



Math 439 – Introduction to Analysis I Course Syllabus

Course Description: Elements of point set theory and an in-depth study of the basic ideas of sequences, limits, continuity and differentiability.

Credit hours: 3

Course Prerequisites and Corequisites: MTH 311 and MTH 333

Course Purpose: To provide an in-depth understanding of the Calculus of one Real Variable and to hone the ability of the student to present sound mathematical proofs.

Course outline: Since various textbooks may be used for the same course, only general content guidelines are shown rather than specific textbook contents.

	<u>Approximate time spent</u>
• Preliminaries	20%
○ Sets and Functions of one variable	
○ Mathematical Induction and the Principle of Well-Ordering	
○ The Field of Real Numbers	
○ The Completeness Axiom	
• Sequences	30%
○ Definitions, limits and/or special properties	
• Limits	20%
○ Definitions, theorems and/or special properties	
• Derivative	15%
○ Definitions, theorems and/or special properties	
• Continuity	15%
○ Definitions, theorems and/or special properties	

Student Learning Outcomes (SLO): At the end of MTH 439, a student who has studied and learned the material should be able to:

1. A knowledge of the definitions and characteristics of sequences, limits, continuity, and derivative. [PLO: 1,2,5]
2. A knowledge of the critical theorems of Real Analysis dealing with derivatives. [PLO: 1,2]
3. The ability to do original mathematical proofs. [PLO: 1,3,4]
4. An understanding of the critical connections and differences between sequences and functions of a continuous variable. [PLO: 1,2]
5. The ability to use analytic knowledge to solve problems. [PLO: 3,5]
6. The ability to use the problem-solving process of experimentation, conjecture, and proof. [PLO: 3,1]
7. The ability to communicate mathematics to a heterogeneous audience in both oral and written form. [PLO: 4,5]
8. The ability to use available technology in the problem solving process. [PLO: 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)