

King Fahd University of Petroleum and Minerals
Department of Mathematics & Statistics
Math 533 – Syllabus
2008-2009 (081)
Coordinator: Dr. Mihai Halic

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| Title: | Complex Analysis |
| Credit: | 3 – 0 – 3 |
| Textbook: | L. Ahlfors, <i>Complex Analysis</i> (3rd ed.), McGraw-Hill, 1979. |
| Prerequisites: | Math 411 and Math 430 |
| Objectives: | <p>Students are assumed to be familiar with the notions acquired in Math 430. In this respect, they are strongly encouraged to revise its contents. Math 533 will bring additional precision, and will develop the material taught in Math 430.</p> <p>The theory will be illustrated with examples. Large weight will be given to the ability of solving problems.</p> <p>Being part of the graduate program, the course is meant to push the students to participate actively to the classes, and develop their own research.</p> |
| Grading: | <ol style="list-style-type: none">1) Shorter/longer quizzes which will check the continuous and regular learning of the material, as well as the ability to apply the general theory. The average grade for the quizzes constitutes 15% of the grade.2) Active classroom participation (this means: correct answers, and the presentation of a proposed theme, adjacent to the topic in the course). Constitutes 5% + 15% = 20% of the grade.3) One Midterm Exam. Constitutes 30% of the grade.4) One comprehensive Final Exam. Constitutes 35% of the grade. |
| Attendance: | <p>A DN grade will be given to all students with 9 or more unexcused absences.</p> <p>Students coming more than 15 min. after the beginning of the course will receive an L=late mark. Two L marks = One absence.</p> |
| Missing an Exam: | There will be no makeup quiz/exam under any circumstance. If a student misses a quiz/an Exam for a legitimate reason (medical emergency, major family problems), his grade for this quiz/exam will be determined on the basis of his average performance in the quizzes. Further, the student must provide an official excuse within 7 days of the missed quiz/exam. |

Timetable

| Week | Date | Chapter | Topics |
|-----------------|---------------|----------------|---|
| 1 | 11.10 – 15.10 | Ch. 1,2 | <i>Review</i> : the definition and properties of complex numbers; the extended plane. <i>Review</i> : elementary complex functions; the complex derivative, Cauchy-Schwartz condition. |
| 2 | 18.10 – 22.10 | Ch. 2 | <i>Review</i> : power series, and explicit computations. |
| 3 | 25.10 – 29.10 | Ch. 3.1 | Notions of topology. |
| 4 | 01.11 – 12.11 | Ch. 4 | Cauchy integral formula. |
| 5 | 08.11 – 19.11 | Ch. 4 | Cauchy integral formula. |
| 6 | 15.11 – 26.11 | Ch. 5 | Series and products developments. |
| 7 | 22.11 – 02.12 | Ch. 5 | Series and products developments. |
| | 01.12 | Midterm | Exam (30%) |
| Vacation | | | |
| 8 | 14.12 – 17.12 | Ch. 3 & 6 | Conformal mappings. |
| 9 | 21.12 – 25.12 | Ch. 3 & 6 | Conformal mappings. |
| 10 | 28.12 – 01.01 | Ch. 8 | Global analytic functions. |
| 11 | 04.01 – 08.01 | Ch. 8 | Global analytic functions. |
| 12 | 11.01 – 15.01 | Ch. 8 | Global analytic functions. |
| 13 | 18.01 – 22.01 | | Presentations from students. |
| 14 | 25.01 – 29.01 | | Presentations from students. |
| | ** .02 | Final | Exam (35%) |

Examples of possible themes for presentations:

- Elliptic functions.
- Cubic curves in \mathbb{C}^2 , relationship with elliptic functions. The addition law on cubic curves. Applications for cryptography.
- Riemann surfaces, viewed as ramified covers of \mathbb{C} . Existence of meromorphic functions on Riemann surfaces.
- Riemann surfaces of genus one and two.

Other topics can also be presented, *upon common agreement*.