

Course Syllabus

CS670 Advanced Analysis of Algorithms

Spring 2017

Instructor: Prof. Ming-Deh Huang, Sal 314, X04783, mdhuang[at]usc[dot]edu, Office Hours: W 1:10-2:00pm

TA: Lian Liu, Office Hours TBD

Time and Location: 10-11:50, MW, WPH 207

Course Information:

- **Text:** Introduction to algorithms, 3rd Ed., by T. Cormen, C. Leiserson, R. Rivest, and C. Stein, McGraw-Hill.
- **Prerequisite:** covered in Ch. 1,2,3,4,5, 10,22 and Appendix (VIII) of the textbook. Mathematical rigor is emphasized in this course, therefore a certain level of mathematical sophistication is desired. In case you are not sure, you may test and see if your background is adequate for this course by solving the following sample assignment: 2.3-7, 2-1, 4-5, 4-6 (from the textbook).

Course Outline: The topics covered and the corresponding chapters and sections in the textbook are as follows:

- Introduction
 - Divide and conquer: 4.2, 4.5.
 - Heapsort: 6.1 - 6.5.
 - Randomized algorithms 5.2-5.4.1, 7.3-7.4, .
- Design and analysis techniques
 - Divide and conquer more - Fast Fourier Transform: Ch. 30
 - Dynamic programming: Ch. 15.
 - Greedy algorithms: 16.1, 16.2, 16.3.
 - Amortized analysis: 17.1 - 17.3.
- Advanced Data structures
 - Fibonacci Heaps: Ch. 19
- Graph algorithms:
 - Minimum spanning trees: 23.1 - 23.2.
 - Shortest Paths: 24.1 - 24.3, 25.1 - 25.3.

- Maximum Flow: 26.1 - 26.2.
- Number Theoretic Algorithms: 31.1 - 31.7
- NP-Completeness: 34.1 - 34.5.
- Approximation Algorithms: 35.1 - 35.2.

Class Structure:

- **Homework:** There will be about 8 assignments. They will be posted under Assignments.
- **Exams:** There will be four in-class quizzes on homework problems. Your homework grade will be based on the scores of these quizzes. There will be an in-class midterm exam and a final exam. The exams are closed book and closed notes.

| | Date | Location |
|------------|---------------------|----------|
| Quiz 1 | Wed., Jan. 25 | WPH 207 |
| Quiz 2 | Wed., Feb. 15 | WPH 207 |
| Midterm | Wed., Mar. 8 | WPH 207 |
| Quiz 3 | Wed, Mar. 29 | WPH 207 |
| Quiz 4 | Wed., Apr. 19 | WPH 207 |
| Final Exam | Mon., May 8, 8-10am | TBD |

- **Grading Policy:**

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| Homeworks | 40% |
| Midterm | 30% |
| Final Exam | 30% |

Statement for Students with Disabilities

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to me (or to TA) as early in the semester as possible. DSP is located in GFS 120 and is open 8:30 a.m.-5:00 p.m., Monday through Friday. The phone number for DSP is (213) 740-0776.

The email: ability@usc.edu

Statement on Academic Integrity

USC seeks to maintain an optimal learning environment. General principles of academic honesty include the concept of respect for the intellectual property of others, the expectation that individual work will be submitted unless otherwise allowed by an instructor, and the obligations both to protect one's own academic work from misuse by

others as well as to avoid using another's work as one's own. All students are expected to understand and abide by these principles. Scampus, the Student Guidebook, contains the Student Conduct Code in Section 11.00, while the recommended sanctions are located in Appendix A: <http://www.usc.edu/dept/publications/SCAMPUS/gov/>. Students will be referred to the Office of Student Judicial Affairs and Community Standards for further review, should there be any suspicion of academic dishonesty. The Review process can be found at: <http://www.usc.edu/student-affairs/SJACS/>.

Additional policies:

- [Student Conduct Code](#) of the University will be strictly enforced. Please review these policies.
 - Please review [University grading policies](#)
 - Please visit course homepage and check Announcement regularly.
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