

ADVANCED CALCULUS I (MAA 4226/5306)

INSTRUCTOR: D. Oberlin

OFFICE: 321 Love

OFFICE HOURS: 10:00–11:00 Monday, Wednesday, Friday

TEXT: Principles of Mathematical Analysis (third edition), by Walter Rudin

COURSE OBJECTIVES: The dual purposes of this course are to provide a firm footing for the mathematics to which one is first exposed in elementary calculus and to introduce the student to the level of rigor expected in advanced courses in mathematics.

COURSE OUTLINE: This is the first semester of a two semester sequence. The sequence begins with a study of certain aspects of the real number system. The emphasis here is on the least upper bound property. Next is the idea of cardinality: finite, countable, and uncountable sets. This is followed by a treatment of elementary point set topology in the context of Euclidean spaces (connectedness, compactness, etc.). The study of calculus proper begins with an extensive and rigorous treatment of sequences and series. All of the familiar results, like the root, ratio, and comparison tests are treated along with certain more advanced items such as summation by parts and Riemann's theorem about rearrangements of conditionally convergent series. The next set of topics centers around continuous functions: the epsilon-delta definition, intermediate value theorem, and extreme value theorem. Following that comes a rigorous study of differentiation and integration, the fundamental processes of calculus, in the setting of functions of a single real variable. The course concludes with an introduction, in the context of sequences of functions, to the study of the interchange of limiting operations.

GRADING: Course grades will probably be based on scores on graded homework, a midterm, and a final examination.

ACADEMIC HONOR CODE: A copy of the University Academic Honor Code can be found in the current Student Handbook. You are bound by this in all of your academic work. It is based on the premise that each student has the responsibility 1) to uphold the highest standards of academic integrity in the student's own work, 2) to refuse to tolerate violations of academic integrity in the University community, and 3) to foster a high sense of integrity and social responsibility on the part of the University community. You have successfully completed many mathematics courses and know that on a "test" you may not give or receive any help from a person or written material except as specifically designed acceptable. Out of class you are encouraged to work together on assignments but plagiarizing of the work of others or study manuals is academically dishonest.

ADA STATEMENT: Students with disabilities needing academic accommodations should: 1) register with and provide documentation to the Student Disability Resource Center (SDRC); 2) bring a letter to the instructor from SDRC indicating you need academic accommodations. This should be done within the first week of class. This and other class materials are available in alternative format upon request.