Course Number and Title:	CALCULUS AND ANALYTICAL GEOMETRY-NS-113			
Credit Hours:	3+0			
Pre Requisite	None			
Instructor (s):	Haleema Sadia			
Lab Engineer:	N/A			
Compulsory/Elective:	Compulsory			
If Elective: Depth Core/ Breadth Core:				
Course Schedule:	Lecture:	3 Hours/Week		
	Lab:	N/A		
	Office hours:	4 Hours/Week		
Course Assessment:	Assignments/ Course project:	3		
	Quizzes:	3		
	Lab work:	N/A		
	Exams:	Mid-Semester and Final		
Grading Policy:	Quizzes:	10%		
	Assignments/ Course project:	10%		
	Lab work:	00%		
	Mid-Semester:	20%		
	End-Semester:	60%		
Text Book:	Calculus and Analytic Geometry by George B. Thomas, Latest Edition.			
Reference Book(s):	Calculus with Analytical Geometry by S.M Yusuf, Latest Edition.			
Course Objective:	The objective of the course is to enable the students to understand the principles of calculus and its application in solving engineering problems.			
Course Learning Outcome	CLO Statement		PLO	Bloom
CLO-1:	To analyze problems, recognize appropriate methods of solution, solve the problems, explain and interpret the solutions.		PLO-1 PLO-2	C1 C2
CLO-2:	To determine the convergence or divergence of sequences and series. Geometrical and physical significance of Mathematical methods.		PLO-1 PLO-2	C3 C4
CLO-3:	Using derivatives to solve application problems involving rates of change and optimization and integration to solve application problems involving areas between curves, volumes by washers and cylindrical shells, arc length and areas of surfaces of revolution.		PLO-1 PLO-2 PLO-6	C5
Topics covered in the course and level of coverage:	❖ Functions and graphs			6 Hours
	❖ Limit and Continuity			6 Hours
	❖ Analysis of series with convergence and divergence			6 Hours
	❖ Indeterminate forms			3 Hours
	❖ Introduction with Geometrical and Physical significance of Derivatives			6 Hours
	❖ Applications of Differentiation			6 Hours
	❖ Introduction with Methods of integration			6 Hours

	❖ Applications of Integration	6 Hours
	❖ Introduction to vectors and applications	3 Hours

Program learning outcomes and how they are covered by specific course outcomes:	Detailed Contents	CLO	PLO
	❖ Mathematical and physical meaning of functions, graphs of various functions, Hyperbolic functions.	CLO-1	PLO-1
	❖ Theorems of limits and their applications to functions: Some Useful limits, right hand and left hand limits	CLO-1	PLO-2
	❖ continuous and discontinuous functions and their applications	CLO-1	PLO-1
	❖ Introduction to derivatives: Geometrical and physical meaning of derivatives, partial derivatives and their geometrical significance	CLO-2	PLO-2
	❖ Application problems (rate of change, marginal analysis) Leibnitz theorem, Rolle's theorem, Mean value theorem. Taylor's and Maclaurin's series	CLO-2	PLO-2
	❖ Indeterminate forms (0/0), (∞/∞)	CLO-1	PLO-1
	❖ Asymptotes, tangents and normals, curvature and radius of curvature.	CLO-3	PLO-6
	❖ Maxima and minima of a function for single-variable (applied problems) differentials with applications	CLO-3	PLO-2
	❖ Euler's theorem, total differentials.	CLO-2	PLO-1
	❖ Maxima and minima of two variables	CLO-3	PLO-6
	❖ Methods of integration by substitutions and by parts, integration of rational and irrational algebraic functions	CLO-1	PLO-2
	❖ Definite integrals including improper integrals	CLO-1	PLO-1
	❖ Gamma and Beta functions, reduction formulae	CLO-1	PLO-2
	❖ Cost function from marginal cost, rocket flights	CLO-3	PLO-6
	❖ Area under curve, , volumes by washers and cylindrical shells, arc length and areas of surfaces of revolution	CLO-3	PLO-6
	❖ Introduction to vectors, scalar and vector product of three and four vectors	CLO-2	PLO-2
	❖ Volume of parallelepiped and tetrahedron	CLO-2	PLO-2
	❖ Vector differentiation	CLO-1	PLO-1
	❖ Vector integration	CLO-1	PLO-2
	❖ Applications of Vector Differentiation and Integration	CLO-3	PLO-6
	❖ Operator, gradient, divergence and curl with their applications	CLO-3	PLO-6
//			

Mapping of CLOs with PLOs and Bloom's Taxonomy Cognitive Levels:

PLO	1	2	3	4	5	6	7	8	9	10	11	12
CLO-1	C1 C4					C1						
CLO-2		C1 C4 C6				C1 C4						
CLO-3		C1 C3				C3						

Mapping of CLOs with Assessment Methods:			
CLOs/Assessment	CLO-1	CLO-2	CLO-3
Assignments:	√	√	√
Quizzes:	√	√	√
Mid-Semester:	√	√	
End-Semester:	√	√	√

-