

**UNIVERSITY OF MADRAS**  
**B.Sc. DEGREE COURSE IN MATHEMATICS**  
**SYLLABUS WITH EFFECT FROM 2020-2021**

**BMA-CSC02**

**CORE-II: DIFFERENTIAL CALCULUS**  
**(Common to B.Sc. Maths with Computer Applications)**

**Inst.Hrs : 4**

**Credits : 4**

**YEAR: I**

**SEMESTER: I**

**Learning outcomes:**

**Students will acquire Knowledge about**

- The basics of differentiation and its applications.
- The notion of curvature, evolutes, involutes and polar co-ordinates.

**UNIT I**

Successive differentiation -  $n^{\text{th}}$  derivative- standard results – Trigonometrical transformation – formation of equations using derivatives - Leibnitz's theorem and its applications

Chapter 3 section 1.1 to 1.6, 2.1 and 2.2

**UNIT II**

Total differential of a function – special cases – implicit functions - partial derivatives of a function of two functions - Maxima and Minima of functions of two variables- Lagrange's method of undetermined multipliers.

Chapter 8 : Section 1.3 to 1.5 and 1.7, Section 4, 4.1 and 5.

**UNIT III**

Envelopes – method of finding envelopes – Curvature- circle, radius and centre of curvature- Cartesian formula for radius of curvature – coordinates of the centre of curvature – evolute-and involute - radius of curvature and centre of curvature in polar coordinates – p-r equation

Chapter 10 Section 1.1 to 1.4 and Section 2.1 to 2.7

**UNIT IV**

Polar coordinates - angle between the radius vector and the tangent – slope of the tangent in the polar coordinates – the angle of intersection of two curves in polar coordinates- polar sub tangent and polar sub normal – the length of arc in polar coordinates.

Chapter 9 Section 4.1 to 4.6

**UNIT V**

Definition-Asymptotes parallel to the axes – special cases – another method for finding asymptotes - asymptotes by inspection – intersection of a curve with an asymptote.

Chapter 11 - Section 1 to 7.

**Content and treatment as in**

“Calculus”, Volume - 1 by S. Narayanan and T.K. Manicavachagompillay - S.Viswanathan publishers – 2006

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**Reference:-**

1. Calculus , Dr. P.R. Vittal&Dr. V. Malini, Margham Publications, Chennai.
2. Calculus by Thomas and Fenny, Pearson Publication.
3. Calculus by Stewart
4. Calculus , Dr. P.R. Vittal&Dr. V. Malini, Margham Publications, Chennai.

**e-Resources:**

1. <http://www.themathpage.com/>
2. <http://mathworld.wolfram.com>
3. <http://www.univie.ac.at/future.media/moe/galerie.html>
4. <http://www.analyzemath.com/calculus>