Syllabus for Math 417-517
Fall 2019
Prof. Dimock

1. This is a course in advanced calculus, with emphasis on applications. The first 2/3 of the course covers calculus in several variables. It is partly a review of Math 241 (which is a prerequisite) and partly new topics. The last 1/3 is an introduction to the calculus of complex variables.

2. The textbook is **Advanced Engineering Mathematics** by Michael Greenberg (Second edition). We will cover topics from part III and part V as well as some topics which are not in the book. We will not be following the book very closely, so it is important to come to the lectures.

3. Topics to be covered:

   (a) *multivariable functions:* derivatives, chain rule, implicit function theorem, inverse function theorem, maxima and minima, differentiation under the integral sign, Leibniz rule, calculus of variations.

   (b) *vector calculus in three dimensions:* line integrals, surface integrals, volume integrals, change of variables formula, gradient, divergence, curl, divergence theorem, Stoke's theorem, applications, independence of path, derivatives and integrals in general coordinate systems.

   (c) *complex variables:* functions of a complex variable, derivatives, Cauchy-Riemann equations, line integrals, Cauchy's theorem, Cauchy integral formula, Cauchy inequalities, real integrals, applications to Fourier and Laplace transforms.

4. Homework problems will be given regularly in class. They will also be posted on the website. These problems are intended as a guide to what to study, and are neither collected or graded. However it is strongly recommended that you do the problems.

5. Math 417 recitations begin the second week of classes. The purpose of the recitations is to gain practice in doing problems. There are no recitations for Math 517, but Math 517 students are welcome to go to the Math 417 recitation if they wish.

6. There will be three in-class exams during the semester, dates to be announced.

   Only the two best exams will count. Thus you can miss one exam without penalty. However do not miss an exam without a good reason, since you will be expected to use the miss to cover illness, travel, or whatever. **There are no make-up exams.**

7. There is also a comprehensive final exam. Your grade will be based on the two in-class exams (25% each) and the final exam (50%).

8. My office is in the Mathematics building, room 323, and office hours are Tuesday and Friday from 4 to 5.

9. The website is: `www.math.buffalo.edu/ ~ dimock`. There you will find:

   (a) a copy of this syllabus

   (b) a list of assigned problems

   (c) lecture notes (usually posted on Fridays)

   (d) announcements about exams

   (e) solved exam problems (after the exam)