

College of Engineering, Forestry, and Natural Sciences
Department of Mathematics and Statistics

MAT 201 (Problem Solving) Syllabus for Fall 2011

Section 1, LEC 5230

Thursdays from 3:00-3:50 p.m. in Adel Math Building (AMB) 147

Instructor Information

Instructor: Jim Swift Jim.Swift@NAU.edu AMB 110 523-6878

Office Hours: MTWF 10-11, W 4-5. If these times are inconvenient, you can make an appointment, or drop by my office any time. E-mail is a good way to contact me.

Website: www.nau.edu/Jim.Swift is my web site. Follow the “Instructor Information” link. On the instructor information page, there is a link to the web site for this class.

Course Description

Text: There is no textbook.

Prerequisite: Consent of Instructor. Calculus is not required. Some (optional) problems may involve calculus.

Course Description: MAT 201 is a one credit hour course, which meets one hour each week of the semester. It has no textbook, no exams, and no traditional and/or repetitive and/or algorithmic-based homework assignments. Instead, this course will consist of problems and puzzles similar to those in the department “Problem of the week” and the annual national Putnam competition, that is, problems of a distinctive nature not falling into a particular category. We intend that this class will build on the students’ innate enjoyment in mathematics/puzzles/problem-solving.

Student Learning Outcomes: The successful student will demonstrate through classroom discussion and presentation, as well as by submitting written work, that they can:

Use common problem solving strategies (using variables, solving simpler problems, looking for patterns, using multiple perspectives, etc.).

Use intuition developed through class activities to select possible problem solving strategies from among a diverse collection of strategies.

Demonstrate understanding of what constitutes a proof in mathematics and how to write, discuss and justify proofs.

Demonstrate the ability to generalize a given problem as a way of showing a deeper understanding of the nuances associated with specific questions.

Show gains in knowledge of mathematical ideas beyond that encountered in typical class offerings.

Course Structure/Approach: The general tenor of the class will be relaxed but active. Students will focus on a single problem under consideration, taking it as a challenge. There are no penalties for attempting a problem. Each step taken by the student along the way toward a solution will itself be an achievement.

During each weekly meeting, one or more problems will be presented by the instructor. (Students are welcome to suggest problems as well!) The class will discuss one or more problems, propose potential solution methods, and, ideally, arrive at solutions. Some problems will remain unsolved or only partially solved during the class period. These and others proposed by the instructor will be assigned as homework, with students given some freedom to choose which of them to pursue. Students will present solutions in class and the class will provide feedback consisting of questions, suggestions, and conjectures. Some solutions will be submitted to the instructor in writing and returned with guidance for corrections, completion of partial solutions, and revisions in the mathematics, writing, and the overall presentation. On occasion, in the proposal and description of problems by the instructor and in the course of solving problems, students will encounter new mathematical topics.

Assessment of Student Learning Outcomes: You are expected to attend all classes, to actively participate during class time, to devote time outside of class to solve problems presented in class, to solve some problems individually and some collaboratively, to solve a variety problems of differing natures, and to present some solutions to the entire class.

Written homework will be collected each week. Turn in a written solution (or a partial solution) of one of the problems on the list at our web site. Ideally, the solution will be for a problem whose solution was not presented at a previous class meeting, or you will find a new and more elegant method to solve a problem that has already been presented.

There will be no final exam. The course grade will be based on

20% Attendance. You get A for no absences, B for 1 absence, C for 2 absences, on this fraction of the grade. Note that you get an F in the class if you miss class more than twice.

40% Class participation. This includes (1) presentation of solutions to the class, (2) engagement in problem solving during class, and (3) response to presentations of others (questions, suggested improvements, conjectures)

40% Written solutions.

Course Policies

Attendance: Attendance is required. Missing more than two classes will result in a failing grade.

Cheating: “Cheating” in this course means “passing off someone else’s work as your own.” Informally, this means that we do not want you to look in books, do internet searches, etc., for information. You may discuss these problems with others in the class, or the instructor. Credit others with ideas that you used

in your write-up. If you have concerns as to whether the use of any outside reference is considered plagiarism, consult your instructor. Cheating will result in consequences as described in the student handbook, typically a zero on the first assignment of a student where cheating occurs, and a failing grade for any subsequent incidents of that student.

Calculators and Computers: For most problems, the solutions should be found by pencil and paper. When warranted, and with full documentation, you may use technology to solve a problem. You do not have to bring a calculator to class.

University and Departmental Policies: Our class web site has links to the Departmental and University Policies at www.cefns.nau.edu/Academic/Math/MasterSyllabi/DepartmentPolicies.pdf and www2.nau.edu/academicadmin/UCCPolicy/plcystmt.html.

Amendments: Any changes to this syllabus will be announced in class, and an updated version will be posted on my website.