



## COURSE OUTLINE: MTH551 - CALCULUS I

Prepared: Mathematics Department

Approved: Karen Hudson, Dean, Community Services and Interdisciplinary Studies

<b>Course Code: Title</b>	MTH551: CALCULUS I FOR TECHNOLOGY				
<b>Program Number: Name</b>	4127: ELECTRICAL TN-TRADES				
<b>Department:</b>	MATHEMATICS				
<b>Academic Year:</b>	2023-2024				
<b>Course Description:</b>	The basic concepts of calculus are introduced through an emphasis on applications and examples. Topics include limits, simple derivatives, derivatives of trigonometric and logarithmic functions, applications of derivatives, curve sketching, integration and applications of integration.				
<b>Total Credits:</b>	4				
<b>Hours/Week:</b>	4				
<b>Total Hours:</b>	56				
<b>Prerequisites:</b>	MTH143				
<b>Corequisites:</b>	There are no co-requisites for this course.				
<b>Substitutes:</b>	OEL780, OEL847				
<b>This course is a pre-requisite for:</b>	MCH607, MTH577				
<b>Essential Employability Skills (EES) addressed in this course:</b>	EES 3 Execute mathematical operations accurately. EES 4 Apply a systematic approach to solve problems. EES 5 Use a variety of thinking skills to anticipate and solve problems. EES 10 Manage the use of time and other resources to complete projects.				
<b>Course Evaluation:</b>	Passing Grade: 50%, D  A minimum program GPA of 2.0 or higher where program specific standards exist is required for graduation.				
<b>Books and Required Resources:</b>	Basic Technical Mathematics with Calculus by Washington/Boue Publisher: Pearson Edition: 11th ISBN: 9780134289915  Calculator - Sharp EL-W516XG (available in the bookstore)				
<b>Course Outcomes and Learning Objectives:</b>	<table border="1"> <thead> <tr> <th>Course Outcome 1</th> <th>Learning Objectives for Course Outcome 1</th> </tr> </thead> <tbody> <tr> <td>1. Understanding Derivatives</td> <td>1.1 Evaluate limits of algebraic functions. 1.2 Approximate the slope of a tangent to a curve.</td> </tr> </tbody> </table>	Course Outcome 1	Learning Objectives for Course Outcome 1	1. Understanding Derivatives	1.1 Evaluate limits of algebraic functions. 1.2 Approximate the slope of a tangent to a curve.
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	<p>1.3 Find the derivative of an algebraic function using the definition of a derivative as a limit.</p> <p>1.4 Find instantaneous rates of change of a function using derivatives.</p> <p>1.5 Find the derivative of polynomial functions using rules of differentiation.</p> <p>1.6 Find derivatives of products and quotients of functions using rules for differentiation.</p> <p>1.7 Find the derivative of a power of a function - Chain rule.</p> <p>1.8 Find the derivative of an implicit function.</p> <p>1.9 Find higher derivatives of algebraic functions.</p>
<b>Course Outcome 2</b>	<b>Learning Objectives for Course Outcome 2</b>
2. Applications using Differentiation	<p>2.1 Find slopes and equations of tangent lines.</p> <p>2.2 Compute velocities and accelerations for curvilinear motion.</p> <p>2.3 Solve related rate problems.</p> <p>2.4 Make graphs of non-linear functions using derivatives.</p> <p>2.5 Make graphs of discontinuous functions using derivatives, asymptotes, intercepts.</p> <p>2.6 Solve applied maximum-minimum problems.</p>
<b>Course Outcome 3</b>	<b>Learning Objectives for Course Outcome 3</b>
3. Understanding Integration	<p>3.1 Use differentials to compute small change in a function.</p> <p>3.2 Find an anti-derivative using derivative rules.</p> <p>3.3 Use the basic rule for integration of algebraic functions.</p> <p>3.4 Determine approximate areas under curves from graphs.</p> <p>3.5 Determine exact areas under curves by integration - the fundamental theorem of integral calculus.</p> <p>3.6 Evaluate other algebraic definite integrals.</p>
<b>Course Outcome 4</b>	<b>Learning Objectives for Course Outcome 4</b>
4. Applications using Integration	<p>4.1 Solve problems involving distance-velocity-acceleration, current-voltage-charge using integration.</p> <p>4.2 Find areas (between two curves) using horizontal and vertical elements and definite integrals.</p> <p>4.3 Find the volume of a solid of revolution using the disk or shell method.</p>
<b>Course Outcome 5</b>	<b>Learning Objectives for Course Outcome 5</b>
5. The Differentiation of Transcendental Functions	<p>5.1 Find derivatives of expressions containing sine or cosine functions.</p> <p>5.2 Find derivatives of other trigonometric functions.</p> <p>5.3 Find derivatives of inverse trigonometric functions</p> <p>5.4 Solve worded problems which involve trigonometric functions.</p> <p>5.5 Find derivatives of logarithmic functions - and constant base.</p> <p>5.6 Find derivatives of exponential functions - any constant base.</p> <p>5.7 Solve worded problems involving logarithmic of exponential functions.</p>



**Evaluation Process and Grading System:**

<b>Evaluation Type</b>	<b>Evaluation Weight</b>
Assignments/Quizzes/Attendance	20%
Tests	80%

**Date:**

December 13, 2023

**Addendum:**

Please refer to the course outline addendum on the Learning Management System for further information.

