# Course Plan
# MATH 5293—Complex Analysis II
# Spring 2013

**Instructor** Dr. A. Noell; office: MS 404, ph: 744-5772; email: noell@math.okstate.edu

**Office hours** Monday and Wednesday 2:30–3:20 pm, Tuesday and Thursday 1:00–1:50 pm, or by appointment

**Text** *Complex Made Simple* by David C. Ullrich

**Exams** There will be two fifty-minute examinations, scheduled for February 8 and March 29. A comprehensive final examination will be administered from 10:00 to 11:50 on Monday morning, April 29. Conflicts with test periods must be cleared with the instructor in advance of the examination.

**Grading** Here is the way the course grade will be determined: The combined score on the homework assignments will count 40%, each fifty-minute exam will count 15%, and the final exam will count 30%. The following scores are guaranteed: 90%—A; 80%—B; 70%—C; 60%—D.

**University drop policy** The last day to drop the course with no grade is Monday, January 14. A grade of "W" will be recorded if the course is dropped after January 14 and before the end of Friday, April 5. The last day to drop the course is Friday, April 5.

**Syllabus attachment** A syllabus attachment from OSU Academic Affairs is available at http://academicaffairs.okstate.edu/images/syl-spring13.pdf

**Academic integrity** Here is a brief statement of the OSU policy: "Oklahoma State University is committed to the maintenance of the highest standards of integrity and ethical conduct of its members. This level of ethical behavior and integrity will be maintained in this course. Participating in a behavior that violates academic integrity (e.g., unauthorized collaboration, plagiarism, multiple submissions, cheating on examinations, fabricating information, helping another person cheat, unauthorized advance access to examinations, altering or destroying the work of others, and fraudulently altering academic records) will result in your being sanctioned. Violations may subject you to disciplinary action including the following: receiving a failing grade on an assignment, examination or course, receiving a notation of a violation of academic integrity on your transcript (F!), and being suspended from the University. You have the right to appeal the charge. Contact the Office of Academic Affairs, 101 Whitehurst, 405-744-5627, academicintegrity.okstate.edu."

Note that informal discussion of homework assignments with other students can be helpful, but you must write up your solutions in your own words and based on your own work. Here are examples of violations of academic integrity: joining with others in writing solutions on the board and then copying them on your paper; examining another student's written work before submitting an assignment; using solutions posted on the internet.

**Etiquette** As a courtesy to others in the classroom, please turn off and stow all electronic devices before class begins.

(TURN OVER)

**First assignment** Due Friday, 1/18:

1. # 10.4 on page 180 of the text
2. Let $D$ be a domain. For which functions $f$ holomorphic on $D$ is $|f|^2$ harmonic on $D$?
3. If $u$ is harmonic on an open set $D$, show that $u_x - iu_y$ is holomorphic on $D$.
4. Suppose that $u$ is harmonic and real-valued on a domain $D$. Show that $u$ is constant if $\{z\colon \nabla u(z) = 0\}$ has a limit point in $D$.
5. (a) Show that if $f$ is holomorphic on a neighborhood of $\overline{\mathbf{B}(p,R)}$ then

$$|f(p)|^2 \leq \frac{1}{\pi R^2} \int_0^{2\pi} \int_0^R |f(p + re^{it})|^2 r \, dr \, dt.$$

(b) Fix a domain $D$ and a positive constant $M$. Denote by $\mathcal{F}$ the family of all functions $f$ holomorphic on $D$ such that

$$\iint_D |f(x+iy)|^2 \, dx \, dy \leq M.$$

Show that $\mathcal{F}$ is a normal family.