

12/16/08

Math 4200 Syllabus **Spring, 2009 Semester
 ✧ Distance Delivery UMEP Version



Course Title:	Introduction to Analysis
Credits:	3 semester
Prerequisites:	The equivalent of Math 2120 or Math 4910-B
Course Description:	The set of real numbers and the logical underpinnings of the calculus are rigorously examined.
Meeting Schedule:	Spring Semester, Tuesdays from 4:30 p.m. to 7:00 p.m. at your distance deliver site (class originates from USU's Logan Campus in Engr 401)

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 Office hours: By appointment

Math 4200 is organized into the following 4 units:

1. **Sets, Relations, Functions, Cardinality, and Reals**

The goal of Unit 1 is for you to use set theory to deepen your understanding of the intricacies of real numbers.

Topics to be studied include the epistemology of mathematics, proofs within an axiomatic system, sets, set relations, set operations, finite sets, whole numbers, integers, rational numbers, denseness, functions, equivalence on sets, cardinality, countable sets, irrational numbers, uncountable sets, completeness axiom, real numbers, the ordered field of the set of real numbers with addition and multiplication, complex numbers, and decimal numeration.

About 25% of your time in the course is expected to be devoted to Unit 1.

2. **Sequences, Series, and Limits of Functions**

The goal of Unit 2 is for you examine the behavior of sequences, emphasizing interrelations among pairs of distinct numbers with near zero differences and our concept of infinity.

Topics to be studied include sequences, limits of functions, relationships involving sequences, special sequences (e.g., monotone, Cauchy, and recursive), and series.

About 35% of your time in the course should be devoted to Unit 2.

3. **Continuity, Derivatives, and Integrals**

The goal of Unit 3 is for you to deepen your conceptualization of continuous functions on real number intervals, derivatives of functions, integrals of functions, and interrelations among those three elements of the calculus.

Topics to be studied include continuity of functions, derivatives, Reimann sums, and integrals.

About 20% of your time in the course should be devoted to Unit 3.

4. **Theorems Underlying Algorithms Typically Taught in Calculus Courses**

The goal of Unit 4 is for you to develop your talents for formulating calculus-related conjectures and proving theorems that underlie algorithms presented in calculus courses (e.g., Math 1210 at USU).

Topics to be studied include theorems involving limits, derivatives and integrals (e.g., theorems that underlie algorithms employed in the calculus (e.g., product rule, quotient rule, formulas for derivatives of trigonometric functions, power rule, chain rule, implicit differentiation, Newton's method, algorithms for using derivatives to determine graphs and behavior of functions, algorithms based on the mean value, L'Hospital's rule, algorithms for computing derivatives of exponential functions, algorithms based on the fundamental theorem of calculus, substitution rule, integration by parts, algorithms for approximating integrals, computation of improper integrals, Taylor's method, and algorithms based on the intermediate value theorem).

About 20% of your time in the course should be devoted to Unit 4.

You will be provided with three opportunities to demonstrate how well you are achieving the goals of the four units. These opportunities are tentatively scheduled for the 4th, 11th, and 15th class meetings and will influence the final course grades as follows:

Opportunity	Tentative Date	Units Involved	Relative Influence on Final Grade
#1	01/27/09	1	20%
#2	03/31/09	1,2	30%
#3	04/28/09	1,2,3,4	50%

Note: In coordination with the Disability Resource Center, reasonable accommodations will be provided for qualified students with disabilities. If you need accommodations because of special exceptionalities, please meet with Jim during the first week of the semester to make arrangements. Accommodations and alternative format print materials (e.g., large print, audio, diskette or Braille) are available through the Disability Resource Center, located in Taggart Student Center room 104, phone number 797-2444.