

Below is a brief checklist of main concepts of the course. Make sure you can make them precise. To obtain a good score at the exam, write clearly and logically, starting from definitions and correctly deducing and motivating your answers.

1 Normal form games

- pure and mixed strategies
- weak and strict domination
- iterated elimination of (weakly/strictly) dominated strategies
- rationalizability
 - iterated elimination of never-best replies
 - in 2-pl games: iterated elimination of strictly dominated pure strategies
- Nash equilibrium and refinements
 - Nash equilibrium
 - strict equilibrium
 - perfect equilibrium
 - * limit of ε -perfect strategy profiles (mistakes w. prob. $\leq \varepsilon$)
 - * perfect $\implies$ undominated; $\Leftarrow$ in 2-pl games
 - proper equilibrium
 - * limit of ε -proper strategy profiles (costly mistakes less likely by factor $\leq \varepsilon$)
- strict equilibrium $\implies$ proper equilibrium $\implies$ perfect equilibrium $\implies$ Nash equilibrium $\implies$ rationalizable strategy profile
- In mixed extensions of finite strategic games, strict equilibria need not exist, but proper equilibria (and consequently all other variants in the chain of implications above) do.

2 Extensive form games

- pure, mixed, behavioral strategies
- perfect recall
- outcome equivalence under perfect recall
- Nash equilibrium and refinements
 - Nash equilibrium
 - subgame perfect equilibrium
 - weakly perfect Bayesian equilibrium: assessment that is weakly consistent and sequentially rational

- sequential equilibrium: assessment that is consistent and sequentially rational
- existence of sequential equilibria via perfect equilibria in agent normal form: extensive-form perfect equilibrium
- Relations between equilibrium strategy profiles:
 - extensive form perfect equilibrium $\implies$ sequential equilibrium $\implies$ subgame perfect equilibrium $\implies$ Nash equilibrium
 - sequential equilibrium $\implies$ weakly perfect Bayesian equilibrium $\implies$ Nash equilibrium

3 Repeated games

- stage game, perfect monitoring, discount future payoffs
- in infinitely repeated games with discounting and perfect monitoring, what payoff vectors can be supported in subgame perfect Nash equilibrium?
 - folk theorem (2 players): for sufficiently patient players (high discount factor δ), any feasible and individually rational payoff vector of the stage game
 - similar result for 3/more players, provided no players have "equivalent" utility functions

4 Evolutionary stability

- robustness against small mutations
 - in a symmetric, finite, 2-pl game, a strategy x is evolutionary stable if it has a higher expected payoff than any mutant strategy y against a population where most people play x but a small positive fraction plays the mutant strategy y .
 - evolutionary stability $\implies$ proper equilibrium

5 Matching

- Deferred acceptance in marriage problem
 - stable matching
 - best for men, worst for women if men propose. Other way around if women propose
 - proposing side has no incentive to lie about preferences, accepting side might
 - no rule that always picks a stable matching and where truthtelling is optimal for both sides
- Variants: college admission, roommate problem
- top trading cycles in housing problem
 - stability: no group of people can make its members better off
 - reporting true preferences optimal