

King Fahd University of Petroleum and Minerals
Department of Mathematics and Statistics

SYLLABUS
MATH 430

Semester: II, 2009-2010 (092)
Course Instructor: Prof. H. Azad

Course #: Math 430
Title: Introduction to Complex Variables
Textbook: E.B. Saff, A.D. Snider, Fundamentals of Complex Analysis (3rd ed.), Prentice Hall, 2003.

Course Objectives:

Upon completing this course students are expected, *at least*, to be able to:

- (1) Perform basic arithmetic with complex numbers.
- (2) Use CR equations to test for analyticity and compute a derivative.
- (3) Work with standard complex functions (mapping properties, derivatives).
- (4) Compute contour integrals using definition and Cauchy integral theorems.
- (5) Compute Taylor and Laurent series expansions of functions.
- (6) Apply the Residue Theorem, especially for evaluating real definite integrals.

Grading policy:

- Class Work: 20% (Quizzes 5%, Homework 10%, Attendance 5%)
Every student is expected to solve, at least two times, selected homework problems on the board.
- Exam I: 20%
- Exam II: 20%
- Final Exam: 40%

Week	Date	Sec. #	Topics
1	Feb 20 – 24	1.1 1.2 1.3	The algebra of complex numbers Representation of complex numbers Vectors and Polar Forms
2	Feb 27 – Mar 03	1.4 1.5	The Complex Exponential Powers and Roots
3	Mar 06 – 10	1.6 1.7	Planar Sets The Riemann Sphere
4	Mar 13 – 17	2.1 2.2	Functions of a Complex Variable Limits and Continuity
5	Mar 20 – 24	2.3 2.4 2.5	Analyticity The Cauchy-Riemann Equations Harmonic Functions
Major Exam I: Saturday, March 27, 2010 Exam I Material: 1.1-2.4			
6	Mar 27 – 31	3.1 3.2 3.3	Polynomial & Rational Functions Exp. & Trig. Functions. The Logarithmic Function
7	Apr 03 – 07	3.5 4.1 4.2	Power and Inverse Trig. Functions Contours Contour Integrals
8	Apr 10 – 14	4.3 4.4	Independence of Path Cauchy's Integral Theorem
April 17-21 : Midterm Vacation			
9	Apr 24 - 28	4.5 4.6	Cauchy Formula & Consequences Bounds for Higher Derivatives
10	May 01 – 05	5.1 5.4 5.2	Sequences and Series Convergence Taylor Sequences
11	May 08 – 12	5.3 5.5	Power Sequences Laurent Series
Major Exam II: Saturday, May 01, 2010 Exam II Material: 2.5-4.5			
12	May 15 – 19	5.6 5.7 6.1	Zeros and Singularities The Point at Infinity The Residue Theorem
13	May 22 – 26	6.3 6.2 6.4	Improper Integrals over R Trig. integrals over $[0, 2\pi]$ Improper Integrals with Trig. Fcts.
14	May 29 – Jun 02	6.7	Rouche's Theorem
15	Jun 05 – 09		Review of the material
Final Exam will be Comprehensive. The Registrar Office will announce the schedule of final exam			

KFUPM policy with respect to attendance will be strictly enforced.