Instructor: Prof. Solomon Friedberg
Office: Maloney Hall 523. Phone: (617) 552-3002. Email: friedber@bc.edu. Office hours: Mondays and Fridays, 10-11 and Wednesdays 11-12 (you do not need an appointment at these times). I am also available by appointment (to make one, please talk to me before or after class or send me email).

Class Hours: Mondays, Wednesdays and Fridays 9 to 9:50 a.m. in Devlin 221.


Course Web Site: Our course website is:
www2.bc.edu/solomon-friedberg/math4460-2017

Please bookmark this page, as it is the place that homework assignments and other course information will be posted.

Course Description: This course gives an introduction to the theory of functions of a complex variable, a fundamental, central, and extremely useful area of mathematics. It is intended both for mathematics majors and for well-prepared science majors. Topics to be covered in the course are: Complex Numbers (definition, basic concepts such as absolute value and conjugation, the complex plane, the triangle inequality, roots of unity and De Moivre’s theorem), Complex Functions and Their Derivatives (complex functions, differentiability, analyticity, the Cauchy-Riemann equations, harmonic functions), Elementary Functions of a Complex Variable (exponential and trig functions, logarithms, complex powers), Integration in the Complex Plane (line integrals, the Cauchy integral theorem, applications to the maximum principle and to Liouville’s theorem), Power Series Representations of Analytic Functions (power series, radius of convergence, Taylor series, Laurent series, orders of zeroes and types of singularities), and Residue Theory (the residue theorem, applications to definite integrals). These are found in Chapters 1-6 of the text. There are many applications of Complex Variables to diverse areas of science, and some of these may be included if there is time.

Learning the Material: This course covers, at the upper division level, one of the subjects which is at the center of modern mathematics, and the depth of the material presented and the pace of the presentation will reflect this. You should plan on spending at least one hour, and perhaps more, after each lecture, learning the material presented completely, in addition to time spent on the homework and studying for examinations. In this hour, you should work on learning the definitions we have covered, the examples, the Theorems, and their proofs. The material is very structured, particularly in the second half of the course, with many lectures building on the previous ones, and it is recommended that you master each concept right away rather than leave them until just before the exams. It is especially important that you keep up in Chapter 4, where the material increases in sophistication as compared to the first three chapters. Please feel free to consult with me in office hours if you are confused or unsure about any concept, example, problem, theorem, or proof. I'd be very happy to help you!!
**Prerequisites:** Math 2202, Multivariable Calculus, is required for this course, as well as at least one of Math 2210 (Linear Algebra), Math 2216 (Introduction to Abstract Mathematics). We will use ideas and theorems from Math 2202 throughout our course, and rigorous proofs as in Math 2216 are a significant part of the course (both lectures and HW). In addition, Math 3320, Introduction to Analysis, or Math 3321, Analysis I, is recommended. You can take this course without Math 3320 or Math 3321 *if you are a strong student who has done well in Math 2216*. However, if this is your first rigorous upper division mathematics course you should allocate extra study time to adjust to this higher level of material. I encourage you to meet with me during the first week of class if you have any concerns about whether this course is right for you.

**Grading and Examinations:** Regular attendance at lectures is required. It is difficult to imagine someone learning the material without such attendance.

Homework will be assigned regularly, and you are required to hand it in. Your scores on the homework will count for 10% of your grade (please see rules below). The homework will be assigned weekly, except before exams. You are expected to work on the problems from the day that they are assigned. The problems will range in difficulty from the easy to the challenging, and it would be very difficult to do any but the easiest problems if you left the homework until just before it is due. You may find yourself unable to do a problem; you should keep working on it, seeking new ideas for its solution. You are also welcome to come to my office hours, where I will provide hints to help you. Please hand in all assignments, even if you believe that you have made very little progress in solving the problems. If you do not hand in the homework, you will receive a substantially lower course grade. There will be three midterms during the semester, each of which will count for 20% of the grade, plus a cumulative final, which will count for 30% of your grade. The midterms are tentatively scheduled for Monday, September 25, Wednesday, October 25, and Friday, December 1, 2017. The final examination will be held on **Wednesday, December 20 at 9:00 a.m.** *This date and time are fixed by the Registrar and may not be changed.* Improvement on the final, if any, will also be taken into account in determining your grade. Please note: there will be no make-up examinations.

**Homework:** Homework assignments will be posted on the class website. Homework will be collected weekly. You are welcome to talk to others about the homework but you must write up your answers by yourself. If you hand in the same homework solutions as someone else, or as found in some other source such as a website, you will be committing plagiarism and will be subject to penalties such as an “F” in this course as well as additional university sanctions. Please take note.

Not all problems can be done in one minute. If you are having trouble with a problem look over the text and your notes to see if you can find an idea that helps you get started. If you are still having trouble with a problem, please come to see me in office hours for help. Note that you are welcome, and even encouraged, to come to office hours to discuss the homework *before* it is due. I want to emphasize that you need to work on the homework problems during the week, not just on the evening before they are due, to do well in this class.
How to Fail This Class:
(a) Cheat. Please be warned—no quarter given. ‘Nuff said.
(b) Don’t bother to go to class; after all, you’re really smart. Get a D on the first midterm. Meet with the Professor (preceded by a friendly email to him with Subject “hey prof”) and promise to work harder. Come to a few classes late, decide it’s not important, and stop attending. You’d rather work out. Fail the remaining exams and don’t bother to hand in the homework. Meet with the Professor just before the final to tell him that you “really know it” and are planning on studying non-stop for the next day to be sure. Fail the final. E-mail the Professor to set up a meeting. Explain to the Professor that you had a bad semester due to your roommate, and ask the Professor if there is any extra work you can do over winter break to make up for it so you can get a C.

How to Get a High Grade in This Course:
(a) Attend all lectures. On time. Focussed on the class.
(b) Learn the material presented in each lecture well, and do so prior to the next class. To accomplish this, study it on your own (going over your notes several times to really learn it), review the text’s discussion of the material, do all assigned homework related to the topic, and make a list of questions to ask the Professor. Then ask.
(c) Find the way to assimilate the ideas which best works for you. (Some people prefer to study on their own, while others prefer studying in groups. Some find notes from lecture most useful, others prefer to concentrate their energies on the course text.) Be responsible for your own learning!
(d) Allow adequate time to review the material prior to each exam. (Sounds easy, but it may require good time management to balance the needs of all your classes and other activities.) It is typically better to study often in smaller doses in place of infrequent long periods. In place of last-minute cramming, get a good night’s sleep before each test.

Syllabus date: August 20, 2017.