

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

<b>Part A: Introduction</b>			
<b>Program: Bachelor in Science (Diploma/Degree/Honors)</b>		<b>Semester - III</b>	<b>Session:2024-2025</b>
1	Course Code	<b>MASE-01</b>	
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><b>This Course will enable the students to:</b></p> <ul style="list-style-type: none"> <li>➤ 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.</li> <li>➤ To Understand the concepts of mean value theorems with their applications .</li> <li>➤ To understand the concept of maxima and minima for functions of two and three variables with their uses and techniques</li> <li>➤ Understand conceptual variations while advancing from one variable to several variables in calculus.</li> <li>➤ Understand the concept of integration of functions of two and three variables and their evaluation technique with emphasis on beta and gamma functions .</li> </ul>	
6	Credit Value	<b>4 C</b>	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
<b>I</b>	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.	<b>15</b>
<b>II</b>	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.	<b>15</b>
<b>III</b>	Jacobians , Maxima, Minima and saddle points of function of two variables. Lagrange's multipliers method. Envelopes, Evolutes	<b>15</b>
<b>IV</b>	Beta and Gamma function. Double and triple integrals .Dirichelet's integrals. Change of order of integration.	<b>15</b>

*(Dr. S. Dashputra)*

*Dr. Ankan Lal Sanyal*

*M. H. Khan*

*(Dr. P. K. Sahu)*

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**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://epqp.inflibnet.aci.in>  
<https://swayam.gov.in> <https://www.mooc.org>

**Part D: Assessment and Evaluation**


**Suggested Continuous Evaluation Methods:**

**Maximum Marks: 100 Marks**  
**Continuous Internal Assessment (CIA): 30 Marks**  
**End Semester Examination (ESE): 70 Marks**

<b>Continuous Internal Assessment (CIA)</b> (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
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<b>End Semester Examination (ESE)</b>	<b>Two Section-A&amp;B</b> Section-A: Q1.Objective- 10x1=10 marks Q2. Short answer type question-5x4=20marks Section-B: Descriptive answer type question, 1 out of 2 from each unit- 10x4= 40 Marks
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**Name and signature of convener & members of CBOS-**


  
 Dr. S. Dashpalle  
 Dr. P. K. Sahu  
 Dr. Omikanth Shivasth  
 [Other handwritten signatures]