



ARSD College, University of Delhi

Lesson Plan

Course Name : B.Sc. Physical Science (APS IC)						
Semester	Course Code	Course Title	Lecture (L)	Tutorial (T)	Practical (P)	Credit (C)
VI		Calculus and Geometry	3			
Teacher/Instructor(s)		MONU KUMAR				
Session		2021				

Course Objective:

The objectives of this course are to consider applications of derivatives for sketching of curves and conics and application of definite integrals for calculating volumes of solids of revolution, length of plane curves and surface areas of revolution which are helpful in understanding their applications in plenary motion, design of telescope and to many real-world problems.

Course Learning Outcomes:

This course will enable the students to: Sketch curves in a plane using its mathematical properties in the different coordinate systems of reference. Compute area of surfaces of revolution and the volume of solids by integrating over cross-sectional areas.

Lesson Plan:

Unit No.	Learning Objective	Lecture No.	Topics to be covered
1.	Derivatives for Graphing and Applications	1-3	The first derivative test for relative extrema
		4-5	Concavity and inflection points, Second derivative test for relative extrema
		6-7	Curve sketching using first and second derivative Tests
		8-10	Limits to infinity and infinite limits
		11-12	Graphs with asymptotes
		13-14	L'Hôpital's rule
		15-19	Parametric representation of curves and tracing of parametric curves (except lines in \mathbb{R}^3)

		20-25	Polar coordinates and tracing of curves in polar Coordinates
2.	Volume and Area of Surfaces	26-28	Volumes by slicing disks and method of washers
		28-30	Volumes by cylindrical shells
		31-33	Arc length, Arc length of parametric curves
		34-38	Area of surface of revolution
		39-42	Reduction formulae

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 for relative extrema, Concavity and inflection points, Second derivative test for relative extrema, Curve sketching using first and second derivative tests, Limits to infinity and infinite limits, Graphs with asymptotes, L'Hôpital's rule; Parametric representation of curves and tracing of parametric curves (except lines in \mathbb{R}^3), Polar coordinates and tracing of curves in polar coordinates.	25
2	Volumes by slicing disks and method of washers, Volumes by cylindrical shells, Arc length, Arc length of parametric curves, Area of surface of revolution; Reduction formulae.	17

		Total
		42
Suggested Books:		
Sl. No.	Name of Authors/Books/Publishers	Year of Publication/Reprint
1	Anton, Howard, Bivens, Irl, & Davis, Stephen (2013). <i>Calculus</i> (10th ed.). John Wiley & Sons Singapore Pvt. Ltd. Reprint (2016) by Wiley India Pvt. Ltd. Delhi.	2016
2	Strauss, M. J., Bradley, G. L., & Smith, K. J. (2007). <i>Calculus</i> (3rd ed.). DorlingKindersley (India) Pvt. Ltd. (Pearson Education). Delhi. Sixth impression 2011	2011
3	Thomas, Jr. George B., Weir, Maurice D., & Hass, Joel (2014). <i>Thomas' Calculus</i> (13th ed.). Pearson Education, Delhi. Indian Reprint 2017.	2017
Mode of Evaluation:		Internal Assessment / End Semester Exam