

Midterm exam: Instructions and study guide

ENM140, Game theory and rationality 2018

Document change log

14 november 2018: Updated information on where the exam is given.

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1 Purpose, format, and rules

The midterm exam is intended to test your understanding of the basic game-theoretic concepts covered in weeks 1–3. The study guide is Section 2 below details what you are expected to know for the exam.

Exam format and grading

- The exam consists of 18 statements, of which some are true (correct) and some are false (wrong). We don't specify how many are true or false.
- The 18 statements are divided into groups, where each group has some background information that is common to all the statements in the group.
- Your exam score is calculated as follows. Correct answers (i.e, true statements marked as true, and false statements marked as false) are awarded 1 point. Wrong answers (i.e., true statements marked as false, and false statements marked as true) give 1 point deduction. Statements that you do not mark never give any points, positive or negative.
- The maximum score is +18 and the minimum is –18. You must be awarded at least +6 points to pass the exam. Your exam score contributes directly to your total course score that is used to calculate your grade on the course (i.e., the exam contributes at most 18 points to your course score).

- You may only use a pen or pencil and an eraser. Specifically, no electronic equipment, no books, and no notes are allowed.
- There will be extra paper provided where you can make notes or calculations.

Other information and rules

- The exam will be given in room SBM500 on Monday 26 November 10:00–11:45.
- You must bring present a valid photo ID, i.e., a passport, Swedish driver's licence or other approved identification document that specifies citizenship and period of validity.
- Also bring your student union membership card.

2 Study guide

The midterm exam will cover materials from the following sections of the course book by Leyton-Brown and Shoham. The exam will use notation and terminology from these sections.

- Chapter 1 (all)
- Chapter 2 (all)
- Sections 3.3 and 3.8
- Chapter 4 (all)
- Section 5.1
- Sections 6.1 and 6.2

Specifically, the exam will test that you understand and can apply concepts from the following list of topics:

- Agents, actions, strategies, action profiles and strategy profiles
- Normal form and extensive form
- Pure and mixed strategies
- Zero-sum and non-zero-sum games
- Pareto optimality
- Best response
- Nash equilibrium:

- Define and identify pure strategy and mixed strategy Nash equilibria in simple two-player games
- Know and be able to apply Nash’s 1951 theorem on existence of Nash equilibrium (Theorem 2.3.1 in the course book)
- Domination: only strict domination is included. You need to be able to define strict domination and use the concept to perform elimination/removal of dominated strategies as in Section 3.3 of the course book.
- Sequential games:
 - Know the difference between perfect-information and imperfect-information extensive-form games
 - Subgame-perfect equilibrium in perfect-information sequential games
 - Understand and apply backward induction in sequential games
- Repeated games:
 - Finitely and infinitely repeated games
 - Infinitely repeated games with average payoff: Understand and apply the Folk theorem as stated in the course book (Theorem 6.2.5)
- Evolutionary game theory:
 - Evolutionarily stable strategy (ESS)
 - Understand the relationship between ESS and Nash equilibrium as stated in Theorem 3.8.3 and Theorem 3.8.4.