

INSTITUTE	FACULTY OF SCIENCE
PROGRAM	BACHELOR OF SCIENCE (CHEMISTRY)
SEMESTER	1
COURSE TITLE	BASIC CALCULUS
COURSE CODE	02MA0132
COURSE CREDITS	4

Objective:

- 1 This course is designed to develop the understanding of limit, continuity, differentiability and integrability of various functions.
- 2 This course is designed to develop the understanding of limit, continuity, differentiability and integrability of various functions

Course Outcomes: After completion of this course, student will be able to:

- 1 Solve problems related to polynomials.
- 2 Evaluate limits and continuity of various functions.
- 3 Use various differentiation techniques to solve differential calculus problems.
- 4 Compute the integrals of algebraic as well as transcendental functions.
- 5 Implement the concepts of polynomials, limits, differentiation and integration for solving problems of science.

Pre-requisite of course:NA

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	Polynomial Polynomial with single variable, Degree of a polynomial, Classification of polynomials based on degree, Classification of polynomials based on no. of terms, Remainder theorem, Factor theorem, Factorization of polynomials, Roots of Quadratic and Cubic equations.	15
2	Limit and continuity: Limit of a single variable function, Standard limit formulae, Existence of limit, Continuity of a function, Conditions for continuity at a given point.	15

Contents : Unit	Topics	Contact Hours
3	Differentiation: Limit definition of differentiation, Standard differentiation formulae, Differentiation of a function at a given point, Chain rule, Multiplication rule for differentiation, Division rule for differentiation.	15
4	Integration: Definite integral of functions of single variable, Standard integration formulae, Integration by parts, Integration using partial fraction.	15
Total Hours		60

Textbook :

- 1 A TextBook of Higher Mathematics: Learning Calculus, Integration and Differentiation in A Simple Way, S.P Thompson , Kindle Edition, 2017
- 2 A Textbook of Integral Calculus, U.P. Singh, Wisdom Press, 2011

References:

- 1 Polynomials (Problem Books in Mathematics) , Polynomials (Problem Books in Mathematics) , Edward J Barbeau, Springer-Verlag New York Inc., 2003
- 2 Polynomials: Theory and Applications, Polynomials: Theory and Applications, Cheon Seoung Ryoo, Mdpi AG, 2020
- 3 Differential Calculus For Beginners, Differential Calculus For Beginners, Joseph Edwards , Arihant Publication, 2023
- 4 A Detailed Study on Limits and Continuity, A Detailed Study on Limits and Continuity, K.Sambaiah, White Falcon Publishing, 2021
- 5 Calculus 1 - Differentiation and Integration: Over 1,900 Solved Problems, Calculus 1 - Differentiation and Integration: Over 1,900 Solved Problems, Dan Hamilton , Hamilton Education Guides, 2018

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember / Knowledge	Understand	Apply	Analyze	Evaluate	Higher order Thinking / Creative
20.00	30.00	25.00	15.00	10.00	0.00

Instructional Method:

- 1 The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by black board, may also use any of tools such as demonstration, role play, Quiz, brainstorming, MOOCs etc.

Instructional Method:

- 2 The internal evaluation will be done on the basis of continuous evaluation of students in the laboratory and class-room.
- 3 Students will use supplementary resources such as online videos, NPTEL videos, e-courses, Virtual Laboratory.

Supplementary Resources:

- 1 <https://www.coursera.org/learn/multivariate-calculus-machine-learning>
- 2 <https://www.coursera.org/learn/introduction-to-calculus>
- 3 <https://archive.nptel.ac.in/courses/111/106/111106146/>
- 4 <https://ocw.mit.edu/ans7870/resources/Strang/Edited/Calculus/Calculus.pdf>