ARSD College, University of Delhi

Model Course Handout/Lesson Plan

Course Name : Generic Elective 1						
Semester	**Course Code**	**Course Title**	**Lecture (L)**	**Tutorial (T)**	**Practical (P)**	**Credit (C)**
1st		calculus	5			6
Teacher/Instructor(s)		MONU KUMAR				
Session		2021				

Course Objectives: The main aim of this course is to learn about applications of derivatives for sketching of curves and conics and applications of definite integrals for calculating volumes of solids of revolution, length of plane curves and surface areas of revolution. Various notions related to vector-valued functions and functions of several variables are discussed in this course.

Course Learning Outcomes: This course will enable the students to:

i) Sketch the curves in Cartesian and polar coordinates as well as learn techniques of sketching the conics.

ii) Visualize three dimensional figures and calculate their volumes and surface areas.

Understand limits, continuity and derivatives of functions of several variable and vector-valued functions

Lesson Plan:

Unit No.	Learning Objective	Lecture No.	Topics to be covered
.1		1-2	The first derivative test
		3-5	Concavity and inflection points
		6-11	Second derivative test, Curve sketching using first and second derivative test.
		12-15	Limits at infinity, Horizontal asymptotes, Vertical asymptotes
		16-20	Graphs with asymptotes; L'Hôpital's rule.
2		21-23	Volumes by slicing,
		24-26	Volumes of solids of revolution by the disk method,
		27-28	Volumes of solids of revolution by the washer method
		29-30	Volume by cylindrical shells..
		31-32	Length of plane curves,
		33-34	Arc length of parametric curves,
		35-40	Area of surface of revolution.
3		41-45	Techniques of sketching conics, Reflection properties of conics.
		46-48	Polar coordinates, Graphing in polar coordinates.
		49-55	Vector-valued functions**:** Limit, continuity, Derivatives, Integrals, Arc length, Unit tangent vector, Curvature, Unit normal vector.
		56-60	Functions of several variables**:** Graphs, Level curves, Limits and continuity, Partial derivatives and differentiability
		61-65	Functions of several variables**:** The chain rule, Directional derivatives and gradient vectors.
		66-70	Functions of several variables**:** Tangent plane and normal line, Extreme values and saddle points.

Evaluation Scheme:

No.	Component	Duration	Marks
1.	Internal Assessment		25
	● Quiz		
	● Class Test		
	● Attendance		
	● Assignment		
2.	End Semester Examination	3 hr	75

Details of the Course		
Unit	**Contents**	**Contact Hours**
1	The first derivative test, Concavity and inflection points, Second derivative test, Curve sketching using first and second derivative test; Limits at infinity, Horizontal asymptotes, Vertical asymptotes, Graphs with asymptotes; L'Hôpital's rule. .	20
2	Volumes by slicing, Volumes of solids of revolution by the disk method, Volumes of solids of revolution by the washer method, Volume by cylindrical shells, Length of plane curves, Arc length of parametric curve, Area of surface of revolution.	20
3	Techniques of sketching conics, Reflection properties of conics; Polar coordinates, graphing in polar coordinates; Vector-valued functions**:** Limits, Continuity, Derivatives, Integrals, Arc length, Unit tangent vector, Curvature, Unit normal vector; Functions of several variables**:** Graphs and level curves, Limits and continuity, Partial derivatives and differentiability, The chain rule, Directional derivatives and gradient vectors, Tangent plane and normal line, Extreme values and saddle points.	30
	Total	**70**

Suggested Books:

Sl. No.	**Name of Authors/Books/Publishers**	**Year of Publication/Reprint**
1-	Anton, Howard, Bivens, Irl, & Davis, Stephen *Calculus* (10th ed.). John Wiley &Sons Singapore Pvt. Ltd. Reprint by Wiley India Pvt. Ltd. Delhi.	2013, 2016
2-	Strauss, M. J., Bradley, G. L., & Smith, K. J*Calculus* (3rd ed.). DorlingKindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Sixth impression Pearson.India.	2007, 2011

3-	Thomas, Jr. George B., Weir, Maurice D., & Hass, Joel (2014). *Thomas*' *Calculus* (13thed.). Pearson Education, Delhi. Indian Reprint	2017.
4-		
Mode of Evaluation:	Internal Assessment / End Semester Exam	