MTL763 (Introduction to Game Theory)

3 Credits (3-0-0)

INFORMATION SHEET

Content:

Two player zero-sum games: Optimal strategies, value of the game, existence of saddle point equilibrium using Brouwer's fixed point theorem, graphical method, Linear programming formulations.

Non-zero sum games: Some well-studied examples, existence of Nash equilibrium for n-player games using Kakutani fixed point theorem, Pareto efficiency, symmetric games, algorithm to compute Nash equilibrium: i) Equilibria by support enumeration, ii) Equilibria by labelled polytopes, iii) Equilibria by vertex enumeration, iv) Lemke-Howson algorithm.

Strategic games with continuous strategy sets, Applications in market competition, Auctions, Electricity Market.

Sequential games, sub-game perfect Nash equilibrium.

Inefficiency of Equilibria: i) Price of Anarchy, ii) Price of Stability. Selfish routing games, Network Design Games. Network formation games: i) pairwise stability ii) Nash stability iii) strong stability, iv) efficiency. Some famous examples: Co-author example, connection models.

Main Text Books

1. Martin J. Osborne, An Introduction to Game Theory, Oxford University Press, 2003.
2. M. Osborne and A. Rubenstien, A Course of Game Theory, MIT 1994.
3. D. Fudenberg and J. Tirole, Game theory, MIT Press, 1991.
4. N. Nisan, T. Roughgarden, E. Tardos and V. V. Vazirani, Algorithmic Game Theory, Cambridge Univ. Press, 2007.

Scheme of Evaluation

Minor Test	1 X 30	30
Two Quizzes	2 X 15	30
One Major Examination	1 X 40	40
	Total	100

IMPORTANT INFORMATION

- Students are encouraged to contact the Course Coordinator or TAs for any difficulties regarding the course.
- Only those students who could not appear for the minor test due to medical reasons are eligible for the make-up examination. However, submission of a valid medical certificate adhering to the institute norms is mandatory.
- The evaluated minor answer books will be returned to the students and they must retain with them as a proof of the marks secured.
- No makeup quiz will be conducted for missing quizzes.

INFORMATION about the Instructor

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(Vikas Vikram Singh)
Course Coordinator