STEPHEN F. AUSTIN STATE UNIVERSITY

Department of Mathematics and Statistics

Math 234 – Calculus II
Course Syllabus

Course description: Applications and techniques of integration, improper integrals, infinite series and power series.

Credit hours: 4

Course Prerequisites and Corequisites: MTH 233

Course outline: Approximate time spent

- **Applications of the definite integral** 30%
  - Volumes of surfaces of revolution
  - Arc length
  - Surface area
  - One or more from the following applications:
    - Work
    - Fluid pressure and forces
    - Moments and centers of mass
- **Techniques of Integration** 30%
  - Basic integration techniques
  - Integration by parts
  - Integration by partial fractions
  - Trigonometric substitutions
  - Numerical integration
  - Improper integrals
- **Infinite Sequences and Series** 40%
  - Sequences
  - Infinite series
    - Geometric series
    - Harmonic series
    - General series
  - Integral test
  - Comparison tests
    - Direct comparison test
    - Limit comparison test
  - Ratio and root tests
  - Alternating series
    - Absolute convergence
    - Conditional convergence
  - Power series
  - Taylor and Maclaurin series

MATH 234 – Calculus II
Syllabus Continuation

Student Learning Outcomes (SLO): At the end of MTH 234, a student who has studied and learned the material should be able to:

1. Extend the definition of the definite integrals to applications, other than area under a curve, including volumes of surfaces of revolution, arc length, and surface area, as well as to examples from other academic fields which might include work, fluid forces, or moments and centers of mass. [PLO: 1, 3, 4, 5]
2. Demonstrate mastery of basic integration techniques. [PLO: 1, 2, 4]
3. Solve more complicated integrals by applying techniques including integration by parts, partial fractions, and trigonometric substitutions. [PLO: 1, 2, 4]
4. Recognize that the Fundamental Theorem of Calculus does not allow for the computation of all definite integrals and be able to apply approximation techniques as an alternative. [PLO: 1, 4]
5. Recognize an improper integral and apply limits to find a solution. [PLO: 1, 2, 4]
6. Define infinite sequences and series and determine convergence and divergence behavior by appropriately applying strategies such as the integral test, comparison tests, and ratio and root tests. [PLO: 1, 2, 4, 5]
7. Recognize alternating series and determine absolute and conditional convergence behavior. [PLO: 1, 2, 4]
8. Determine the radius and interval of convergence of a power series. [PLO: 1, 2, 4]
9. Develop Taylor/Maclaurin Series expansions for basic functions. [PLO: 1, 2, 4]

Program Learning Outcomes (PLO):

Students graduating from SFASU with a B.S. degree and a major in mathematics will:

1. Demonstrate comprehension of core mathematical concepts. [***Concepts***]
   (notion of theorem, mathematical proof, logical argument)
2. Execute mathematical procedures accurately, appropriately, and efficiently. [***Skills***]
   (calculus, algebra, routine, nonroutine, applied)
3. Apply principles of logic to develop and analyze conjectures and proofs. [***Logical Reasoning***]
   (quantifiers, breaking down mathematical statements, counterexamples)
4. Demonstrate competence in using various mathematical tools, including technology, to formulate, represent, and solve problems. [***Problem Solving***]
   (calculus tools, algebra tools, applied tools, nonstandard problem solving)
5. Demonstrate proficiency in communicating mathematics in a format appropriate to expected audiences. [***Communication***]
   (written, visual, oral)

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