

## Course Information

Welcome to CMPS 132, Computability and Complexity. The course meets TuTh in Crown 104 from 10-11:45.

My office is 319 Applied Sciences, I will try to be available after each class and can be reached by e-mail ([dph@cse.ucsc.edu](mailto:dph@cse.ucsc.edu)) and through the class newsgroup. Also, feel free to drop by my office anytime with questions about the class material.

The main goal of the class is to promote the understanding of computation and its limits. Many parts of the course are rather abstract, so students should have good mathematical skills and interest in the theoretical aspects of computing.

**Prerequisites:** All students must have successfully completed CMPS 130, or have seen me to get a permission code.

**Main text:** *Introduction to Languages and the Theory of Computation*, by Martin.

**TA:** Dima Kuzmin, [dima@cse.ucsc.edu](mailto:dima@cse.ucsc.edu)

**Course Work:** There will be regular (weekly) written homeworks, an in-class midterm during the quarter, and a final exam. These will be weighted to obtain an overall performance as follows.

Midterm	30%
Homeworks	30%
Final	40%

Incompletes are only available in certain circumstances. Contact the instructor as soon as possible if you feel an incomplete may be appropriate.

**Assignments:** The first assignment is to be done individually. However, the other assignments are to be done in small groups (of 1-2 or 2-3 students depending on class size), with each group submitting a single set of solutions. Please rotate groups, so that the same group is not repeated. Any help or ideas (other than from the text, instructor, or TA) *must* be appropriately acknowledged in your solutions.

**Expectations:** I expect that every student will attend lectures, keep up with the reading, and fully understand their group's solutions to the assignments. The material is very subtle, and often must be read several times before full understanding is acquired. Students are encouraged to ask questions in lectures and in my office. The goal of this course is not just for the students to learn what the various theorems say, but to understand *why* they are true and *how* they are proven.

Students should check the class newsgroup ([ucsc.class.cmp132](mailto:ucsc.class.cmp132)) and webpage (<http://www.cse.ucsc.edu/classes/cmps132/>) regularly (say every other day) for updates/clarifications to assignments.

**Syllabus:** The course will cover chapters 9 through 14 of the text (in order), with less emphasis on chapter 12. Any extra time will be spent covering additional reductions and complexity classes.

Topic	Text
Turing Machine mechanics	Ch. 9
The power of Turing Machines	Ch. 10
Turing Machines can't do everything	Ch. 11
Recursive function theory	Ch. 12
TMs, resources, and complexity	Ch. 13
$\mathcal{P}$ , $\mathcal{NP}$ , and reductions	Ch. 14

Assigned reading for week one: Chapter 9.