

Information for Students (*tentative*)

Overview. This course is aimed at future mathematics teachers who have already studied calculus and want a deeper understanding of the central concepts of the subject. The class meets on Monday and Wednesday, 10:30–12:20 in Miller 302A.

Instructor. The instructor is Steve Monk, C-339 Padelford Hall, 362-1439; monk@math.washington.edu. Office hours: Wednesday 12:30–1:30 and by appointment.

Written materials. The written materials for this course are from a draft of *Making Sense of Calculus* by Stephen Monk, Part I, *The Mathematics of Change and Variation*. You will buy the materials from the Copy Center in the basement of the Communications Building.

Goals. There are three main goals in this class. They are interconnected and of equal importance.

The CONTENT GOAL is that you gain a deeper, more comprehensive and complex understanding of calculus, as a body of powerful mathematical ideas, as a way of understanding phenomena of change and variation, and as a subject studied in school.

The COMMUNICATION GOAL is that you learn to communicate your understanding, insights, and intuitions in relation to the ideas of calculus and that you do so with other people who may see calculus in ways very different from the way you do. This involves listening to others, asking questions, solving problems, making guesses, and supporting claims.

The LEARNING PROCESS GOAL is that you analyze and reflect on your experience as a student in this course in a way that will contribute to your understanding of the subject as well as your effectiveness as a mathematics teacher.

Course Structure. The work of the course is organized into *Investigations*, each of which approaches the task of coming to understand calculus in a different way. There will be three or four of them during the quarter. Each Investigation culminates in an Investigation Report, in which you pull together and reflect on what you learned in the course of the Investigation.

Groups. Learning to articulate your mathematical ideas, listen to others, and participate in group problem-solving are critical goals of this class. Thus your work in this class will be done in several different configurations, including whole-group discussions, individual work outside of class, and group work done

both inside and outside of class. Groups will be randomly assigned the first day of the quarter. These will be your group assignments for approximately the first three weeks. It is important that groups have a certain amount of permanence, so that students will feel comfortable with those they work with. However, it is also important that students learn to work with as many different people as possible and be able to experience themselves as working members of a variety of groups. Consequently, group assignments will be changed twice during the quarter. From time to time, you will also be assigned to groups for special purposes.

Your work and responsibilities in this course. There are several different kinds of work in this class that everyone must do. These are:

- a. Do the reading assignments with care.
- b. Do written assignments that are to be handed in separately.
- c. Hand in an Investigation Report at the end of each Investigation.
- d. Contribute to the work of your group, by: participating fully and constructively in the group's work, completing out-of-class assignments that feed back into group activities, and doing your share of organizing and writing documents written by the group.
- e. Participate in whole-class discussions of various kinds.

Note that the nature of these responsibilities and the overall structure of the course make it mandatory that you attend *every* class session, except for illness. If you are unable to attend, please let me know.

In addition, there are several different kinds of optional work that you can do in order to get more out of your experience of this course and to improve your grade.

Grades. *There will be no tests in the course.* Your grade will be based on your overall participation in the course. Grade distinctions beyond a basic grade of 2.8 will depend primarily on how much additional work you want to take on, pursuing questions more deeply, reflecting on what you are learning, doing outside reading, and pulling together the ideas of the course at the end of the quarter. The mechanics of the grading system are as follows:

Basic Work: At least a 2.8 to a student who hands in competent versions of all Investigation Reports, and other assignments, attends *every* class (except for excused absences), and participates fully and constructively in classroom activities.

Quality points: An additional 0.0 to 0.6 grade points given to students, based on an evaluation of their written work along a three-point scale: Plus, Ok,

Minus. These evaluations will be based on the completeness, thoughtfulness, and, depth of this work.

Optional reflective writing: An additional 0.3 grade points is available for keeping a *Reflective Journal* in which you report and reflect after each class period on your experiences as a student in this class. I will read these journal entries from time to time during the quarter. This journal must be started by the end of Week 1. There is a separate handing outlining what is expected in this journal.

Synthesis project. An additional 0.3 grade points is available if you do acceptable work on an optional Synthesis Project near the end of the quarter. *This project will be described in greater detail separately.*

Last updated 1/21/06