

# Real Analysis II (3)

(Effective Spring 2016)

**Prerequisite:** Math 481.

**Catalog Description:** Real Analysis I, II. Sets and countability. The real number systems. Sequences, limits, infinite series, metric spaces, continuous functions, uniform continuity, and convergence. Riemann and Lebesgue integration. Students are required to submit written work and make an oral presentation.

**Learning Outcomes for Major:** This course addresses one or more of the student learning outcomes for the major. Upon completion of his/her degree from the University of Tennessee at Martin with a major in mathematics, the graduate will be able to:

- i. apply mathematical concepts and principles to perform numerical and symbolic computations.
- ii. use technology appropriately to investigate and solve mathematical and statistical problems.
- iii. write clear and precise proofs.
- iv. communicate effectively in both written and oral form.
- v. demonstrate the ability to read and learn mathematics and/or statistics independently.

**Teaching Objectives:** The student will:

1. Discuss the concept of measure zero and give examples.
2. Define the Riemann integral (both definite and improper).
3. Prove the elementary properties of the Riemann integral.
4. Prove the Fundamental Theorem(s) of Calculus.
5. Determine whether a sequence of functions is pointwise convergent and if it is uniformly convergent.
6. State an example of a continuous nowhere-differentiable function.
7. Define measurable sets, measurable functions and the Lebesgue integral.
8. Prove and apply the elementary properties of the Lebesgue integral.

**Text(s):** Principle of Real Analysis [“Baby Rudin”] 3ed McGraw Hill. ISBN: 978-0070542358 hardback or 978-0070856134 paperback.

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