

COMP 553

Algorithmic Game Theory

Lectures. Tuesday/Thursday 11.30am-1pm in Trottier Room 1100

Instructor.

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 - *Office Hours:* Friday 1pm-2.30pm in Burnside Room 1021

Teaching Assistants

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 - *Office Hours:* Wednesday 10am-11am in Burnside Room 1118
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Topics. An introduction to algorithmic game theory. The course will cover classical topics in economics and game theory, such as social choice theory, mechanism design, general equilibrium theory and welfare economics, and cooperative game theory. We will also study computational aspects and modern applications such as webpage advertising, online auctions, bandwidth allocation, network and traffic routing, social networks etc.

Pre-Requisites. A strong mathematical background. The course is intended primarily for higher level undergraduate and graduate students in mathematics, computer science, and economics. Given the interdisciplinary nature of the course no specific course can be a prerequisite. All concepts will be taught from scratch but a background in any of the following is useful: *game theory, economics, mathematical programming and optimization, algorithms and complexity, discrete mathematics.*

Course Textbook. [*Twenty Lectures on Algorithmic Game Theory*](#) by Tim Roughgarden, Cambridge University Press, 2016.

Reference Books.

- [*Algorithmic Game Theory*](#) by N. Nisan, T. Roughgarden, E. Tardos, and V. Vazirani (eds), Cambridge University Press, 2007.
- [*"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.

Grading Scheme. Assignments 30% and Final 70% (or Final 100% if this leads to a better mark).