

MATH 4200 – Introduction to Real Analysis

Summer 2007
Distance Delivery

Tuesday and Thursday, 7:15 to 10:00 p.m.

Instructor	Dr. David Brown
email	david.e.brown@usu.edu (I check email frequently even on weekends and evenings.)
Office Hours	by appointment
Text	<i>A Radical Approach to Real Analysis</i> (2nd ed.) by David Bressoud

Course Content

This course could be summarized as the study of the underpinnings of Calculus. These underpinnings were brought into question in the early 1800's, and underwent a revision so thorough that 'Calculus', after this revision, is sometimes called 'Analysis'.

At first the goal of this course will be to underscore the reasons for, and transfer some of the unease that mathematicians began to feel in the early 1800's. This will be done by exploring the concepts of the infinitely large and infinitely small – two notions that drive Calculus. Specifically, we will study cardinality and some of the nonintuitive behaviors of infinite sets (like the fact that $(0, 1)$ and \mathbb{R} have the same cardinality), and we will explore the effects of the idea that the set of real numbers is a line in contrast with practical attempts to derive decimal approximations for numbers like π and $\sqrt{2}$. We will also explore some of the strange behaviors of objects like infinite series and sequences, and try to understand why analysis is characterized by rigor and technical definitions.

Once the topics of infinity, infinitesimals, sequences, and series are addressed, we will study differentiation, integration and continuity, hopefully becoming able to appreciate the reconstruction of Calculus and more comfortable with the theory that makes it work.

Evaluation

You will have opportunities to determine your letter grade in this class via one medium: homework assignments. Please think of the homework assignments as projects on which you strive for perfection. The relative weight of each assignment may be distinct from the others because complexity and difficulty will change from assignment to assignment. Expect one assignment per week.

Homework policies

Policy: No late homework will be accepted.

Reason: This class is accelerated, and timely and prompt completion of assignments is crucial for your continued understanding.

Policy: Assignments that are not well-written, not well-organized, or are not clear to a reader (like me) will not be graded.

Reason: Technical writing and the communication skills required to do that are of the most important skills I want you to develop in this class. Writing well is thinking well. Grading and marking assignments for errors is one method for assessing the extent to which you are assimilating and coping with material; it is impossible to determine whether a correct answer is accidental versus intentional if the written solution is vague.

Recommendation: Learn some sort of software for mathematical writing. I use L^AT_EX it is free and downloadable from <http://www.latex-project.org/ftp.html>.

Reason: It is easy to edit and wordsmith an electronic document. It is annoying at best to edit a document made with a pencil.

Recommendation: I encourage working together on assignments, and discourage plagiarizing another's work. There is a difference between collaboration and cheating and I want the former, not the latter, to happen here;

so your solutions to an assignment must be unique and reflect how much you know about the solution to the problem.

Reason: Collaboration entails using another type of communication skill, one that may not be reflected on a written assignment, but I am convinced that the ability to explain your solution to another will positively affect the quality of your assignment.

Policy: Evidence of cheating on an assignment will result in a zero for that assignment.

Your final grade will be computed on a 10-point scale: if x is your percentage of points earned versus points possible, and $x \in [90, \infty)$, then your letter grade will be A; if $x \in [80, 90)$, then your letter grade will be B; $x \in [70, 80) \Rightarrow C$, $x \in [60, 70) \Rightarrow D$. If $x < 60$, your letter grade will be F. Pluses and minuses are awarded at my discretion.

Students with Disabilities

Students with physical, sensory, emotional or medical impairments may be eligible for reasonable accommodations in accordance with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973. All accommodations are coordinated through the Disability Resource Center (DRC) in Room 101 of the University Inn, 797-2444 voice, 797-0740 TTY, or toll free at 1-800-259-2966. Please contact the DRC as early in the semester as possible. Alternate format materials (Braille, large print or digital) are available with advance notice.