King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 430 – Syllabus
2010-2011 (102)
Coordinator: Dr. Mihai Halic

Title:	Introduction to Complex Variables
Credit:	3 – 0 – 3
Textbook:	E.B. Saff, A.D. Snider, *Fundamentals of Complex Analysis* (3rd ed.), Prentice Hall, 2003.
Prerequisites:	Familiarity with the concepts from Math 201 (Calculus III) is very helpful: ***convergence criteria*** for sequences and series, ***polar coordinates*** in $\mathbb{R}^2$, ***directional derivatives*** of functions in two real variables. Students are ***strongly encouraged*** to review these notions.
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% (Quiz = 13% + HW = 5% + Attendance = 2%)** **Exam 1 : 24%** **Exam 2 : 24%** **Final Exam : 32%**
Homework:	The only way to *learn* mathematics is *to do* mathematics. The homework assignments ***will be collected*** once a week (on Saturday) ***in the class***. Late homework will be accepted, with a ***50% reduction*** (= half) of points ***for each day of delay***. (1/2 after first day, 1/4 after second day …)
Attendance:	A **DN** ***grade*** will be given according to the regulations written in the Undergraduate Bulletin (pp. 38)**.** Students coming more than 15 min. after the starting of the course will receive an L = late mark. ***Two L marks = One absence*****.**
Missing an Exam:	There will be ***no makeup quiz/exam*** under any circumstance. If a student misses a quiz/an Exam for a legitimate, his grade for this quiz/exam will be determined on the basis of his average performance in the quizzes. Moreover, in such cases students ***must provide an official excuse within 14 days*** of the missed quiz/exam.

Timetable

Week	Date	Section	Topics	Exercises
1	12.02 – 16.02	1.1 1.2 1.3	The algebra of complex numbers Representation of cplx. numbers Vectors and Polar Forms	3, 4, 5ac, 16bd, 20ad, 21, 30 1, 5, 7cdfg, 11, 16 1b, 3, 5, 7b,d,h, 8, 10b, 19
2	19.02 – 23.02	1.4 1.5 1.6	The Complex Exponential Powers and Roots Planar Sets	4ac, 7, 11, 12b, 20ab, 23a 3, 4b, 6c, 7b, 10, 11, 16 2-8, 11, 15-17, 19, 20
3	26.02 – 02.03	1.7 2.1 2.2	The Riemann Sphere Functions of a Complex Variable Limits and Continuity	1bc, 2, 5a-c, 6, 9 4, 5, 7ab, 8ab, 10, 13 1, 2, 4, 5, 7, 11, 12
4	05.03 – 09.03	2.3 2.4 2.5	Analyticity The Cauchy-Riemann Equations Harmonic Functions	2, 3, 4c, 6, 7, 9ac, 11 2, 5, 6 3acef, 6, 9, 12 14, 17ab
5	12.03 – 16.03	3.1 3.2	Polynomial & Rational Functions Exp. & Trig. Functions.	3ac, 5ab, 7, 11ac, 13b, 17 2, 3, 5bdf, 9acd, 11, 17, 18b
	19.03		**Midterm Exam (24%)**	
6	19.03 – 23.03	3.3 3.5	The Logarithmic Function. Power and Inverse Trig. Functions	3, 4, 6, 7, 11, 14, 19 1ae, 3ab, 4, 5, 8, 12, 15ab, 16
7	26.03 – 30.03	4.1 4.2	Contours Contour Integrals	1bd, 3, 5, 8, 13abd 3abd, 5, 7, 11, 14ac
8	02.04 – 06.04	4.3 4.4	Independence of Path Cauchy's Integral Theorem	2, 4, 5, 7, 10 6, 7a, 9 all, 10c, 13, 17
	09.04 – 13.04		**Vacation**	
9	16.04 – 20.04	4.5 4.6	Cauchy Formula & Consequences Bounds for Higher Derivarives	4, 5, 8, 11, 13, 16 2, 3, 4, 7, 8, 10, 16
10	23.04 – 27.04	5.1 5.4 5.2	Sequences and Series Convergence Taylor Sequences	1cdf, 4, 5, 9, 11b,c,d, 14 1, 3bef, 5acd, 9, 10 1, 3, 4, 5, 11, 13
	30.04		**Midterm Exam (24%)**	
11	30.04 – 04.05	5.3 5.5	Power Sequences Laurent Series	1, 2, 3adfg, 6, 10, 12, 15 1, 2, 5, 9
12	07.05 – 11.05	5.6 5.7 6.1	Zeros and Singularities The Point at Infinity The Residue Theorem	1, 3ab, 4, 7, 12 1a,e,h, 3c, 5, 6, 7 1, 2, 3ceg
13	14.05 – 18.05	6.3 6.2 6.4	Improper Integrals over $\mathbb{R}$ Trig. integrals over $[0,2\pi]$ Improper Integrals with Trig. Fcts.	1, 2, 7, 9, 10 1, 4, 7, 11 1, 5, 6, 10
14	21.05 – 25.05	6.7	Rouche's Theorem	1c-e, 3, 7, 8, 10, 13, 18
15	28.05 – 01.06		Review of the material	
			Final Exam (32%)	