Instructor: Prof. Bruce Reznick, 327 Altgeld Hall, 333–4284, reznick@math.uiuc.edu. My phone has voice mail and I frequently check and reply to my email, including weekends. Office hours are by appointment. I take them seriously, and they can usually be arranged within 24 hours. You are also encouraged to ask me questions immediately before, during and after class. I enjoy answering questions by email (which you can get credit for, see below), and so that I can post the (anonymized) question and my answer on our webpage.

http://www.math.uiuc.edu/~reznick/math347F15.html
http://www.math.uiuc.edu/~reznick/F15links.html

The main page will have a “class diary” summarizing the class day by day, with links to handouts, and responses to all relevant questions sent to me by email. You are invited to contribute to the ongoing page of useful mathematical links. I’m terrible with names; please don’t take it personally.

Purpose, Text and Syllabus: Math 347 is a “professionalization” course designed to make you comfortable with the construction and interpretation of proofs. It is a requirement for all advanced mathematics courses. Proofs by themselves are not particularly interesting, so we will be writing proofs (as much as possible) about actual beautiful mathematics. The content goal of the course is to introduce you to some basic general categories of mathematical object (e.g., rings, fields, orderings) and show you both familiar and unfamiliar examples. I am aware that significant numbers of you are not mathematics majors, but are studying in a different discipline. Be aware that this is an abstract mathematics course (though with concrete examples) and not an applied one. It is really important for you to be actively engaged in each class and to let me know when I’m going too fast (or not fast enough!)

The text is Tools of the Trade by Paul Sally, Jr. This is a “grown-up” mathematics book, and is not like your calculus texts. For one thing, the answers are mostly not in the back, and rather than tell you the answers, the author gives you hints so that you discover them yourself. This might take some time to get used to. Last year, we covered most of Chapter 1, the first half of Chapter 3 and parts of Chapters 4 and 5. The summit of our studies will be the so-called $p$-adic completion of the rationals, an advanced topic rarely seen in undergraduate math courses. I will provide supplementary notes for any topic not covered in Tools. My goal is that you each succeed in this course, and I am willing to do whatever it takes, up to redefining the meaning of the word “success”.

Homework Policy and Content: It will be an explicit assignment to read ahead in the textbook before class. Each class meeting will begin with a discussion of the assigned reading. We will work out any uncertainties in those topics before proceeding to new material.

Written homework will be assigned to be due weekly on a day to be determined. Please staple or paper-clip your homework sheets (no folding over corners), and consider writing more than one draft. You are expected to spell correctly and write complete, grammatical sentences when possible in this and all your University assignments. Homework solutions will be distributed when the assignment is due. No late homework is accepted, but the lowest two homework scores (possibly zero) will be omitted in computing your homework average. In rare instances, you may be excused from an assignment, but the dropped scores
are intended to cover minor illnesses, weddings, etc. There is no outside grader for this course. I do it myself. A phone and e-mail list will be distributed once the class stabilizes. It is my policy not to give individual homework help on pending problems. But if you ask a question in class or in email, I can further explain the underlying mathematics to everybody.

Some problems on the homework will be taken from the text (no solutions in the back). Some problems will be adapted from last year’s homeworks and exams. Some problems I’ll just make up. Problems which are like exam problems will be marked ($\mathcal{E}$). Be aware that some problems are good for homework and inappropriate for exams, because they require you to do more reflection or computation than is sensible on a tightly-timed test. Many assignments will contain extra-credit problems. Collaboration in studying and working the homework is strongly encouraged! Collaboration without comprehension is a waste of time. I ask you not to collaborate on extra-credit problems!

**Exam Policy:** By departmental policy, there will be three Hour Exams, at the usual intervals. The exact dates of the exams will be determined in class. You will need serious documentation in order to qualify for a makeup exam. Exams resemble the homeworks, but will be shorter and are closed-book. I will distribute blank index cards which you will be able to fill with notes. The Final Exam is comprehensive, and somewhat harder than the Hour Exams. The Final must be held at the scheduled time: 8:00-11:00 AM, Monday, December 14, which is the second day (of six) of Finals Week.

**Class Participation:** I tried this last year, and it worked pretty well. A small portion of the grade is the easiest to achieve. Send me at least five emails during the semester with questions about material from the lectures or the reading from the book (not the homework or exams), at least two weeks apart. The reason is that smart math students tend to be both somewhat shy and somewhat reluctant to admit publicly when they don’t understand something. Your questions are of great value to me in helping structure my explanations in class. Put “347 Class Participation” in the subject line.

**Grading Policy:** Keep in mind that I am grading your work, not you as a person. Each Hour Exam counts 20%, the Final Exam counts 40% and the Homework counts 15%. Class participation counts 5%. The lowest 20% is dropped. (A missed exam cannot be dropped from the computation of the grade.) All grades are numerical. The highest possible grade cutoffs are: $A/B - 90\%$, $B/C - 80\%$, $C/D - 70\%$, $D/E - 60\%$, by which I mean “A-/B+”, etc. I will try to keep you posted on any curving as the semester progresses. I am aware that this is an honors course and so the overall grade distribution should be fairly high. There are two exceptions to the numerical grading for people who take all three Hour Exams: anyone who scores 96% on the Final gets an A and anyone who scores 75% on the Final will pass. Experience shows that these exceptions rarely make a difference.

**Philosophy:** It will be a privilege and a pleasure for me to spend the semester talking and listening to you. Education is not a zero-sum game when done correctly. I do not consider you my adversaries, and hope the feeling will be mutual. Become an active participant in Math 347. Let the ideas of this course get under your skin and visit your dreams. These are serious steps towards being able to understand and appreciate advanced mathematics.