Math 96 Syllabus

Fall 2019

Lecture: Friday 4:00-4:50pm AP&M 6402
Course Webpage: http://cseweb.ucsd.edu/~dakane/Math96/

Professor: Daniel Kane
Email: dakane “at” ucsd.edu
Office Hours: Mondays 2:30-3:30pm in AP&M 7131 or by appointment.

Course Description: Math 96 will cover basic techniques in mathematical problem solving with a view towards improving performance in the William Lowell Putnam Competition.

Prerequisites: A passing grade in Math 20A or equivalent.

Exams: There will be no formal final exam for the class, but students will be expected to sit through at least one of the two halves of the Putnam competition, held this year 8am-11am and 1pm-4pm on Saturday, December 7th. Please be sure to register (at https://forms.gle/LQnpbpvjb2wSo5ct9) by October 11th if you have not already so that you can be signed up to take the exam.

Homework: Homework we will be due at the start of class each week except for the first week, Thanksgiving week, and the last two weeks of the quarter. Please be sure to submit homeworks by the start of class, as late submissions may not be accepted. If you cannot make the beginning of class, you may have another student turn it in for you, or arrange another method to get it to the instructor on time. In order to pass the class students will be expected to finish at least five out of the seven homeworks. Homeworks will typically be of one of two types, usually alternating between them between weeks:

• Problem solving homeworks: Here students will be asked to solve one problem from a list of practice problems.
• Solution writing homeworks: Here students will be asked to write an easy-to-follow, correct and well-written proof for a problem solved recently in class.

Write-up Guidelines: All homework questions will require you to write complete mathematical proofs. Also be sure to:

• Write your name on the top of the submission.
• Clearly designate which problem you are solving.
• If your submission is more than one page long, make sure to number all pages and staple them together.

• Write legibly.

Collaboration Guidelines: Students are encouraged to collaborate on homework assignments. You should feel free to discuss the problems and talk about how to come up with solutions, or about how to structure proofs. On the other hand, you are expected to write up your solution independently of any collaborators, and you should not share written solutions to homework problems with other students before the homework deadline. If you do collaborate with other students on the homework, you should make sure to list any collaborators that you had. Additionally, since this is a course focusing on individual problem solving ability, it is strongly recommended that you spend at least an hour thinking about a homework by yourself before discussing it with others.

Use of Outside Resources: You should not attempt to search for homework solutions online, doing so will be considered academic dishonesty.

Academic Integrity: Academic integrity will be taken very seriously be the course staff. Breaches of integrity may have broader consequences outside of the assignment in question. The following will all considered to be breaches of academic integrity:

• Collaboration on homeworks beyond the scope outlined in the section above (including sharing of homework solutions with other students before the homework deadline).

• Failure to cite collaborators on homeworks.

Grading: Grading will be pass/fail. The requirements for passing are:

• Submit reasonable solutions on time to at least five of the seven homeworks.
  AND

• Sit through at least one of the two sessions on the Putnam (you are not required to solve any problems on it).

Lecture Schedule: Lectures will alternate between two types:

• Technique lectures: Here the professor will discuss basic results in an area and some of the techniques applicable to solving problems in this field.

• Problem solving lectures: Here the class will be provided with a list of problems, that we will attempt to solve via group discussion moderated by the professor.

Below is a rough schedule for topics covered in the class:
September 27th  Techniques: Basic problem solving strategies
October  4th  Techniques: Sequences and Functional Equations
October 11th  Practice
October 18th  Techniques: Number Theory
October 25th  Practice
November 1st  Techniques: Polynomials
November 8th  Practice
November 15th Techniques: Combinatorics
November 22nd Practice
November 29th Thanksgiving weekend: No class
December 6th  Techniques: Testing Strategies
December 7th  Putnam Exam