Computer Science 511
Design and Analysis of Algorithms
Fall 2008

General Information

Description. A study of basic algorithm design and analysis techniques. Emphasis is on learning to formulate algorithmic problems and on developing problem-solving skills.

Prerequisites. CS 311 (undergraduate design and analysis of algorithms) or equivalent. A strong background in programming and discrete mathematics is essential.

Time and Place. MWF 11:00–11:50 a.m., 101 I ED 2

Web Page. www.cs.iastate.edu/~cs511

Instructor. David Fernández-Baca, fernande@cs.iastate.edu, 294-2168, 111 Atenasoff. Office Hours: TBA

Teaching Assistants

- Jianrong Dong, jdong@iastate.edu. Office Hours: TBA
- Sudheer Vakati, svakati@iastate.edu. Office Hours: TBA


Topics

All chapter references below are to the Kleinberg-Tardos text.

1. Network flow (2 weeks; Chapter 7)
2. Linear programming\(^1\) (2 weeks)
3. NP-Completeness (3 weeks; Chapter 8)
4. PSPACE (1 week; Ch. 9)
5. Tractable special cases of NP-hard problems (1 week, Chapter 10)

\(^1\)The instructor will provide supplementary material on this topic.
6. Approximation algorithms (2 weeks; Chapter 11)

7. Local search (1 week, Chapter 12)

8. Randomized algorithms (2 weeks; Chapter 13)

**Grading**

Final grades will be based on scores on homework assignments, 2 midterm exams, and a final. The weights of these are as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>Homework</td>
<td>16%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>28%</td>
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<tr>
<td>Exam 2</td>
<td>28%</td>
</tr>
<tr>
<td>Final</td>
<td>28%</td>
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</tbody>
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Midterm exams will be 2-hours long and held in the evening. Exams 1 and 2 are tentatively scheduled for the weeks of September 29th and November 3rd, respectively. The Final is tentatively scheduled for 9:45–11:45 a.m., Thursday, December 18th.

**Policy on Academic Honesty**

Students enrolled in Computer Science courses at ISU are expected to maintain the highest standards of academic integrity. Cases of cheating that go undetected and hence unpunished skew the grading curve in a class, thereby lowering the grades for students who do not cheat. Students who cheat rob themselves not only of knowledge and skills that they should have acquired in a course, but also of the experience of learning how to learn, arguably the most valuable benefit of a university education. The reputation of the department, the university, and the value of the degree suffer if employers find the graduates of a program lacking in abilities that successful completion of specific courses should guarantee.

Most professions, including Computer Science, have codes of ethics or standards to which individuals are expected to abide by. At the university you practice the integrity that you must demonstrate later. Suspected cases of academic misconduct will be pursued fully in accordance with ISU policies. Students are strongly urged to consult the university’s policy on academic dishonesty. The information included here is intended to help students avoid unintentionally committing academic dishonesty.

**Problem Sets.** The primary purpose of assignments is to clarify and enhance the understanding of the concepts covered in the lectures. Past experience with this course has

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2This section is an abridged and slightly adapted version of a statement written by Professor Vasant Honavar for Computer Science 572. Thanks to Professor Honavar for allowing us to use this material.
shown that this is helped by increased interaction among students. Discussion of general concepts and questions concerning the homework assignments among students is encouraged. However, each student is expected to work on the solutions individually. When discussing problems from assigned problem sets with other students, you may:

- discuss the material presented in class or included in the assigned readings needed for solving the problem(s)
- assist another student in understanding the statement of the problem (e.g., you may assist a non-native speaker by translating some English phrases unfamiliar to that student).

It is expected that you have independently arrived at solutions that you turn in for problem sets. The following are examples of activities that are prohibited:

- sharing solutions or fragments of solutions (via email, whiteboard, handwritten or printed copies, etc.)
- posting solutions or fragments of solutions in a location that is accessible to others
- using solutions or fragments of solutions provided by other students (including students who had taken the course in the past)
- using solutions or solution fragments obtained on the Internet or from solution manuals for text books
- using material from text books, reference books, or research articles without properly acknowledging and citing the source.

Exams. Copying someone else’s solutions, using notes or reference materials (unless instructed otherwise), altering an exam for re-grading, getting an advance copy of the examination, or having someone else write the exam amount to cheating on an exam.