Syllabus for Math 417-517  
Fall 2018  
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, differentia-  
       tion under the integral sign, Leibniz rule, calculus of variations.

   (b) vector calculus in three dimensions: line integrals, surface in-  
       tegraals, 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, the  
       Cauchy integral formula, Cauchy inequalities, real integrals, ap-  
       plications 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 two in-class exams during the semester, dates to be announced. You can be excused from an exam if you have a good reason and arrange it ahead of time, but **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 (roughly 25% each) and the final exam (roughly 50%).

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

9. The website is: [www.nsm.buffalo.edu/~dimock](http://www.nsm.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 Thursdays)
   (d) announcements about exams
   (e) solved exam problems (after the exam)