Salisbury University Department of Mathematical Sciences

MATH 451/551 : Analysis I
Syllabus (Tentative)

Description: Modern real analysis including topology of the real number system, sequences, continuity, differentiability and integration. 4 Hours Credit: Meets four hours per week.

Prerequisites: C or better in MATH 202, MATH 210.

Intended Audience: All majors in the mathematical sciences and any students who wish to pursue graduate study in Mathematics or its applications, physics or engineering.

Objective: To develop the foundations for the analysis of real valued functions. The primary focus will be on proof.

Textbooks: *Introduction to Real Analysis (4e)* by Bartle and Sherbert, ISBN 978-0-471-43331-6.

Topic	Weeks
Preliminaries (Ch.1)	1
Sets, Functions, Mathematical Induction, Finite and Infinite sets	
The Real Numbers (Ch.2)	3.5
Algebraic and Order properties of $\mathbb{R}$, Absolute Value and the Real Line, The Completeness Property of $\mathbb{R}$, Supremum, Intervals	
Sequences and Series (Ch.3)	3
Sequences and Their Limits, Limit Theorems, Monotone Sequences, Subsequences and the Bolzano-Weierstrass Theorem, The Cauchy Criterion, Properly Divergent Sequences	
Limits (Ch.4)	2
Limits of Functions, Limit Theorems, Extensions of the Limit Concept	
Continuous Functions (Ch. 5)	2.5
Continuous Functions, Combinations of Continuous Functions, Continuous Functions on Intervals, Uniform Continuity, Monotone and Inverse Functions	
Differentiation (Ch. 6)	2.5
The Derivative, The Mean Value Theorem, L'Hospital's Rules, Taylor's Theorem	
Tests	1
Total	**14**

Evaluation

Presentations/Participation	20%
Exams	60%
Final Exam	20%

- Graduate students will be assigned special homework/test problems or projects.

- Clear descriptions of thought processes, evidence of critical thinking, and effective communication must be demonstrated in written work.

- **Writing Across the Curriculum:** Students will be expected to communicate mathematics and mathematical ideas effectively in speech and writing. At the University Writing Center, trained consultants are ready to help you at any stage of the writing process. In addition to the important writing instruction that occurs in the classroom and during professors' office hours, the Center offers another site for learning about writing. **All students are encouraged to make use of these important services.**

- **NOTE:** Once a student has received credit, including transfer credit, for a course, credit may not be received for any course with material that is equivalent to it or is a prerequisite for it.