This is an experimental course, modeled on one that was offered for the first time at MIT in the spring of 2004. It is suitable for students at many levels. The course is designed to show you how new mathematics is actually created: how to take a problem, make models and experiment with them, and search for underlying structure. You will also learn how to explain your finding clearly, and how to work effectively in a group. No predetermined body of mathematics is planned, but you will become intimately acquainted with some particular areas.

The class will be split into groups, typically of 3 students, who will choose a project, work on it, and submit a written report describing their findings. We will also have oral reports of some of the projects. Often, though not necessarily always, your research will involve computer experiments. Findings should be stated precisely, either as facts or as conjectures; proofs will be viewed favorably, but are not required.

Topics range from ones that are treated in mathematics books to ones that lead to open problems. Few are well defined. In contrast to homework assignments for your other classes, you will not be told precisely what to compute or to prove. The topics have been chosen because they display interesting phenomena, but we do not necessarily have a particular result in mind. And if we did, you might discover something else.

There will be no examinations. Your grade will be based on quality of your teams project work and on the quality of its written reports, weighted approximately equally. The class will meet as a group once a week, Wednesday 5:00 –6:00 pm in the computer lab in East Hall, B743. In addition, staff will be available for consultation in East Hall B743 from 5:00pm – 7:00pm Monday through Friday. Organizational details including a timetable for the projects will be discussed at the first class meeting. We expect three lab projects to be completed by each group during the term.

Prerequisite: Multivariable Calculus and familiarity with a computer program suitable for mathematical modeling are recommended, but not required. There is no text. You will need an override from the math department to register.

Michael Artin is a Professor at MIT. He received his Ph.D. from Harvard in 1960. He is considered a leader in the field of algebraic geometry/non-commutative algebra. Professor Artin received the 2002 Leroy P. Steele Prize for Lifetime Achievement (from AMS) for his lifelong contributions to commutative and non-commutative algebra and ring theory as well as to modern algebraic geometry.

Please contact the Undergraduate Math Office 734-763-4223 for additional information. To give you an idea of the range of possibilities, a few topics for projects will appear on the Mathematics website soon.