STEPHEN F. AUSTIN STATE UNIVERSITY

Department of Mathematics and Statistics

Math 440 – Introduction to Analysis II
Course Syllabus

Catalog Description: A continuation of MTH 439 with topics in Taylor, Fourier, and other special series and an in-depth study of Riemann-Darboux Integration.

Credit hours: 3

Course Prerequisites and Coreqisites: MTH 439

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.

	Approximate time spent
• **Infinite series**	60%
○ Definitions, limits and/or special properties of series of constants and series of functions	
• **Integration**	40%
○ Definitions, properties and special uses to include improper integrals.	
○ A study of the Gamma function as a special improper integral	
○ A study of the Riemann-Stieltjes integral	

Student Learning Outcomes (SLO): At the end of MTH 440, a student who has studied and learned the material should be able to:

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