Brooklyn College
Department of Computer & Information Sciences

CISC 7422 [712X] Game Theory and Social Choice
37½ hours plus conference and independent work; 3 credits

A comprehensive introduction to the mathematical and logical techniques relevant to understanding the structure of games and social choice (elections). The study of social institutions, including electoral systems, using techniques from mathematics and computer science, including probability, game theory, and logic. (This course is the same as MATH 7580 **[**Mathematics 612X].)

Syllabus

Each topic is expected to take up one lecture.

1. Probability, preference orderings, utility.
2. Social choice.
3. Voting theory, alternative voting systems and their properties.
4. Theorems of Arrow and Gibbard-Satterthwaite.
5. Judgment aggregation and its paradoxes. Group identity.
6. Games in normal and extensive form. Prisoner's dilemma and other games.
7. Nash equilibrium,
8. Nash bargaining.
9. Midterm examination.
10. Propositional logic, validity, consequence.
11. Modal Logic, Logic of Knowledge.
12. Applications of knowledge to games
13. Fair division of property.
14. Other topics

Objectives of the course:

1. Students will learn how voting systems work and get some insight into various paradoxical results which have occurred in the US recently.

2. Students will acquire familiarity with common games and their analysis

3. Students will learn what it means for a set of individuals to be a group, and how co-ordination of action requires states of information which sustain such co-ordination.

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