

**Part A: Introduction**

Program: Diploma Course		Class: B.Sc. Sem. III	Year: 2023	Session: 2023-2024
1	Course Code	MSE-1		
2	Course Title	Advanced Calculus		
3	Course Type	Theory		
4	Course Learning Outcome (CLO)	<p>This Course will enable the students to:</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>		
5	Credit Value	Theory & Tutorial: 4		
6	Total Marks	Maximum Marks : 100 (Ext. 80 + Int. 20)		Minimum Passing Marks: 40

**Part B: Content of the Course**

Module	Topics	No. of Hours
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. Dirichlet's integrals. Change of order of integration.	15

Handwritten signatures and initials are present at the bottom of the page, including:

- Initials: "u.k.h."
- Signature: "Sha"
- Signature: "Dany"
- Signature: "A"
- Signature: "S.A."
- Signature: "D"
- Signature: "D.D."
- Signature: "S.S.B."

**Part C - Learning Resource****Text Books, Reference Books, Other Resources**

- Howard Anton, I. Bivens & Stephan Davis (2016). Calculus (10th edition). Wiley India.
  - Gabriel Klambauer (1986). Aspects of Calculus. Springer-Verlag.
  - Wieslaw Krawcewicz & Bindhyachal Rai (2003). Calculus with Maple Labs. Narosa.
  - Gorakh Prasad (2016). Differential Calculus (19th edition). Pothishala Pvt. Ltd.
  - Principles of Mathematical analysis, W. Rudin, McGraw-Hill Publication.
  - Jerrold Marsden, Anthony J. Tromba & Alan Weinstein (2009). Basic Multivariable Calculus, Springer India Pvt. Limited.
  - James Stewart (2012). Multivariable Calculus (7th edition). Brooks/Cole. Cengage.
  - Mathematical Analysis, S.C. malik and S. Arora, New age international, Delhi
- Suggested Equivalent **online courses**: Web link NPTEL/ SWAYAM/ MOOCs

**Part D: Assessment and Evaluation****Suggested Continuous Evaluation Methods:**

<b>Maximum Marks:</b>	<b>100 Marks</b>
<b>Continuous Comprehensive Evaluation (CCE):</b>	<b>20 Marks</b>
<b>Semester End Exam (SEE):</b>	<b>80 Marks</b>

<b>Internal Assessment:</b> Continuous Comprehensive Evaluation(CCE)	Internal Test -02 of 10 Marks each Assignment/Seminar-01 Of 10 Marks	Sum of best of two test and assignment marks
<b>Semester End Exam (SEE)</b>	Paper- <b>Two Section-A&amp;B</b> Section-A: Objective and short answer type question-1x10+3x10= 40 Marks Section-B: Descriptive answer type question Module wise- 10x4 =40 Marks	
Amendment or Modification shall may be made by course coordinator as per situation or directed by the department/Examination cell/NEP-20 Scheme coordinator		

Name and signature of convener & member of BOS:

urk  
 (Dr. U.K. Shrivastava)

[Signatures of BOS members]

[Signature of Convener]