Syllabus

Math 4910-B, Summer 2007

Course Title: Conceptual Calculus

Credits: 3 semester

Prerequisites: A (mathematical) Pulse (including a foundation in algebra, geometry, trigonometry, and basic differential and integral calculus although specific topics within these fields will be reviewed as needed)

Textbook: Calculus Concepts and Contexts (3rd ed.) by James Stewart

Meeting Schedule: Tuesdays & Thursdays (July 3 – August 21), 4:15 p.m. to 7:15 p.m. at your distance delivery site (class originates from USU's Logan Campus, Engr 401)

Instructor: Eric Rowley
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website: www.math.usu.edu/~rowley
(it's way outdated so don't hold high expectations)
Home Phone: (435)787-4497

Office Hours: By appointment

Student Teaching Assistants:
Brent Thomas brentthomas@cc.usu.edu
Rebecca Peterson rebeapete@cc.usu.edu

Students (more like colleagues, really):

This course is mostly populated by, but not restricted to, public school teachers seeking to upgrade their math-teaching endorsement levels by participation in the UMEP program. Further information about UMEP can be found at umep.usu.edu .

Course Goals:

The principal course goal is for you to have a meaningful learning experience as you interact with the course content. Pragmatically speaking the goal is for you to accomplish a calculus course requirement and/or provide you with the necessary prerequisite skills and knowledge to participate in subsequent courses.

Course Content:

The content of Math 4910-B is organized into overlapping sections outlined at the end of this document. You will interact with this content by constructing concepts, discovering relationships, comprehending vocabulary and notation, developing algorithmic skills,

memorizing basic facts, applying knowledge and skills to real, contrived, and mathematical situations, etc.

Classroom Procedures:

Attendance and participation are welcomed, crucial, and expected. Comments, questions, interruptions, etc. are encouraged

Much of the out of class communication and course management/administrative handling will be done on BlackBoard Vista. If you need help with any facet of BlackBoard Vista, contact Brent at brentthomas@cc.usu.edu or Rebecca at rebeapete@cc.usu.edu .

Homework, Quizzes, Tests, Grades, etc.:

You should keep a journal. Your journal should include, but is not limited to, individual sections for each of the following:

- Major/fundamental definitions
- Major/fundamental theorems
- Basic derivative formulas
- Summary of methods for evaluating definite integrals
- Summary of indefinite integral formulas and strategies
- Applications of integrals
- Power series representations of fundamental functions
- Fundamental parametric curves
- Anything else you feel is journal worthy (whatever helps you to organize, retain, and retrieve information)
- final essay (course- and self-evaluation)

Those who kept a similar journal for Math 4910-A may simply add to the Calc I journal.

Homework will be assigned at each class meeting. Based on your stature as professionals, it is assumed the assignments will be completed thoroughly, accurately, neatly/organized, and on time. Assignments may be submitted to your assigned TA by fax (435-797-1822) or email.

With sufficient notice, Tests, quizzes, etc. will be given at the instructor's discretion.

Your final grade will be based/justified in equal parts by your journal, homework, test (each test counts as one part) and quiz scores.

Americans with Disabilities Act:

Title II of the Americans with Disabilities Act mandates that all state and local government programs be administered in such manner as to protect qualified individuals with disabilities from discriminatory treatment. Utah State University complies with this policy, and therefore:

If you need accommodations because of special exceptionalities, please meet with Eric during the first week of the semester to make arrangements. Accommodations including alternative format print materials (e.g., larger print,

audio, diskette, Braille, etc.) are available through the Disability Resource Center, located in Taggart Student Center room 104, phone number (435)797-2444.

Content Outline:

I. Review of Chapter 5
   A. Definitions of *Definite Integral* and *Indefinite Integral*
   B. Fundamental Theorem of Calculus
   C. Methods for evaluating Definite integrals
      1. Direct application of the definition
      2. Approximation methods
      3. Calculators and computers
      4. Geometric method
      5. The Fundamental Theorem of Calculus (which requires one to find antiderivatives)
         a. Techniques for finding antiderivatives
            i. Memory
            ii. Integral Tables
            iii. Calculators and Computers
            iv. Substitution method
            v. Integration by parts
            vi. Partial fraction decomposition

II. Application of Integrals—Chapter 6
   A. Area
   B. Volume
      1. Cross-sectional area method
         a. Disk method
         b. Washer method
      2. Shell method
   C. Arc length
   D. Average value
      1. Mean Value Theorem for Integrals
   E. Force and work
   F. Mass and moments of mass of a straight wire with variable density

III. Power series representations of functions—Chapter 8
   A. Sequences
      1. convergence and divergence
   B. Series
      1. Geometric
      2. Power Series
         a. Ratio test / intervals of convergence
         b. Taylor polynomials, Taylor series, and Taylor's inequality

IV. Two- and three-dimensional coordinate systems and Vector calculus (Chapters 9 & 10 and appendix H)
    A. Basics of vectors
        1. Dot products
        2. Cross products
    B. Equations for lines and planes
    C. Arc length
    D. Motion in space
    E. Polar, cylindrical, and spherical coordinate systems
    F. Functions of two variables and Surfaces