Information for Students

Overview. This course is aimed at present and future mathematics teachers who have already studied calculus and want a deeper understanding of the concept of limit in calculus – what it is, how it is used, why we have such a concept, etc. The class meets on Wednesday, 4:30–6:50 in MEB 102.

Instructor. The instructor is Prof. 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 material for this course is Volume II of *Making Sense of Calculus* by Stephen Monk, called *Reasoning about Infinite Processes*. Don't be concerned if you have not read Volume I of this book. The two volumes can be read in either order. Although it is produced by the UW Copy Center, you buy this material from the textbook department of the University Book Store.

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

a. Do each week's reading assignment, paying particular attention to the Study Questions.
b. Submit an E-Post writing assignment each week, and also read and bring to class the E-Post assignments of your classmates.
c. Hand in the brief written assignment each week.
d. Come to every class meeting and participate fully in both the small–group and whole–class discussions.

* ***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. This is an absolute requirement*** *

If you are unable to attend class, please notify me in advance and also contact me after the class to find out what is expected of you for the next week.

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. *See below for details*.

Grades. ***There will be no tests in the course.*** Your grade will 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 completes in a satisfactory and timely manner all four aspects of the "Your work and Responsibilities in this course," described above.

Quality points: An additional 0.1 to 0.3 grade points given to students, based on an evaluation of their overall participation in the class and their written work (described in b. and c. above) along a three-point scale: "Plus, Ok, Minus." These evaluations will be based on the completeness, thoughtfulness, and depth of this work.

IMPORTANT NOTE ON THE REQUIREMENTS AND QUALITY POINTS

I believe that a relaxed, non-intimidating atmosphere in class is very conducive to students' learning. This atmosphere can mislead a few students to being somewhat casual about meeting requirements – as if attendance is not *really* mandatory and assignments can be a *little* late, etc. This is especially true when pressure from other courses begins to build up. This is a mistake. ***Relaxed does not mean casual***. Attendance *is* required, assignments are *all* to be handed in on time, etc. Forgetting this can mean losing Quality points.

Optional Assignments for further grade points. If you want a grade higher than 2.8 (plus possible Quality Points), then you can choose one or more from among the following options, each listed with the grade points you earn for completing it in a satisfactory manner.

Weekly Reflective Writing. 0.3 grade points. This consists of your writing no less than a single (typewritten) page each week in which you informally discuss an issue that has come up for you during the preceding week of this course, as you have done your reading, written your E-Post, and participated in classroom discussions. This can be about a mathematical question or it can be about your experience as a student in this class. The choice of the specific topic you address is up to you. Whatever it is, you should give some background on the issue and push your thinking further than you might otherwise have an opportunity to do. Your writing should always go beyond a simple reporting of the events of the class session. ***You should only choose this option if you enjoy writing about your experiences and get something from doing it. If your reports become too brief or perfunctory, I may ask you to discontinue the project.***

You should send me this Weekly Reflective Writing via e-mail by Monday of each week, starting at the beginning of Week 2. It can be either an e-mail message or an attachment.

Book Report. 0.3 grade points. The goal of this optional assignment is simply that you read a book intended for non-expert readers presenting some aspect of the world of calculus. A recommended list of books is given at the end of this handout. Typically, they will be lighter books, written for non-expert readers. Your assignment here is to read the book, write two very brief "Progress Reports," to be handed in on Week 4 (April 18) and Week 7 (May 9), giving a few details on what you have learned, and writing an informal book report of at least two pages by the end of the quarter,

giving an overall impression of the book and pointing to some aspect of it that connects to the issues we have been discussing in the class.

Final Paper. 0.3 grade points. Write a Final Paper of about 6-7 (typewritten) pages to be handed in on the day scheduled for the (non-existent) Final Exam. I will give you a specific assignment for this paper. Generally speaking, you will be asked to tie together some theme or themes we have been discussing in the class.

IMPORTANT – SENDING ASSIGNMENTS BY E-MAIL

Like everyone, I get a great deal of strange e-mail from people whose names I don't recognize, and, like most people, I automatically delete most of it. So, if you send me assignments or other messages by e-mail, make sure you are identifiable by name as the sender of the message. If you are not, please indicate in the subject header that you are in M497. Also, if you send a document as an attachment, please indicate your name and the nature of the document in its filename, so that the document does not get lost when I save it to my disk. For example, "TJones-wk2-refl" tells me what the document is, whereas *refl-assign* does not. Attached documents with no such identifier will be returned.

Further Details of Course Structure.

Reading and using the Study Questions. At each class session, I will hand out an assignment sheet for the next week's work. It will include the reading assignment in *Making Sense of Calculus* and Study Questions for the reading assignment. Some of the material is fairly dense, perhaps even difficult. You should be prepared to read it more than once.

E-Post. By Monday at 8:00 PM of each week, you must write several paragraphs and submit them to the course E-POST, giving your first impressions of the material, perhaps answering some questions I will supply on the E-Post, as well as writing out your own questions about what seems confusing or ambiguous to you. This writing should be informal and understandable to your classmates. The E-Post Questions will also be on the weekly handout.

Before coming to class, you should read the E-Posts of your classmates and think about the things they are saying and asking about. Please bring printouts of the week's E-Posts to class. (See below for how you will use what you read each week on the E-Posts.)

Brief Weekly Writing Assignments. Along with each week's reading assignment, you should complete a brief written assignment to be handed in at the beginning of class. This will usually consist of giving the details of some mathematical argument or answering one or two brief questions on the reading. This should be handed in at the beginning of class each week.

Weekly class meeting. At the beginning of each class meeting, you will form into (assigned) groups of three or four in order to discuss your responses to the week's reading, to bring up questions you have, and to discuss the questions you and the people in your group have. The starting point of each week's group

discussion should be the E-Posts from the whole class, but especially from the people in your group. Since new groups will be formed each week, it is important that you have read all the E-Posts from the class. The amount of time spent in these group discussions will vary from week to week, but will generally be between 45 minutes and an hour.

At the end of this first Group Discussion phase of the class meeting, each group will write out on a single piece of paper what topics and issues they discussed and what questions they have at the end of this discussion. When this phase is over, we will have a break, during which I will read the writings of the various groups and consider what we will do for the second part of the class. Sometimes, this will consist of your discussing a new issue in your groups and sometimes this will consist of a whole-class discussion of an issue you struggled with in the first part of the class.

Suggested Readings for a Book Report

Here are titles and authors of some books you should consider for your outside reading, in connection with the Book Report option. I also supply some comments. Most of these books are available in the library. You may want to look at them before choosing one. If you know of a book you'd like to read, which is not on this list, just ask me about it.

1. *Newton's Gift*, by David Berlinski. (2000). As the title suggests, this focuses on Newton and his life, as well as his mathematics and science. Newton was a rather strange character to say the least.

2. *Isaac Newton*, by James Gleick. (2003) More of a standard biography than Berlinski's book. Very well written. Perhaps heavier than Berlinski, but well-worth the effort.

3. *Understanding Infinity: The Mathematics of Infinite Process*, by A. Gardiner. (1982). This gives a fairly straight math-book version of some of the material we study in this course. A bit text-booky. I'm not sure I agree with Gardiner's views, but it's a provocative book. Since this book is heavier than the others, read only up to p. 136.

4. *Everything and More: A Compact History of* ∞, by David Foster Wallace,. (2003). My copy is hardback. I'm not sure there is a paperback. This is the "zippiest," most "mouthy" math book I've ever seen. "But, hey, try it, you might like it." Read only up to p.122. It's full of rich allusions, images, and ideas. Many students have reported that they enjoyed this book.

5. *The Calculus Wars: The Greatest Mathematical Clash of All Time*, by Jason Socrates Bardi. (2005) The "wars" in question were between the allies of Newton and those of Leibniz—about who *really* invented the subject. Not exactly John Grisham, but a good read.

5. *A Tour of Calculus*, by David Berlinski. (1997). Was a best seller; very readable. Students in this class have tended to be put off by his "artsy" writing.