Mathematics 424B — Autumn 2007

Instructor: John Palmieri, Padelford C-538, 543-1785, palmieri@math.washington.edu
Class time and place: MWF 11:30, Benson 203
Office hours: T 2:30–3:20, W 1:30–2:20, drop in, and by appointment
Web page: http://www.math.washington.edu/~palmieri/Math424/ or
http://faculty.washington.edu/jpalmier/Math424/
Text book: *Principles of Mathematical Analysis*, 3rd edition, by Walter Rudin.
TA: Matthew Badger, Padelford C-109, mbadger@math.washington.edu, office hours TBA

Goals. There are four goals for this class: improve your skill at solving mathematical problems, improve your ability to communicate your solutions, improve your ability to read mathematical textbooks, and learn the particular mathematics under consideration.

Class structure. In order to accomplish these goals, we will focus on the book's exercises. I will spend some class time discussing the material from the book, but mostly I will talk about solving the exercises. In more detail: I will provide (on the class web page) a list of the problems to be discussed during the upcoming classes. You will try to solve them; this will involve trying to make sense of the text book, as well as working on the problems themselves. During class, I will answer questions about the text, and then lead a discussion about the assigned problems. A portion of your class grade will be based on your participation in these discussions.

I will designate some of the assigned problems as *homework* problems. We won't discuss these in class very much; instead, you will turn them in and the TA will grade them. You will designate some of the problems as *portfolio problems*. You will work on making the solutions to these as clear as you can; this may involve writing several drafts and revisions. See below for more details.

Homework. Homework is due **each Wednesday** at 3:30pm in my office, Padelford C-538. You may turn it in early, for example in class on Wednesday. Feel free to work with other people on your homework, but you must write your solutions yourself. If you find a solution in a book or some other source, please provide a reference.

Portfolio. On **December 3**, you will turn in a portfolio of solutions for the exercises from this course. This will include three types of problems: exercises we discuss in class, weekly homework problems, and your designated portfolio problems. For the first two types, you will get credit for having a legible attempted solution. For the portfolio problems: you will choose 6 problems from the in-class and homework problems to focus on, choosing at least two from Chapters 1–2, at least two from Chapters 3–4. On October 19, you will turn in a first draft for two of these solutions, and on October 22 we will have a "workshop day," in which we discuss these. Another three drafts will be due on November 19, and we will have a workshop day on November 21. For these portfolio problems, you will get credit for turning in your drafts on time, for participating in the workshop days, for the mathematical quality of the solutions, and also for the writing quality.

When you turn in the portfolio on December 3, you will need to include a cover sheet (which I will describe later in the quarter), plus all drafts of your portfolio problems, as well as your work on

in-class exercises and your graded homework problems.

One model for maintaining the portfolio: before class, attempt all assigned problems. During class, ask questions if you need help or clarification, and take notes. After class, rewrite your solutions taking the in-class discussion into account. Add your homework problems when you get them back from the TA. In a perfect world, your portfolio would be a solutions manual for the course. Short of this, you should strive to produce a document which will help you to review for the midterm and the final.

When choosing your portfolio problems, you can choose ones that you understand well mathematically, so you can focus on the writing, or you can choose ones that you don't understand as well, to force yourself to grapple with some difficult mathematical concepts. Probably a mix of these is a good idea.

Exams. We will have a midterm on **October 26**, in class. After I've graded the midterm, you will have a few days to correct some of your mistakes for some extra credit. I'll give you more details as the time approaches. The final exam is on **December 12, 2:30–4:20**. For both exams, at least some of the problems will be based on the in-class and homework exercises; I hope this encourages you to keep your portfolio up-to-date.

Grading. The various components of the course are weighted as follows:

midterm	20%
final	25%
exercises	35 %
portfolio	20%

For the exercises, 5% will be awarded for in-class participation, and the remaining 30% will be based on the TA's evaluation of your homework solutions.

For the portfolio, 5% of your grade will be assigned based on completeness of the portfolio, 5% will be for participation (turning in the drafts, participation in the workshop days), 5% will be for mathematical quality of the portfolio problems, and 5% will be for writing quality.

The mathematics. The point of this course, mathematically, is to lay the foundations for calculus. The integers **Z** and the rational numbers **Q** are the starting points: their properties are assumed to be familiar. Chapter 1 discusses how to get from the rational numbers to the real numbers **R**, and how to establish some basic properties of the reals. Chapter 2 is called "Basic topology" and discusses open sets, closed sets, and other related issues such as compactness. This is all important stuff, and we will cover it thoroughly. Then we will move on to Chapter 3, sequences and series; some of this material will be familiar (such as convergence tests), but the approach will probably be more rigorous than you've seen. We will cover some of Chapter 4 (continuity), as time permits.

Office hours. Feel free to drop by my office; if I'm there and not talking to someone else, I'm probably available to talk. If I'm not there, email is a good way to contact me, since I check it pretty regularly. I will not be in my office on most Thursdays.