

Program: Certificate		Year: First	Semester: I
Class: UG			
Subject: Mathematics			
Course Code: MN-1A		Course Title: Calculus	
<p>Course Learning Outcomes: This course will enable the students to:</p> <p>a) Understand the concept of functions, limits, and continuity, and apply them to solve mathematical problems.</p> <p>b) Use differentiation rules, including the chain rule and mean value theorem, to differentiate real-valued functions and apply successive differentiation and Leibnitz's theorem to solve calculus problems.</p> <p>c) Develop skills in finding antiderivatives, computing definite integrals using Riemann sums and the fundamental theorem of calculus, and using various integration techniques to solve real-world problems.</p> <p>d) Gain proficiency in integrating various types of functions, analyzing curves, and calculating area and volume of surfaces of revolution using integration techniques.</p>			
Credit: 4 (Theory)		Compulsory	
Full Marks: 75		Time: 3 Hours	
Unit	Content		Hours
I	Functions and Limits: Definition of functions and their properties, Limits of functions and their properties, Continuity of functions.		12 h
II	Differential calculus: Differentiability of a real valued function, Geometrical interpretation of differentiability, Rules of differentiation, Chain rule of differentiation, Mean value theorem and its applications, Successive differentiation, Leibnitz's theorem.		18 h
III	Integration: Antiderivatives, Indefinite and definite integrals, Riemann sums and the definite integral, Fundamental theorem of calculus, Properties of definite integrals, Integration Techniques.		12 h
IV	Integral Calculus: Integration of rational and irrational functions, Reduction formula, Computing of definite integral, Curve tracing, Length of curve, Computing of double and triple integrals, Area and Volume of surface of revolution.		18 h
Sessional Internal Assessment (SIA) Full Marks – 25 Marks A – Internal written Examination – 20 Marks (1 Hr) B – Over All Performance including Regularity – 05 Marks			
<p>Books Recommended:</p> <ol style="list-style-type: none"> 1. R. K. Dwivedi (2019). Calculus, 1st Edition, Pragati Prakashan, Meerut, India. 2. Howard Anton, I. Bivens & Stephan Davis (2016). Calculus (10th edition). Wiley India. 3. Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag. 4. Wieslaw Krawcewicz & Bindhyachal Rai (2003). Calculus with Maple Labs. Narosa. 5. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd. 6. George B. Thomas Jr., Joel Hass, Christopher Heil & Maurice D. Weir (2018). Thomas' Calculus (14th edition). Pearson Education. 			