Computer Science 511  
Design and Analysis of Algorithms  
Fall 2012  
www.cs.iastate.edu/~cs511

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, discrete mathematics, and elementary probability theory is essential.

Time and Place. MWF 11:00–11:50 a.m., Gilman 1652.

Instructor. David Fernández-Baca, 111 Atanasoff, fernande@iastate.edu, 294-2168. Office hours are by appointment, but students may drop in whenever the instructor’s door is open.

Teaching Assistants. TBA.

References. Our textbook is


We will rely on the following texts for additional material on specific topics.


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\(^1\) A near-final version of this text is available at www.cs.berkeley.edu/~vazirani/algorithms.html

\(^2\) An early version of this book can be found at citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.2.9618
The instructor will post lecture notes on certain topics. Also, a considerable amount of supplementary material is available on the web.

**Topics**

All chapter references below are to Kleinberg & Tardos (2006).

1. Flows and cuts (Chapter 7).
2. Linear programming (Cormen et al., 2009; Dasgupta et al., 2007; Vanderbei, 2010).
3. Review of NP-completeness (Chapter 8; Dasgupta et al., 2007).
4. Fixed-parameter algorithms (Chapter 10; Flum & Grohe, 2006; Niedermeier, 2006).
5. Approximation algorithms (Chapter 11; Williamson & Shmoys, 2012).
6. Randomized algorithms (Chapter 13).
7. Local Search (Chapter 12; Dasgupta et al., 2007).

**Grading**

Our grading scheme is summarized below.

<table>
<thead>
<tr>
<th></th>
<th>Weight</th>
<th>Tentative Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>15%</td>
<td>Every 1.5–2 weeks</td>
<td></td>
</tr>
<tr>
<td>Exam 1</td>
<td>25%</td>
<td>September 26</td>
<td>11:00–noon</td>
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<tr>
<td>Exam 2</td>
<td>25%</td>
<td>October 31</td>
<td>11:00–noon</td>
</tr>
<tr>
<td>Final</td>
<td>35%</td>
<td>December 13</td>
<td>9:45–11:45 a.m.</td>
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All exams will be held in our classroom, 1652 Gilman.

**Policy on Academic Honesty**

Students enrolled in Computer Science courses at ISU are expected to maintain the highest standards of academic integrity. Suspected cases of academic misconduct will be pursued fully in accordance with university policies. Here we provide information to help students avoid unintentional misconduct. For more details, students are strongly urged to consult ISU’s policy on academic dishonesty.

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3 An electronic version of the book can be downloaded from www.designofapproxalgs.com/download.php
4 This section is an abridged and adapted from a statement written by Professor Vasant Honavar for Computer Science 572. Thanks to Professor Honavar for allowing us to use this material.
5 http://www.public.iastate.edu/~catalog/2005-07/geninfo/dishonesty.html
**Problem Sets.** The primary purpose of assignments is to clarify and enhance the understanding of the concepts covered in the lectures. It is expected that students have independently arrived at solutions that they submit. Nevertheless, past experience has shown that learning is enhanced by interaction among classmates. Thus, discussion of general concepts and questions concerning the homework assignments among students is encouraged.

Examples of *allowed* collaboration are the following:

- Discussing the material presented in class or included in the assigned readings that is needed for solving assigned problems.
- Assisting other students in understanding the statement of the problem (e.g., by translating some English phrases unfamiliar to that student).

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.** The primary purpose of exams is to test the understanding of the concepts covered in class. Exam solutions are expected to be entirely the work of each student. The following is a non-exhaustive list of activities that amount to *cheating* on an exam.

- 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 exam.
- Having someone else write the exam.

**Students with Disabilities**

Iowa State University complies with the American with Disabilities Act and Section 504 of the Rehabilitation Act. Any student who may require an accommodation under such provisions should contact the instructor as soon as possible. No retroactive accommodations will be provided in this class.