

FOUR YEAR UNDER GRADUATE PROGRAM(2024-28)
DEPARTMENT OF MATHEMATICS
COURSE CURRICULUM

Part A: Introduction

Program: Bachelor in Science (Diploma/Degree/Honors)		Semester - III	Session:2024-2025
1	Course Code	MASE-01	
2	Course Title	Advanced Calculus	
3	Course Type	Discipline Specific Elective (DSE)	
4	Pre-requisite (if any)	Basic idea of elementary differential and integral calculus	
5	Course Learning Outcome (CLO)	<p>This Course will enable the students to:</p> <ul style="list-style-type: none"> ➤ Calculate the limit and examine the continuity and understand the concepts of limit, continuity and differentiability of functions of more than one variable with geometrical interpretation. ➤ To Understand the concepts of mean value theorems with their applications . ➤ To understand the concept of maxima and minima for functions of two and three variables with their uses and techniques ➤ Understand conceptual variations while advancing from one variable to several variables in calculus. ➤ Understand the concept of integration of functions of two and three variables and their evaluation technique with emphasis on beta and gamma functions . 	
6	Credit Value	4 C	1Credit = 15 hours- Learning and observation
7	Total Marks	Maximum Marks : 100	Minimum Passing Marks:40

Part B: Content of the Course

Total no of teaching – learning period =60 Periods (60 Hours)

UNIT	Topics	No of Periods
I	Limit and continuity of function of two and three variables. Mean value theorems of function of two variables- First mean value theorem and taylor's theorem. Partial Differentiation and Euler's theorem on homogeneous functions, Change of variables.	15
II	Partial Derivation and differentiability of function of two variables. Schwartz's theorem, Young's theorem, Implicit function theorem. Fourier series, Fourier expansion of piece wise monotonic function.	15
III	Jacobians , Maxima, Minima and saddle points of function of two variables. Lagrange's multipliers method. Envelopes, Evolutes	15
IV	Beta and Gamma function. Double and triple integrals .Dirichelet's integrals. Change of order of integration.	15



 Dr. S. Dashpaul
 Dr. Omkar Lal Shrivastava
 Dr. P. K. Sahu
 Dr. C. S. Rao
 Dr. D. K. Patel
 Dr. S. K. Sahoo

Part C - Learning Resource

Text Books, Reference Books, Other Resources

Text Books Recommended-

1. Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd.
 2. Mathematical Analysis, S.C. malik and S. Arora, New age international,Delhi
 3. Howard Anton, I. Bivens & Stephan Davis (2016). Calculus (10th edition).Wiley India.
 4. Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag.
 5. Wieslaw Krawcewicz & Bindhyachal Rai (2003). Calculus with Maple Labs.
 6. Principles of Mathematical analysis, W.Rudin,McGraw Hill Publication
 7. Jerrold Marsden, Anthony J. Tromba & Alan Weinstein (2009). Basic
 8. James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage.

E-resources: <https://onlinecourses.nptel.ac.in>

<https://epap.inflibnet.ac.in>

<https://swayam.gov.in> <https://www.mooc.org>

Part D: Assessment and Evaluation

Suggested Continuous Evaluation Methods:

**Suggested Continuous
Maximum Marks:**

100 M_{\odot} yr^{-1}

Continuous Internal Assessment (CIA):

100 Marks

Continuous Internal Assessment (CIA) & End Semester Examination (ESE)

30 Marks

End Semester Examination (ESE):		70 Marks
Continuous Internal Assessment (CIA) (Conducted by course teacher)	Test /Quiz – 20+20 Marks Assignment/Seminar- 10 Marks	Better marks out of two test/quiz + obtained marks in Assignment shall be considered against 30 marks
End Semester Examination (ESE)	Two Section-A&B Section-A: Q1.Objective- $10 \times 1 = 10$ marks Q2. Short answer type question- $5 \times 4 = 20$ marks Section-B: Descriptive answer type question, 1 out of 2 from each unit- $10 \times 4 = 40$ Marks	

Name and signature of convener & members of CBOS-

Prints and signature of convener & members of CBOS-

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Dr. P. K. Sahu Abdul Abdul Abdul Abdul
Abdul Abdul Abdul Abdul Abdul