



Mathematics (MAT 102) Calculus II

Instructor	
Credits:	4 hours
Prerequisite:	Math 101
E-Mail:	
Office:	Department of Mathematics, College of Sciences,

Textbook: Calculus, R. T. Smith & R. B. Minton, McGraw-Hill, 4th Edition

Overview:

- To give an overview of different techniques for computing integrals.
- To understand the meaning of definite integral as a limit of Riemann sum.
- To give several applications of integration.
- To develop the basics of the calculus of infinite series.
- To study some interesting types of series, as power series, MacLaurin series and Fourier series.
- To introduce polar coordinates and polar graphs including curves in the plane and in space, volumes, and lines.

Contents:

Chapter 1: Integration

- Antiderivatives and integrals. Integration by Substitution (**one week**)
- Integration by Parts. (**one week**)
- Trigonometric techniques of integration. Integration of Rational Functions (**one week**)
- Integrals involving logarithmic, exponential hyperbolic functions. Indeterminate forms and improper integrals. (**one week**)

Chapter 2: Series

- Sequences of real numbers and infinite series (**one week**)
- Remarkable infinite series (geometric series, positive-term series, alternating series, p-series, telescoping series). (**one week**)
- Convergence tests (ratio test, root test, comparison and limit comparison test, integral test). (**one week**)
- Taylor series, representation of function as infinite series, power series. (**one week**)
- Differentiation and integration of power series, Taylor and MacLaurin series, Taylor expansion of differentiable functions and analysis of Remainder. (**one week**)
- Binomial series. Periodic functions, Fourier series, convergence of Fourier series. (**one week**)

Chapter 3: Parametric equations

- Polar coordinates and conic sections: Plane curves and parametric equations, calculus and parametric equations, Arc Length and surface area in parametric equations (**one week**)
- Polar coordinates, calculus and polar coordinates, conic sections, study of conic sections in polar coordinates. (**one week**)

Chapter 4: Applications of definite integrals

- Area between two curves, Solid of revolutions, volumes by cross sections, volumes by cylindrical shells (**one week**)
- Arc length and surfaces of Revolution (**one week**)

Exams (common):

- **Midterm1:** Around 5th - 6th week
- **Midterm2:** Around 11th - 12th week
- **Final:** 16th week

Grading:

- Midterm1: **20%**
- Midterm2: **20%**
- Participation, home works & quizzes: **20%**
- Final Exam: **40%**