

FACULTY OF COMPUTER APPLICATIONS
B. Sc. Data Science

- **Semester** : 1
- **Subject Code** : 05DS0103
- **Subject** : Calculus

Course Objectives : After learning the course the students should be able to -

- Learn different class of functions and understand their properties.
- Explain the concept of limit and continuity of functions.
- Apply idea of Derivatives of functions
- Discuss Anti-derivative of functions.
- Analyze different functions in calculus theory.

Prerequisites :

Definition of polynomials. Degree of polynomials. Types of polynomials. Factorization of polynomials.

Unit No	Topics Covered	No of lectures required
1	Functions : 1. Idea of a function 2. Graph of a function. 3. Algebraic and transcendental functions. 4. Polynomial functions. 5. Logarithmic functions. 6. Exponential functions. 7. Trigonometric functions. 8. Integer functions 9. Odd Even functions	14
2	Limit and Continuity of functions :	12

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	1. Intuitive idea of limit of a function. 2. Algebra of limits 3. Limit of a polynomials and rational functions. 4. Evaluation of limit of a function of a special form. 5. Continuity of a function at a point. 6. Continuity of a function over an interval.	
3	Derivatives of functions : 1. Idea of derivative as a limit. 2. Algebra of derivatives of functions. 3. Product rule for derivatives. 4. Quotient rule for derivatives. 5. Derivatives of various types of functions. 6. Chain rule for derivatives.	12
4	Anti-derivative of functions : 1. Introduction to anti-derivatives. 2. Standard Integral rules for various functions. 3. Integration by parts. 4. Chain rule for Integration.	12
	Total Hours	50

Course Outcomes :

After completion of this course, student will be able to

1. Visualize a variety of class of functions and understand their properties.
2. Conceptualize the idea of limit of a function.
3. Analyze the continuity property of functions.
4. Understand and apply the idea of differentiation of functions.
5. Understand and apply the concept of integration of functions.

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Course Outcomes - Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9
CO1	M			L	M				
CO2	M			L	L				
CO3	M			L	L				
CO4	H			H	H		M		M
CO5	H			M	H		M		M

Text Book :

1. **Differential Calculus, Pratiksha saxena, McGraw Hill Education India Private Limited.**
2. **Concepts of Functions and Calculus, Vikas Rahi, Tata McGraw Hill Education Private Limited.**

Reference Books :

1. **Differential and Integral Calculus, N. Piskunov, CL Media Private Limited.**
2. **Maurice D. Weir, Joel R. Hass and Frank R. Giordano, Thomas' Calculus, Pearson Education.**
3. **Shanti Narayan and P K Mittal, Differential Calculus, Reprint. New Delhi: S. Chand and Co. Pvt. Ltd.**
4. **Shanti Narayan and P K Mittal, Integral Calculus, Reprint. New Delhi: S. Chand and Co. Pvt. Ltd.**

Web References :

1. **URL 1 : <https://www.khanacademy.org/math/calculus-1>**
2. **URL 2 : <https://byjus.com/maths/calculus/>**
3. **URL 3 : <https://www.cuemath.com/calculus/>**

App References :

1. **APP 1 : <https://play.google.com/store/apps/details?id=io.ocado.calculus>**
2. **APP 2 : <https://play.google.com/store/apps/details?id=com.andromo.dev658544.app955261>**
3. **APP 3 : <https://play.google.com/store/apps/details?id=com.pustakadewi.calculus>**

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Syllabus Coverage from text /reference book & web/app reference:

Unit No.	Chapter Numbers
1	Textbook 1 : Chapter 1 - 1.6, 1.7, 1.8 (4, 7, 8, 9, 10, 12, 13, 15) Textbook 2 : Chapter 1(2) - 2.1.1, 2.1.2, 2.2, 2.2.1, 2.3.1, 2.3.2
2	Textbook 1 : Chapter 2 - 2.1, 2.2, 2.4, 2.5, 2.7, 2.8, 2.11, 2.12, 2.13 Textbook 2 : Chapter 1(3) - 3.1, 3.2, 3.3, 3.5
3	Textbook 1 : Chapter 2 - 2.18, 2.19, 2.21, 2.5, 2.7, 2.8, 2.11, 2.12, 2.13 Textbook 2 : Chapter 1(4) - 4.1, 4.4, 3.3, 3.5 Textbook 2 : Chapter 1(5) - 5.1, 5.2
4	Textbook 2 : Chapter 2(1) - 1.1, 1.2, 1.4, 1.5 Textbook 2 : Chapter 2(4) - 4.1, 1.2, 1.4, 1.5 Reference Book 1 : Chapter 10 – 10.1, 10.2, 10.3, 10.6