Syllabus for Mathematics 552
Spring 2020

INSTRUCTOR: Ralph Howard OFFICE: LC 304 PHONE: 777-7471
OFFICE HOURS: TTh 2:30-3:30 and by appointment
TEXT: We will use several texts, mostly as references. All are free and available online:

- Complex Variables by R. B. Ash and W. P. Novinger.
- An Introduction to Complex Analysis and Geometry by John P. DAngelo.
- An Introduction to Complex Analysis for Engineers by Michael D. Alder.
- Complex Variables: A Physical Approach by Steven G. Krantz.
- Guide to Cultivating Complex Analysis by Ji Lebl.

CLASS WEB PAGE:
`http://ralphhoward.github.io/Classes/Spring2021/552/`
Most of the homework and class notes will be posted on this page.

Grading: There will be three hour exams of 100 points each. Homework will be collected and will count for 100 points. The Final will count for 150 points. This makes a total of 550 points:

Three midterms @100 points each	300 points
Final	150 points
Homework (includes quizzes)	100 points
Total	550 points

The grade will be based on the total number of points out of the 550 points. Note that the homework counts as much as a test so it is important to spend time on the homework. Homework will be submitted via Blackboard as pdf documents.

Letter grades will be assigned to all the tests. The last day to drop without a "WF" is Saturday March 27 and you should have a good idea of where you stand by then.

There will be no make up exams. If you miss a test, then your score on that exam is 80% of the average of your other test scores (including the final). If you miss a second exam then the score on it is zero. As an example suppose you get 96 on the first two tests and 144

on the final but missed the third exam. Your average is then

$$\frac{96+96+144}{3.5} = 96.$$

So the score on the third exam is 80% of 96 which is 76.8. Assume your homework average is 90%. Then the total for the class is

$$96+96+76.8+144+90 = 502.8 \quad \text{out of } 550$$

So the average is

$$502.8/5.5 = 91.4\%$$

so you still get an A. The bright side of this system is that assume you had 96 on the first two tests, a 65 on Test 3, and 144 on the Final. Then you would have been better off just not showing up for Test 3. If this happens I will replace the 65 with 76.8 (80% of the average on the other exams).

Likewise **no late homework will be accepted.**

The exams will be on the following days:

Test 1	Friday, February 14
Test 2	Wednesday, March 17
Test 3	Friday, April 16
Final	Monday, May 3 12:30 pm.

Some points about submitting homework and tests:

- Assignments should be pdf documents and just one document (that is do not send a separate file for each page).
- If you are taking photos of your work you should make sure the result is readable. This means using a dark pen or pencil and making sure things are in focus. A good way to check this is to email a copy to yourself and see if it is presentable.
- Overly large documents are hard for my software to deal with. You files should well under 10 megabytes and preferably well under 5 megabytes.
- One way to insure all this is to use LaTeX to write up your work.

Course content: The goal of the class is to lean the basics of the calculus of a complex valued function of a complex variable that is differentiable. The theory is very different form that of functions of a real variable, for example if a function is once differentiable, then it has derivatives of all orders. Such maps have surprising geometric properties, such as preserving angles between curves. The condition of differentiability will be shown to be equivalent to a system of partial differential equations, the Cauchy-Riemannian equations. The Cauchy integral theorem and Cauchy integral formula will be proven and used

to show that differentiable functions of a complex variable have convergent power series. The residue theorem will be proven and used to evaluate definite integrals. If there is time, the basics of conformal mapping will be covered.

Learning Outcomes: Students will learn about the calculus of complex valued functions of a complex variable and how this differs from that corresponding theory for real valued functions. The differential and integral calculus of these functions will be used to solve a wide variety of problems in mathematics and, time permitting, in engineering.