

Mathematics 481
Real Analysis I (3)
(Effective Fall 2017)

Prerequisite: Math 314 and Math 320. Must be taken in sequence.

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. Define the real numbers, least upper bounds, and the triangle inequality.
2. Define functions between sets; equivalent sets; finite, countable and uncountable sets.
3. Recognize convergent, divergent, bounded, Cauchy and monotone sequences.
4. Calculate the limit superior, limit inferior, and the limit of a sequence.
5. Recognize alternating, convergent, conditionally and absolutely convergent series.
6. Apply the ratio, root, limit and limit comparison tests.
7. Define metric and metric space.
8. Determine if subsets of a metric space are open, closed, connected, bounded, totally bounded and/or compact.
9. Determine if a function on a metric space is discontinuous, continuous, or uniformly continuous.

Text(s): Real Analysis for the Undergraduate, Matthew A. Pons, Springer. ISBN: 978-1-4614-9637-3 hardback or 978-1-4614-9638-0 eBook.

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