COURSE NUMBER/TITLE: MATH-451 [355-451] REAL ANALYSIS II

CREDITS: 3

COURSE DESCRIPTION: Continuation of MATH-450; differentiation, integration, infinite series.
Prerequisite: MATH-450 Real Analysis I

TEXTBOOK: Advanced Calculus, 3rd Ed., by Buck (adopted Fall 2014)
Introduction to Real Analysis, 2nd Ed., by Stoll (adopted Fall 2001)
Previous:
Advanced Calculus, 1st Ed., by Fitzpatrick (adopted S98)
Introduction to Real Analysis, 2nd Ed., by Bartle and Sherbert (Prior to S98)

COURSE OBJECTIVES:
1. To review elementary mathematics from an advanced standpoint.
2. To provide insight into the role of rigor in mathematics.
3. To build understanding of the foundations and concepts of analysis.
4. To strengthen powers of logic (reasoning).
5. To provide appreciation of and insight into the applications of analysis to statistics and numerical
analysis.
6. To test readiness for advanced (or graduate) study in mathematics.

COURSE OUTLINE:
1. Differentiation
   - Rolle's Theorem
   - Mean Value Theorem
   - Interchange of Limit and Derivative
   - Directional Derivative
   - Chain Rule
2. Integration
   - Riemann-Stieltjes Integral (Existence and Properties)
   - First Mean Value Theorem
   - Fundamental Theorem of Integral Calculus
   - Integration by Parts
   - Second Mean Value Theorem
3. Infinite Series
   - Convergence (Cauchy Criterion, Absolute, Rearrangement of Series)
   - Tests of Convergence (Comparison, Root, Ratio, Integral, Alternating Series)
4. Series of Functions
   - Absolute and Uniform Convergence
   - Continuity of the Limit
   - Tests for Uniform Convergence