CS 698W: Topics in Game Theory and Collective Choice

1. **Objectives**: Formally analyze and design 'social' algorithms in the presence of strategic behavior of multiple rational and intelligent agents. First part introduces the ideas of game theory and the second part deals with designing mechanisms that account for several economic objectives. Finally we look at real world applications of these ideas.
2. **Prerequisites**: familiarity with formal mathematical reasoning, some probability theory, basic calculus, and knowledge of one programming language.
3. **Course Contents**: (# of modules in bracket)
    a. Introduction to game theory [2]
    b. Introduction to social choice theory [2]
    c. Mechanism design without money [4]
    d. Mechanism design with money in quasi-linear form [4]
    e. Cooperative games [1]
    f. Application domains [2]
4. **Special Emphasis**: use of analytical tools for economic decision making
5. **Lecture & Venue**: Tuesday, Friday 12-1 PM, Wednesday 2-3 PM, KD102
6. **Office Hours**: by appointment (maximum 2 hours per week)
7. **Evaluation Components & Policies**: Two exams and a course project (30% weight on each), scribing at most 2 lectures (10% weight)
8. **Course Policies**: No attendance, Honesty Practices and Withdrawal – in accordance with the Institute and DOAA norms.
9. **Books & References**: No specific textbook. Topics roughly follow the coverage by Yoav Shoham and Kevin Leyton-Brown: Multiagent Systems (www.masfoundations.org). Other relevant references and texts (if needed) will be posted on the course homepage from time to time. Some of the following books may be useful.
    a. Martin Osborne and Ariel Rubinstein: A course in game theory
    b. Martin Osborne: An Introduction to Game Theory
    c. Y. Narahari: Game Theory and Mechanism Design
    d. Tilman Borgers: An Introduction to the Theory of Mechanism Design
    e. Andreu Mas-Colell, Michael Whinston, and Jerry Green: Microeconomic Theory
    f. Game Theory course notes: http://www.isid.ac.in/~dmishra/gm1doc/notes_2016.pdf
    g. Mechanism Design course notes: http://www.isid.ac.in/~dmishra/gmdoc/mdnotes.pdf