Course Information

1 Staff

Lecturer:	Dana Moshkovitz dmoshkov@mit.edu	32-G606
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2 Textbook

The primary written reference for the course is the third print of the textbook:

Sanjeev Arora and Boaz Barak, Computational Complexity - A Modern Approach, Cambridge University Press, 2009.

An early draft of the book is available online at: http://www.cs.princeton.edu/theory/ index.php/Compbook/Draft, but the book contains many corrections and improvements.

3 Prerequisites

The natural predecessor of 6.841J/18.405J is the graduate class 6.840J/18.404J theory of computation. The latter covers (roughly) Chapters 1 (Basic Complexity Classes), 2 (NP and NP Completeness), 3 (Diagonalization), 4 (Space Complexity), 7.1-7.4 (Randomized computation), as well as the beginning of Chapter 8 (Interactive Proofs) of the Arora-Barak book.

Students who did not take 6.840J/18.404J, but took and did well in the undergraduate class 6.045J/18.400J or other basic complexity class, are welcome.

4 Lectures

Lectures will be held in room 4-153 from 2:30 P.M. to 4:00 P.M. on Tuesdays and Thursdays. The course webpage shows the *tentative* schedule of lectures and readings. During the semester we will have guest lectures from prominent complexity theorists like Avi Wigderson, Madhu Sudan, Boaz Barak and others.

5 Mailing List

Please join the mailing list of the course at http://lists.csail.mit.edu/mailman/ listinfo/advanced-complexity-fall12.

6 Course website

The course website contains the schedule of lectures and readings, the problem sets, the lecture notes, corrections made to the course materials, and special announcements. You should visit this site regularly to be aware of any changes in the course schedule.

7 TQE

Graduate students who satisfy the prerequisites, as well as the requirements, of the class may petition to count it toward their TQE instead of 6.840J/18.404J. It is the theory group's decision that such petitions will be approved.

8 Listeners

Listeners who do not take the class for credit are welcome. The webpage gives details about upcoming lectures, and there is a mailing list advanced-complexity-fall12@lists.csail.mit.edu to which we will send lecture announcements. Picking and attending individual lectures of interest is encouraged. However, *regular listeners, who attend the majority of the lectures are asked to scribe notes once.*

9 Lecture Notes

Every student is expected to scribe notes for one class. We will decide who scribes for which class as we go. The lecture notes should be emailed to the course staff within 24 hours of the end of the lecture.

10 Problem sets

Five problem sets will be assigned during the semester. The course webpage shows the *tentative* schedule of assignments and due dates. Always submit your assignment to the TA in the beginning of the appropriate lecture. **Each problem must be written up on a separate page**, since problems will be graded by separate graders. Mark the top of each sheet with the following: (1) your name, (2) the question number, (3) the names of any people you worked with on the problem (see Section 13), or "Collaborators: none" if you solved the problem completely alone.

11 Grading Assignment

Each registered student is expected to grade one problem for the class. The graders will get the solutions to grade from the TA together with a model solution, and are expected to submit the graded solutions to the TA within a week. Each *problem part* should be marked as either (i) correct (up to minor mistakes); (ii) flawed (i.e., has major deficiencies); (iii) missing (no real solution). In addition, concrete mistakes should be marked and explained. The purpose is that the students get a fair and useful feedback on their solutions.

12 Final Grade

The final grade will be based on five problem sets, a grading assignment, and scribe notes. The grading assignment and scribe notes will be coordinated by the TA.

The grading breakdown is as follows:

5 Problem sets	60%
1 Scribe notes	25%
1 Grading assignment	15%

The grades for the scribe notes and the grading assignment are determined by the TA's assessment of their quality. A student who does not scribe notes or not grade assignments will not pass the class.

13 Questions and Answers

We will use Piazza for questions and answers during the semester. Please enroll at https://piazza.com/mit/fall2012/6841j18405j/home (there is an enrollment button in the corner).

14 Collaboration policy

The goal of homework is to give you practice in mastering the course material. You are allowed to collaborate on homework, however we ask that you dedicate enough time to think about each problem by yourself before consulting others. Moreover, **you must write up each problem so-lution by yourself without assistance**. You are asked to identify your collaborators on problem sets. If you did not work with anyone, you should write "Collaborators: none." If you obtain a solution through research (e.g., on the web), acknowledge your source, but write up the solution in your own words. It is a violation of this policy to submit a problem solution that you cannot orally explain.