MATH 625 – COMPLEX ANALYSIS, SPRING SEMESTER 2016

1. General Information

Instructor: Dr. Joseph Hundley
Office: Mathematics 203
Office Phone: 716-645-8771
Office Hours: Tuesday 12:30-1:30 and 3:30-5:30, and Wednesday 3-4.
E-mail: jahundle@buffalo.edu
Textbook: Conway, Functions of One complex variable.
Calculators and other electronic devices: No calculator is required for this course. Use of calculators and other electronic devices on exams is not permitted. On the homework, you may use whatever you like. My recommendation is to do computations by hand using pencil and paper whenever feasible, in order to develop your familiarity with and feel for the techniques, algorithms, and ideas. I will be interested to hear about any technology or software which you find helpful in learning this material or performing relevant combinations. (Perhaps I will learn of something worth recommending.)

2. Course Description

Complex Analysis is the branch of mathematics which studies differentiable and analytic functions of one or more complex variables. (In a first course, we mostly stick to one.) It has applications to geometry and number theory, as well as applied mathematics and physics. Major topics include: Properties of $\mathbb{C}$ and the extended complex plane , complex power series, analytic functions, branches of the log, Cauchy-Riemann equations, harmonic functions and harmonic conjugates, analytic functions as mappings, Mobius transformations, the Orientation Principle, Riemann-Stieltjes integrals and line integrals along curves, power series representations of analytic functions, Cauchy's Estimate, zeros of an analytic function, entire functions, Liouville's Theorem, the Identity Theorem, the index of a closed curve, Cauchy's Theorem and Integral Formula, including the homotopic version and simple connectivity, counting zeros, the Open Mapping Theorem, Goursat's Theorem, classification of singularities, poles and essential singularities, the Laurent Series Development of an analytic function on an annulus, the Casorati-Weierstrass Theorem, the Residue Theorem, Contour integration, the Argument Principle, Rouche's Theorem, the Maximum Modulus Theorems, Schwarz's Lemma, the Riemann Mapping Theorem.

2.1. **Prerequisites.** Two semesters of introductory real analysis, equivalent to UB's undergraduate courses 431 and 432.

3. Grading

3.1. **Problem sets (updated).** Problems will be assigned more or less every class session. These are to be written up and turned in at or before the end of the next Tuesday meeting. (Originally, homework was to be turned in at the next meeting. Now, it is due on Tuesday.) A student who must miss class may turn in assignments electronically. Each students three lowest scores will be dropped before the average is computed. (The number of dropped scores was five in the original set up, when there were roughly twice as many assignments total.)

3.2. **Exams.** I plan to have one in-class examination, given on March 24 (the Thursday following Spring Break), as well as a final exam. If you miss an exam without an official excuse (such as illness or official university business), then you will be allowed to take a makeup exam, but with an automatic 25% deduction from the grade. If you have an official excuse, it must be documented (e.g., with a doctor's note, which I will verify). In addition, you must make arrangements before the date of the exam in case of a foreseeable circumstance (e.g., the state track meet) or as soon as possible in the case of an unforeseeable one. If make up arrangements are not made in a timely fashion you will receive a zero.

3.3. **Final Exam.** A comprehensive final exam will be given on Tuesday 5/10/2016, from 11:45AM to 2:45PM in Math 122. All topics covered in the course may be tested on the final, but topics covered after the midterm will be emphasized. Note that travel plans do not constitute an official university excuse for missing an examination or for obtaining a conflict or makeup examination. Hence, the above note regarding a 25% deduction will be enforced in the event that a student's travel plans conflict with the university's designated final examination period for this course.

3.4. **Attendance.** There is no need to offer an excuse for missing a regular class section (i.e., a day when there's no exam). If you miss a class, it's **your responsibility** to get the homework in on time (you can give it to a classmate, put it in my mailbox, or email it), and to find out whether any announcements were made, what was covered, etc., and to learn the material that was covered that day on your own. (You can of course come to Office Hours for help.) I should perhaps mention that, in my experience, the set of students who can learn the material without coming to class regularly is of measure zero in the set of students who think they can.

3.5. **Grade Assignment.** Course average is computed according to the following breakdown:

- Homework 30%
- Midterm 30%
- Final 30%

The grade you receive will be the one corresponding to your course average as follows

		92-100	A	90-92	A-
88-90	B+	82-88	B	80-82	B-
78-80	C+	72-78	C	70-72	C-
68-70	D+	60-68	D		
		0-60	F		

In the case of a course average which falls right on one of the boundary values, (92, 90, 88, etc.) the higher grade will be given.

4. Other

4.1. **Disabilities.** If you require classroom or testing accommodations due to a disability, please contact Accessibility Resources, located at 25 Capen Hall. AR can be reached by phone at (716) 645-2608 or by email at stu-accessibility@buffalo.edu. Please inform me as soon as possible about your needs so that we can coordinate your accommodations.

4.2. **Electronic Devices.** Electronic devices are permitted in regular lectures as long as they are **silent** and **not a distraction** to you or others. For example, if you want to take a quick picture of the board, go ahead, but if you can't do so without obstructing the view of the person behind you, that's a problem. Electronic devices are **strictly forbidden during exams.**

4.3. **Tardiness.** You should try to be on time. If you're late, you should try to enter and take your seat without disrupting the class. If people arriving late are regularly a disruption, I will adopt a more formal tardiness policy.

4.4. **Academic Honesty.** The student conduct rules at

http://www.ub-judiciary.buffalo.edu/rulereg.shtml/

will be enforced. Examination papers may be scanned, photographed or photocopied. Any cheating on exams will be given the maximum punishment possible. If you are having difficulties please talk to me about it rather than attempting to cheat!

4.5. **Inclusion.** My goal is to welcome you all to number theory and foster a classroom environment that is inclusive, equitable, and inspiring. If you have feedback (preferably constructive) on how I am doing, or ideas that might help me accomplish that goal more effectively, please feel free to share them with me.

4.6. **Dropping and Resigning.** The final day to drop a course (no record on your transcript) is September 8. The final day to resign from a course (R on your transcript) is November 13. If you are making up an incomplete from a previous instructor please see me to be sure you are following the proper procedures. For information see the Repeat Policy in the UB Undergraduate catalog at:

http://undergrad-catalog.buffalo.edu/policies/grading/repeat.shtml