MATH 4290/7290 Complex Analysis II Fall 18

Instructor:
Dr. Eric Schippers
office: 528 Machray Hall
phone: 474-6926
office hours: T 2:30 - 4:20, W 9:30 - 10:20
email: eric_schippers@umanitoba.ca
home page: server.math.umanitoba.ca/~schippers

Text:
Functions of One Complex Variable I, Conway, John B. 2nd edition.
I will deviate quite a bit from the text in a few places; when doing so, the lectures will be self-contained. Lecture notes are essential.

Grading:
Undergraduate Four assignments worth 25% in total; midterm (TBA) worth 25%, one final exam worth 50% total.
Graduate Four assignments worth 20% in total; midterm (Monday October 28th, 5-7pm) worth 25%; one final exam worth 45%; 10%.

Presentation (graduate students only):
You will give a half-hour presentation on some topic in complex analysis. Please contact me for a list of possible presentation topics. You are expected to choose a topic by mid-October, and periodically talk to me about your progress, ask questions and discuss, sources.

Problem list:
I will hand out a long list of problems at the beginning of the course, which will be updated periodically. You are expected to do these as the course progresses, keeping up with the lectures. The assignment questions will come partly from this list. Just doing the problem sets is not enough.

Course Content:

- Riemann surfaces and examples, the Riemann sphere, infinite products (if time allows), holomorphic functions on Riemann surfaces, hyperbolic, Euclidean and spherical metrics and distances. (Lecture notes).
- Möbius transformations, meromorphic functions, rational functions, mappings between the disk, plane, and sphere. Schwarz lemma. (Lecture notes).
- The argument principle and consequences, open mapping theorem. (Lecture notes, chapter IV 7, chapter V 3).
- Topology of the space of analytic functions, Arzela-Ascoli theorem, equicontinuity, uniform convergence, normal families (chapter VII, 1-3)
- Riemann mapping theorem, other mapping theorems (chapter VII, 4)
- harmonic functions, subharmonic and superharmonic functions, the Dirichlet problem, Green's functions (chapter X)
- if time allows, other topics may be covered, such as Schwarz reflection (chapter IX 1), conformal mapping of multiply connected domains (lecture notes), covering spaces, analytic continuation and monodromy (chapter IX), Weierstrass factorization (chapter VII 5), gamma and Riemann zeta functions (chapter VII 7-8).

Please note that I will not always follow the approach in the text and also will supplement the text material. A complete set of lecture notes is essential throughout the entire course. I will clearly indicate places where I deviate from the text as we go along. I will also give more detailed information about the readings at the beginning of each topic.

Statement on Academic Dishonesty:

The Department of Mathematics, the Faculty of Science and the University of Manitoba all regard acts of academic dishonesty in quizzes, tests, examinations or assignments as serious offences and may assess a variety of penalties depending on the nature of the offence.

Acts of academic dishonesty include bringing unauthorized materials into a test or exam, copying from another student, plagiarism and examination personation. Students are advised to read section 7 (Academic Integrity) and section 4.2.8 (Examinations: Personations) in the General Academic Regulations and Requirements of the current Undergraduate Calendar. Note, in particular, that cell phones and pagers are explicitly listed as unauthorized materials, and hence may not be present during tests or examinations.

Penalties for violation include being assigned a grade of zero on a test or assignment, being assigned a grade of "F" in a course, compulsory withdrawal from a course or program, suspension from a course/program/faculty or even expulsion from the University. For specific details about the nature of penalties that may be assessed upon conviction of an act of academic dishonesty, students are referred to University Policy 1202 (Student Discipline Bylaw) and to the Department of Mathematics policy concerning minimum penalties for acts of academic dishonesty.

All students are advised to familiarize themselves with the Student Discipline Bylaw, which is printed in its entirety in the Student Guide, and is also available on-line or through the Office of the University Secretary. Minimum penalties assessed by the Department of Mathematics for acts of academic dishonesty are available on the Department of Mathematics web-page.

Conversion of numerical grades to letter grades

Letter	**Minimum Percentage to Guarantee**	**Final Grade Point**
A+	95	4.5
A	85	4.0
B+	78	3.5
B	72	3.0
C+	66	2.5
C	60	2.0
D	51	1.0