COMP-553: Algorithmic Game Theory

McGill University, Fall 2016

Course Details

Instructor: Yang Cai

Office: McConnell Engineering Building (MC) 324

Office hours: Tuesday 16:30-17:30 (Yang)

Contact info: `cai@cs.mcgill.ca`

Lecture room: BURN 1B23

Class times: Tue/Thu 13:05–14:25

Teaching Assistant: Mingfei Zhao (Office hours TBD)

Important Links

- myCourses (WebCT Vista): `http://www.mcgill.ca/lms/`

Contacting Instructors and Teaching Assistants

Post all your questions about assignments on the myCourses message boards so everyone can see both the questions and the answers. You may freely answer other students' questions as well, with one important exception: you may not provide solution. Of course, you can send e-mail to a teaching assistant or instructor directly for private matters; to that end, you may use the e-mail facilities provided by McGill or any e-mail account you have with any e-mail provider.

Students are expected to monitor their McGill e-mail account, myCourses, and the course home page for course-related news and information.

Course Description

Broad survey of topics at the interface of theoretical computer science and economics, with an emphasis on algorithms and computational complexity. Our main focus will be on algorithmic tools in mechanism design, algorithms and complexity theory for learning and computing Nash and market equilibria, and the price of anarchy. Case studies in Web search auctions, wireless spectrum auctions, matching markets, and network routing, and social networks.

Textbook

Algorithmic Game Theory, by Noam Nisan, Tim Roughgarden, Eva Tardos, Vijay V. Vazirani (eds.), Cambridge University Press, September 2007.

Other Reference Books

- *Networks, Crowds and Markets* by D. Easley and J. Kleinberg, Cambridge University Press, 2010.
- *Multiagent Systems: Algorithmic, Game Theoretic and Logical Foundations* by Y. Shoham and K. Leyton-Brown, Cambridge University Press, 2009.
- *Game Theory, Alive* by Anna R. Karlin and Yuval Peres.

Course Prerequisites

- A course in algorithms (COMP 360 or equivalent)
- A course in probability (MATH 323 or equivalent)
- No prior knowledge of Economics or Game Theory is required

Assessment

The grade comprises the following components:

- 5% from games played in class; will play a few games with your classmates in class, and your score depends on your performance in these games.
- 5% from class participation
- 45% from homework problems; there will be 3 problem sets.
- 45% from the final exam

No late assignments will be accepted.

Plagiarism Policy

McGill University values academic integrity. Therefore all students must understand the meaning and consequences of cheating, plagiarism, and other academic offenses under the Code of Student Conduct and Disciplinary Procedures (see `www.mcgill.ca/integrity/` for more information). Most importantly, work submitted for this course must represent your own efforts. Copying assignments or tests from any source, completely or partially, allowing others to copy your work, will not be tolerated.