

GAME THEORY 2 - SYLLABUS FALL 2011

The focus of the lectures will be on fundamentals of the theory of mechanism design. There will be some assignments. Assignments will not be graded. However, I will post solutions for your reference. You are encouraged to complete the assignments for a better understanding of the topics. The mid-term examination has 50% weight and the final examination has the remaining 50% weight. The following topics will be covered in the course:

1. Mechanism design (7 Lectures)

- Social choice function
- Dominant strategy incentive compatibility
- Mechanisms and revelation principle
- Efficiency with transfers - Groves mechanisms
- Affine maximizers - generalized Groves mechanisms
- Combinatorial auctions
- Pivotal (VCG) mechanisms - combinatorial auctions
- Cycle monotonicity
- Single dimensional case
- Bayesian incentive compatibility

2. Budget balance and bilateral trade (2 Lectures)

3. Optimal auction design (3 Lectures)

- Standard auctions and motivations
- Characterization of Dominant Strategy incentive compatibility
- Revenue equivalence
- Optimal auction design
- Symmetric case

4. Topics on mechanism design without money (12 Lectures)

- Gibbard-Satterthwaite Theorem
- Two alternatives case
- House allocation problem

- Stable matchings
- Single-Peaked domains and possibilities
- Multi-Object choice problem and separability
- Randomization in Gibbard-Satterthwaite Theorem

Textbook: No textbook is required. Classnotes will be provided. However following books are good references.

- *Auction Theory* by **Vijay Krishna** - Chapters 1 to 5.
- *Microeconomic Theory* by **Mas-Collel, Whinston, and Green** - Chapter 23.
- *Algorithmic Game Theory* by **Nisan, Roughgarden, Tardos, and Vazirani** - Chapters 9, 10, and parts of 11.
- *Two-sided Matching: A Study in Game-theoretic Modeling and Analysis*, by **Alvin Roth and Marilda Sotomayor**, Econometric Society Monographs.