

Teaching Plan
Department of Mathematics
Session: 2023-24(Jul-Dec)
Name of the Teacher: Dr. Abhijit Mukherjee
BA. 5th Semester(Hons: Mathematics)
Allotted Paper: C 5.1 (Multivariate Calculus)

Objective: After going through this course the students will be able to:

- 1) Extend the concepts from one variable calculus to function of several variables
- 2) Demonstrate the ability to think critically and solving application of real world problems involving double/triple integrals

Paper/Unit	Detailed Teaching Plan	Teaching Hours Required
Unit-I	1. Functions of several variables, limit and continuity of functions of two variables.	3
	2. Partial differentiation, total differentiability and differentiability.	3
	3. Sufficient condition for differentiability. Chain rule for one and two independent parameters.	4
	4. Directional derivatives, the gradient, maximal and normal property of the gradient.	5
	5. Tangent planes, Extrema of functions of two variables.	4
	6. Method of Lagrange multipliers, constrained optimization problems.	4
	7. Definition of vector field, divergence and curl.	5
	8. Tutorial.	2
Unit-II	1. Double integration over rectangular region, double integration over non-rectangular region.	4
	2. Double integrals in polar co-ordinates.	3
	3. Triple integrals, Triple integral over a parallelepiped and solid regions.	4
	4. Volume by triple integrals .	3
	5. Cylindrical and spherical co-ordinates.	4
	6. Tutorial	2
Unit-III	1. Change of variables in double integrals and triple integrals.	6
	2. Line integrals, Applications of line integrals: Mass and work.	6
	3. Fundamental theorem for line integrals.	3
	4. Conservative vector fields, independence of path.	3
	5. Tutorial	2
Unit-IV	1. Green's theorem.	5
	2. Surface integrals, integrals over parametrically defined surfaces.	4
	3. Stoke's theorem.	5
	4. Divergence Theorem	4
	5. Tutorial	2

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Department of Mathematics
Session: 2023-24(Jul-Dec)
Name of the Teacher: Dr. Abhijit Mukherjee
BA. 5th Semester(Hons: Mathematics)
Allotted Paper: DSE 1.1 (Analytical Geometry)

Objective: After going through this course the students will be able to:

- 1) Sketch Parabola, Ellipse and Hyperbola
- 2) Solve various geometric problems analytically

Paper/Unit	Detailed Teaching Plan	Teaching Hours Required
Unit-I	1. Technique for sketching Parabola, Ellipse and Hyperbola	14
	2. Reflection properties of Parabola, Ellipse and Hyperbola	14
	3. Classification of Quadratic Equations representing Line, Parabola, Ellipse and Hyperbola.	14
	4. Tutorial	3
Unit-II	1. Theory and problems on Spheres	14
	2. Theory and problems on Cylindrical Surfaces	14
	3. Illustrations of graphing standard quadric surfaces	14
	4. Tutorial	3

Teaching Plan
Department of Mathematics
Session: 2023-24(Jul-Dec)
Name of the Teacher: Dr. Abhijit Mukherjee
BA. 1st Semester(Hons: Mathematics)
Allotted Paper: MTHC1 (Calculus and Classical Algebra)

Objective: After going through this course the students will be able to:

- 1) Learn the techniques of successive differentiation, Leibnitz theorem and L' Hospital rule for evaluation of limit.
- 2) Explain various types of reduction formula for integration of trigonometric function and application in finding the volume and surface area of revolution of curve.

Paper/Unit	Detailed Teaching Plan	Teaching Hours Required
Unit-II	1. Successive differentiation	3
	2. Leibnitz theorem and its application	3
	3. L' Hospital Rule	2
	4. Application of Maxima and Minima	3
	5. Tutorial	1
Unit-III	1. Reduction formulae of different types of integrals	4
	2. Rectification	3
	3. Volume and Surface area of revolution of a curve	3
	4. Tutorial	2

