Math 361- Real Analysis I
Department of Mathematics
Morehouse College
Fall 2007

College Catalog Description: The real numbers, completeness, and elementary topology of Euclidean Spaces; limits, convergence, sequences in R^n; continuity; differentiability and integrability in R.

Prerequisites: Math 255 and Math 263 with a grade of "C" or better

Required textbook: The Elements of Real Analysis, 2nd Ed., by Robert G. Bartle

Topical Outline (sections to be covered from Bartle)
6. Completeness Axiom; Suprema; Infima; Archimedean Property
7. Cells and Intervals; Nested Cells Property
8. Vector and Cartesian Spaces; Inner Product Spaces; Normed Spaces; Schwarz Inequality
9. Open and closed sets, neighborhoods
10. Nested Cells Thm. and Bolzano-Weierstrass Thm.; Cluster Points
11. Heine-Borel Thm.; Compactness; Cantor Intersection Theorem
14. Sequences; Convergence; Uniqueness of Limit; Examples
15. Subsequences
16. Monotone Convergence Thm. and Cauchy Sequences; Bolzano-Weierstrass Theorem; Cauchy Criterion
18. Limit Superior; Limit Inferior; Unbounded Sequences; Infinite Limits
20. Continuous functions; Discontinuity Criterion; Combinations of Continuous Functions
22. Theorems about continuous functions: Global Continuity Theorem; Preservation of Compactness; Max/Min Value Theorem; Continuity of Inverse Function
23. Uniform continuity
27. Derivative; The Mean Value Theorem; Rolle's Theorem
29. Riemann-Stieltjes integral; Cauchy Criterion for Integrability; Properties of the Integral
30. Existence of the integral; Riemann Criterion for Integrability; Integrability of Continuous Functions; Differentiation Theorem; Fundamental Theorem of Integral Calculus
31. More on the integral if time permits.