

Salisbury University Department of Mathematical Sciences

MATH 451/551 : Analysis I
Syllabus (Tentative)

Description: Modern abstract 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: *An Introduction to Analysis* 4nd Edition by William R. Wade 9780134707624

| Topic | Weeks |
|--|-----------|
| The Real Number System (Ch.1) | 3 |
| Sets, Functions, Algebraic and Order properties, The positive integers, Least Upper Bound Axiom/Completeness | |
| Sequences in \mathbf{R} (Ch. 2) | 3 |
| Limits of bounded, monotone, and Cauchy Sequences and of subsequences. Limit Theorems, Tending towards infinity . | |
| Continuity and limits of Functions (Ch. 3) | 3 |
| Limit theorems, One sided limits, Limits involving infinity, Definition and proofs of continuity, Intermediate and extreme values, Uniform Continuity. | |
| Differentiability on \mathbf{R} (Ch. 4) | 3 |
| The derivative, Rules for differentiation, The Mean Value Theorem, Taylor's Theorem, L'Hôpital's Rule, Inverse Function Theorems. | |
| Brief Introduction to Integration (Ch. 5.1, 5.2 and 5.3) | 1 |
| The Riemann Integral, some properties and the Fundamental Theorem of Calculus. | |
| Tests | 1 |
| Total | 14 |

Evaluation

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| Portfolio | 20% |
| Boardwork and Quizzes | 10 – 15% |
| Written Homework | 15 – 30% |
| Tests and Final | 40 – 50% |

- 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.