

22C : 131 : 001 **Limits of Computation**  
**Fall 2004**

**Class Schedule**

9.30–10.45, TTh at 118 MacLean Hall

**Instructor**

Kasturi Varadarajan: 101E MacLean Hall, 353-2541, kvaradar@cs.uiowa.edu  
Office hours: 2.00–3.00 pm, monday and wednesday

**Teaching Assistant**

Chen Zhang: 101C MacLean Hall, chenzhan@cs.uiowa.edu  
Office hours: 3.00–4.00 pm, thursday

**Course Web Page**

[www.cs.uiowa.edu/~kvaradar/sp2005/limits.html](http://www.cs.uiowa.edu/~kvaradar/sp2005/limits.html)

**Departmental Information**

Department of Computer Science, 14 Maclean Hall

**Textbook**

*Introduction to the Theory of Computation*, by Michael Sipser, PWS publishing company.

**Reference Books**

*Computational Complexity*, by Papadimitriou, Addison Wesley; *Introduction to Automata Theory, Languages, and Computation*, by Hopcroft, Motwani, and Ullman, Addison Wesley. These books will be placed on reserve in the library.

**Prerequisites**

Ideally, the equivalent of our undergraduate algorithms course.

**Grading**

Grading will be based on five homework assignments, and two in-class exams. The homeworks will account for 40 percent, the midterm for 25 percent, and the endterm for 35 percent of the grade. No late homework submissions will be accepted.

You are expected to do the homework assignments on your own without consulting human and non-human sources (like the web, books other than the textbook) for the solutions. You are welcome to discuss the homeworks with your classmates, but you are not allowed to take away from the discussion any written record, electronic or otherwise, of the discussion.

### **Students with disabilities**

I need to hear from anyone who has a disability which may require some modification of seating, testing or other class requirements so that appropriate arrangements may be made. Please see me after class or during my office hours.

### **Topics to be covered**

- Languages and Turing Machines
- Undecidability
- Polynomial-time Computation
- NP-completeness
- Randomized Algorithms and Complexity Classes
- Interactive Proofs
- Space-bounded Computation
- Interactive Proofs and PSPACE
- Cryptography: an Application of Hardness
- Approximation Algorithms, Complexity Classes, and Completeness