUS WITH ANALYTIC GEOMETRY, Wiley (Latest edition)</p> <p>Adams R., Essex C., CALCULUS: A complete course, Pearson (Latest edition)</p> <p>Morris C., Stark R., FUNDAMENTALS OF CALCULUS, Wiley (Latest edition)</p>						
Assessment	<table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td style="padding: 5px;">Examinations</td> <td style="text-align: center; padding: 5px;">90%</td> </tr> <tr> <td style="padding: 5px;">Class Participation and Attendance</td> <td style="text-align: center; padding: 5px;">10%</td> </tr> <tr> <td></td> <td style="text-align: center; padding: 5px;">100%</td> </tr> </table>	Examinations	90%	Class Participation and Attendance	10%		100%
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Language	English						