

Carthage Mathematics Department
Course Summary for Math 3120 Real Analysis

1. Credits: 4
2. Semesters Offered: Spring
3. Text(s): Notebook for Real Analysis by Snively
4. Topics Covered:
 - a. Methods of proof
 - b. Development of the real number system
 - c. Sequences, including monotone sequences and Cauchy sequences
 - d. Series
 - e. Limits of functions, continuous functions, uniform continuity
 - f. Derivatives
 - g. The Riemann integral, including the Fundamental Theorem of Calculus
 - h. The gauge integral, including the Fundamental Theorem of Calculus
5. Skills Enhanced:
 - a. Proof writing
 - b. Argumentation
 - c. Sentence structure, technical writing in general
6. Sample Syllabus: (we cover the entire set of notes)
 - a. Chapter 1: The Real Numbers
 - b. Chapter 2: Sequences
 - c. Chapter 3: Limits
 - d. Chapter 4: Continuous Functions
 - e. Chapter 5: Differentiation
 - f. Chapter 6: Integration
 - g. Chapter 7: Series
7. Miscellanea
 - a. This course is writing intensive.
8. Course Goals: By the end of the course, students should be able to do the following.
 - a. Write an epsilon-delta proof.
 - i. Assessment: written assessment, final exam. On the final exam, students are required to write multiple epsilon-delta proofs.
 - b. Write an epsilon over two argument.
 - i. Assessment: written assessment, final exam. On the final exam, students are required to write at least one epsilon over two argument.
 - c. Use acceptable conventions in mathematical proofs.
 - i. Assessment: written assessment, final exam. All writing in the course is evaluated on content, style and correctness.
 - d. Use theorems, showing in detail that the assumptions of the theorem are met.
 - i. Assessment: written assessment, final exam. On the final exam, students are required to use theorems and validate all assumptions.
 - e. Demonstrate sufficient knowledge of the course content.
 - i. Assessment: Three exams, daily homework assignments. Sufficient knowledge is required to obtain a passing grade. The knowledge must be demonstrated on homework and exams.