Math 360 Complex Variables Syllabus and Policy (Spring 2015)

Class Times and Location
Tues and Thurs 12:30- 1:45 p.m.
Room: Burruss 0034

Course Description We introduce the theory of complex-valued functions of complex variables. This is a beautiful and very useful branch of mathematics. We will extend the familiar notions of derivatives and integrals of real functions of real variables to the case of complex functions of complex variables, while at the same time exploring the differences between analysis on the real line and that on the complex plane. Differentiability in the complex plane is a very strong property, so it becomes clear early on that this class is mainly concerned with the study of analytic functions and their splendid properties. The emphasis will be intuition, computations, and applications, while at the same time retaining enough mathematical rigor to appreciate the theory.

Nature of the Course Content (Directly from the course catalog)
MATH 360. Complex Variables with Applications.
3 credits Offered every third semester as of fall 2013 Introduction to algebraic properties of complex numbers, analytic functions, harmonic functions, mappings of elementary functions, contour integration, series, residues and poles and conformal mappings. Emphasis on computations and applications to fluid and heat flow. *Prerequisite*: **MATH 237**

Instructor

Hala Al Hajj Shehadeh
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Office Hours

Tues and Thurs 2:00-3:15.

Course Webpage

Is both on Canvas and on **my website (http://educ.jmu.edu/~alhajjhy/)**. Syllabus, handouts, **Homework assignments**, announcements will all be found there.

Course Text

Complex Variables and Applications by James W. Brown and Ruel V. Churchill (McGraw Hill Higher Education). We will loosely follow the book, covering topics from all 12 chapters. Some material will only be covered in class and will not be from the book.

Grading Policy

Homework assignments: 30%.

Topic Presentations: 10%
In-class Midterm Exam: 30%
Comprehensive Final Exam: 30%

Please let me know in the first two weeks of classes about any documented condition that requires extra time to complete the exams.

Policy: 90 -100: A - to A range; 80 - 89: B- to B+ range; 70 - 79: C- to C+ range; 60 - 69: D to D+ range; 59 and below: F.

Attendance Policy

You should attend class faithfully. I take attendance every class period. Some material may only be covered in the classroom. You should contact me in case of any illness.

Exam Schedule

In-class Midterm Exam: **Thurs, Mar 5 2015 POSTPONED till Tues, Mar 17 2015!**
In-class Final Exam: **Tues, May 5 2015 from 10:30 a.m. till 12:30 p.m.**

You **cannot** reschedule an exam. A makeup exam is possible only due to an (extreme) emergency situation.

H.w. Assignments

There will be weekly H.w. assignments and they will sometimes include computer projects. You can use Matlab, Maple or Mathematica to complete your computer projects.
The **H.w. will be assigned on Thurs of each week and is due the next Thurs**.

Honor code

Remember that JMU has a strict honor code. While you are strongly encouraged to work with others in this class, the work you submit must be your own. Copying someone else's work won't help you learn the material and might just get you expelled.

Material Covered

We will loosely follow the textbook, so class attendance is so important.

We will mostly follow the following plan. We might be a bit faster or slower on few occasions. Applications will be embedded into the topics. There is a total of 29 lectures.

Week 1: Differentiability and Analyticity.

Week 2: Cauchy Riemann Equations. Harmonic Functions. Maximum Principle.

Week 3: Elementary Functions and their Conformal Maps.

Weeks 4 and 5 (no class on Tuesday): Elementary Functions: Complex Exponential, Complex Logarithm.

Week 6: Analytic Continuation. Reflection Principle.

Week 7 (snow day): Complex Integration. Cauchy's Integral and Applications.

Week 8 (snow day): Complex Integration. Cauchy's Integral and Applications.

Week 9: **Spring Break.**

Week 10: **Midterm Exam.** Power Series. Taylor Series. Laurent Series.

Week 11: Laurent Series. Residue Theorem and Contour Integration.

Week 12: Residue Theorem and Contour Integration.

Week 13: Classification of Singularities. Picard's theorem. Argument Principle. Rouche's Theorem.

Week 14: Conformal Mapping and Applications.

Week 15: Conformal Mapping and Applications.

Week 16 (Time permitting): Schwarz-Christoffel Transformation.

Presentation Schedule

Julia Dorward and Elisha Howe Jan 29 (History of Complex Analysis- Main People)
Kirill Korsak and Noah Mclelland Feb 5 (The Point at Infinity)
Shirley Shi and Codie Lewis Feb 19 (Riemann Surfaces)
Avery Wengler and Eric Wasser Feb 26 (Generating Fractals Using Complex Functions)
Jonathan Gerhard and Ben Dulaney Mar 19 (The Riemann Zeta Function)
Robert Staniunas and John Harnois Mar 26 (Poisson Integral Formula)
Hanna Marple, Makaila Williams and Maria Annone April 2 (Weierstrass and Hadamard Factorizations)
Noah Watson and Zev Woodstock April 16 (Fourier Transform and Differential Equations)
Seth Reed and Eric Schueler April 23 (Laplace Transform and Differential Equations)