

Syllabus for MA 501
Mathematical Representation, Reasoning, and Patterns
June 24 August 3, 2002
8:00 9:40 A.M., Monday through Thursday
Instructor: Hal Martin

Course Description: (from the department website) *Historical and philosophical foundations of mathematics and their relationships to problem solving and applications; proof, logic, and mathematical reasoning; algebraic structures and functions; mathematical representations and coding.*

Comment: The course description is somewhat nebulous and allows for a great variety of interpretations. I think that it's fair to say, however, that our six week course is going to involve all of the key ideas alluded to in the description given above.

Text: *Mathematics: the new golden age*, by Keith Devlin.

Keith Devlin is a prominent research mathematician and also an outstanding expositor of mathematical ideas. The text is a popular work which covers a lot of the history of 20th century mathematics. The course will focus on Chapters 1, 2, and 3, with additional reading material both from the text and by way of handouts. There will be a variety of assigned problems for you to work on as well. Some of the problems will be open ended and will really be small research projects.

Course Design: The course will have three main elements. One will consist of readings from Devlin's book and handouts. Each class period we will spend a few minutes discussing the reading assignment for that day. I anticipate that we will spend about 20 minutes per class period discussing the reading assignment, but it may be longer or shorter depending upon the depth of our collective interest in the topic. A second element of the course will be assigned problems. I hope that we will typically spend about 40 minutes collectively discussing solutions to the problems. This is a graduate course and so I expect a considerable amount of participation. Solutions should be written up in a clear expository fashion using acceptable English style and grammar. I will also expect people to go to the board and present their solutions to the group. Finally, I expect the audience to be good critics of the work presented. This means to be mathematically sharp and not to let errors or omissions slip by unnoted. It also means that when we criticize another person's work, we do so in a respectful and supportive manner. Finally, the third element of the course will consist short lectures, typically about 40 minutes per class session, and normally presented by the instructor. There are several topics that I wish to cover that will either complement or help clarify aspects of Devlin's book. The lectures will also be used to provide background material needed in order to solve some of the more difficult assigned problems. Most of the lectures will concern elementary number theory and the foundations of mathematics.

Grading: (Tentative and open to discussion.) Assigned problems, (40 60)%. Mid-term exam, (10 20)%. Participation, 10%. Final exam, (20 30)%. The variability in the percentages is tailored to each student and allows one to benefit from his or her strengths.

Disabilities: If you have a need for disability related accommodations or services, please inform your instructor or the Office of Student Support and Disability Services at 405 Cohodas (Phone 227-1550, TDD: 227-1543). Reasonable and effective accommodation and services will be provided to students if requests are made in a timely manner, with appropriate documentation, in accordance with federal, state and university guidelines.