Game Theory Exam Topics, Autumn 2018

1. Combinatorial games, Chomp, strategy-stealing, k-nim, Sprague–Grundy function, sums of games, Hackenbush, Hex (Ferguson Part I, Sections 1–4 and 6; Karlin–Peres Chapter 1).

2. Strategic games, domination, pure and mixed Nash equilibrium, iterated elimination. Repeated Prisoners Dilemma. Proof of the Nash theorem using Kakutani's fixed point theorem (Ferguson Part III Section 2; Karlin–Peres Chapter 4 and Section 6.4; Pritchard lectures 1–4; `https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-254-game-theory-with-engineering-applications-spring-2010/lecture-notes/MIT6_254S10_lec05.pdf`)

3. Maxmin strategies, von Neumann's minimax theorem on two-player 0-sum games, correlated equilibrium (Ferguson Part III Section 1.5; Karlin–Peres Chapter 2, Section 7.2; Pritchard lecture 5)

4. Top trading cycles algorithm, stable matchings, many-to-one matchings (Karlin–Peres Chapter 10; Abdulkadiroğlu–Sönmez Sections 2 and 3.1.1)

5. Cooperative games, core, spanning tree game, Shapley value (Ferguson Part IV, Sections 1–2)

List of online resources referred above:

- Thomas S. Ferguson, *Game Theory*, `http://www.math.ucla.edu/~tom/Game_Theory/Contents.html`
- A.N. Karlin, Yuval Peres, *Game Theory, Alive*, `https://homes.cs.washington.edu/~karlin/GameTheoryBook.pdf`
- David Pritchard, *Game Theory and Algorithms*, `http://ints.io/daveagp/gta/`
- Atila Abdulkadiroğlu, Tayfun Sönmez, *Matching Markets: Theory and Practice*, `https://www2.bc.edu/tayfun-sonmez/WorldCongressSurvey-June22-2011.pdf`

Note that these resources discuss several topics that we did not cover. You only have to learn the theorems that were mentioned in the lectures.