

Catalog Description: Indeterminate forms and improper integrals. Infinite sequences and series, convergence, power series. Taylor series and applications.

Course Objectives: After completing this course, students will be able to

1. Recognize and use sequences.
2. Recognize, classify, and determine the convergence of numerical series.
3. Recognize and determine the convergence of power series and Taylor series.
4. Determine the Fourier Series of a function.
5. Communicate mathematical ideas using correct and appropriate notation.

Learning Outcomes and Performance Criteria

1. Demonstrate an understanding of sequences.

Core Criteria:

- (a) Determine if an expression is a sequence.
- (b) Determine the closed form of a sequence and expand the closed form of a sequence.
- (c) Determine and justify if a sequence converges or diverges.
- (d) Determine the limit of a convergent sequence.
- (e) Determine if a sequence is bounded and find a bound.
- (f) Determine if a sequence is increasing, decreasing or neither.

Additional Criteria:

- (a) Evaluate a limit using L'Hopital's rule.

2. Demonstrate an understanding of numerical series.

Core Criteria:

Additional Criteria:

(a) Use the comparison test to determine if an improper integral converges.

3. Demonstrate an understanding of power series.

Core Criteria:

(a) Determine a Taylor polynomial and remainder term of a function.

(b) Determine error bounds for the remainder of a Taylor polynomial.

(c) Find the Taylor series of e^x ; $\sin(x)$; $\cos(x)$; $\ln(1 + x)$; and $\frac{1}{1 + x}$.

(d)