



# National University

## Of Computer & Emerging Sciences

<b>Department</b>	Department of Computer Science	<b>Dept. Code</b>	CS
<b>Course Title</b>	Calculus and Analytical Geometry	<b>Course Code</b>	MT 1003
<b>Pre-requisite(s)</b>	None	<b>Credit Hrs.</b>	3

<b>Objective:</b>	The main objective of this course to enhance the knowledge acquire in college Mathematics, Familiarize the student with basic concepts of calculus and its applications in solving engineering problems.
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PLO	Program Learning Outcome (PLO) Statement	Level	Tools
01	Ability to apply knowledge of mathematics, science and engineering fundamentals and an engineering specialization to the solution of complex engineering problems.	E	Q, A, M, F

*I = Introduction, R = Reinforcement, E = Evaluation.*

*A = Assignment, Q = Quiz, M = Midterm, F=Final, L = Lab, P = Project, W = Written Report.*

CLO	Course Learning Outcome (CLO)	Domain	Taxonomy level	PLO	Tools
01	Define the ideas of derivatives and anti-derivatives (integrals) using the concept of limits & continuity and sigma	Cognitive	C1	PLO-1	M, F, A, Q
02	Translate the learning of vector calculus and analytical geometry in multiple dimensions	Cognitive	C1	PLO-1	F, A, Q
03	Apply derivatives and integrals for solving different problems arising in computer sciences.	Cognitive	C1	PLO-1	M, F, A, Q

<b>Text Book(s)</b>	<b>Title</b>	Calculus Early Transcendental 10 <sup>th</sup> Edition
	<b>Author</b>	Howard Anton, IRL Bivens, Stephen Davis
	<b>Publisher</b>	JOHN WILEY
<b>Ref. Book(s)</b>	<b>Title</b>	Calculus & Analytical Geometry 9 <sup>th</sup> Edition
	<b>Author</b>	George B. Thomas, Ross L. Finney
	<b>Publisher</b>	
	<b>Title</b>	Calculus Early Transcendental 8 <sup>th</sup> Edition
	<b>Author</b>	James Stewart
	<b>Publisher</b>	Thomson, 2008

Week	Contents/Topics	Exercises/Questions	CLO
1	Interval, Inequality, Relation and Functions vertical line test, Piecewise, Absolute value, Introduction to functions Domain and Range, One-One and onto function. Symmetry ,Even/odd function, Asymptote	Appendix <b>0.1</b> (1-04, 7-10, 27,28) <b>0.2</b> (27-34, 53-63, 66,67)	-
2	Concepts of limit. Evaluation of limits. Continuity and points of discontinuity. Types of discontinuity.	<b>1.1</b> (1-16) <b>1.2</b> (1-32) <b>1.5</b> (1-6,11-22, 29,30,35,36)	<b>01</b>
3	Secant line, Equation of Normal and tangent line, Slope, Rate of change. Concept and idea of differentiation. Geometrical meaning of derivatives. Rules and techniques of differentiation.	<b>2.1</b> (11-18), <b>2.2</b> (9-20,46-48), <b>2.3</b> (1-24, 41-47)	<b>01</b>
4	Product and quotient rule. Derivative of trigonometric and logarithm function, Chain rule	<b>2.4</b> (1-24) <b>2.5</b> (1-24) <b>2.6</b> (7-40) <b>3.1</b> (3-18,25-28)	<b>01</b>
5	Chain rule, Implicit differentiation. Local Linear approximation. Indeterminate forms, L' Hospital Rule	<b>3.5</b> (5-16,23-33, 39-46) <b>3.6</b> (7-45)	<b>01</b>
6	<b>Mid-Term I</b>		
7	Application of derivatives, Role's and Mean Value's Theorem.	<b>3.4</b> (10-20), <b>4.8</b> (1-8)	<b>03</b>
8	Concavity, Increasing and Decreasing. Relative Extreme (1 <sup>st</sup> and 2 <sup>nd</sup> derivative test) Absolute Maxima and Minima	<b>4.1</b> (15-30) <b>4.2</b> (7-12, 25-36)	<b>03</b>
9	Riemann sums and definite integral	<b>5.5</b> (13-24)	<b>01</b>
10	Area bounded by the curves. Volume by Disk and washer method	<b>6.1</b> (1-18), <b>6.2</b> (1-26)	<b>03</b>
11	<b>Mid-Term II</b>		
12	Techniques of integration, Basic Integration, Integration by parts Reduction formula, Trigonometric substitution	<b>7.1</b> (1-30), <b>7.2</b> (1-30, 61,62,63) <b>7.4</b> (1-25,37-48)	<b>01</b>
13	Integration of Rational function by Partial fraction, u= tan(x/2) substitution, Improper integrals.	<b>7.5</b> (9-30), <b>7.6</b> (65-70) <b>7.8</b> (3-32)	<b>01</b>
14	Parametric equations of lines in 3D, Plane in 3-space	<b>11.5</b> (3-10,15-22,29-34)	<b>02</b>
15	Distance Problems involving planes, Intersecting planes.	<b>11.6</b> (11-20, 41-48)	
16	<b>Final Exam</b>		

### **Marks Distribution:**

Sessional I	15
Sessional II	15
Assignment	10

Quiz	10
Final	50
Total	100