

MATH – 301: Calculus- III

(Required)

Course Description: MATH – 301 : CALCULUS-III LT: 2 LB: 1 CR : 2

This course is designed to cover topics of advanced calculus. It includes vectors and surfaces, parametric equations, polar coordinates, infinite series, partial differentiation of functions of several variables, and multiple integrals. Application problems will be solved during problem solving sessions (one extra hour per week).

Prerequisite: MATH – 102 : CALCULUS-II

Textbook: Calculus 6th edition, by Swokowski, Olinick, and Pence, PWS publishing company, Boston, 1994, ISBN: 0-534-93624-5

References: Calculus, Early Transcendentals 8th edition by Anton, Bivens, and Davis, Wiley, (2005), ISBN: 978-0-471-48238-3

Course Learning Objectives:

To enable the students to:

1. Define vectors and do operations on vectors in the three dimensional space.
2. Use vector concepts to describe lines and planes in three dimensions.
3. Describe three dimensional surfaces.
4. Define parametric equations of curves and find the slope of their tangent lines.
5. Determine arc length and area of surface of revolution for curves in parametric form.
6. Define polar coordinates and find area enclosed by graphs of polar equations.
7. Define infinite series and check their convergence and divergence.
8. Represent a given function as power series, Taylor series, and Maclaurin series.
9. Apply the concepts of partial differentiation to functions of two and three variables.
10. Determine gradient and extreme values of functions of several variables.
11. Determine equations of tangent planes and normal lines to surfaces in three-dimensional space.
12. Define double integrals, cylindrical and spherical coordinate systems.
13. Find areas in the plane and volumes in three-dimensional systems.
14. Evaluate triple integrals for functions of three variables over a given region

Course Outline:**[I] Modules:**

Module	Topic	Duration (weeks)
1.	Vectors and Surfaces	1-3
2.	Parametric Equations and Polar Coordinates	4-6
3.	Infinite Series	7-8
4.	Partial Differentiation	9-11
5.	Multiple Integrals	12-14

Evaluation Methods:

1. Major exams and a final exam.
2. Assignments, quizzes, homework
- 3.

Course Learning Outcomes:

The expected learning outcome is that the students will be able to:

1. Define vectors in the three-dimensional space.
2. Use definite integrals to find area enclosed by graphs of polar equations.
3. Represent functions as a power series.
4. Use the gradient of a function to find the tangent planes and normal lines in three-dimensional space.
5. Evaluate triple integrals for functions of three variables over a given region.

Prepared by:

GS curriculum committee Feb . 2009

