CMC MSU Course Syllabus (Tentative)

Course No.	Game, Knowledge and Cooperation I	BSc MSc	
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DESCRIPTION and POURPOSES	This course is an introduction to game theory and strategic thinking from epistemic point view. Ideas such as information, knowledge, possibility, common-knowledge, Nash equilibrium, communication are discussed and applied to game played in class and to cooperative management problem such as principal-agent model with moral hazard.		
OBJECTIVES	After successfully completing the course, you will have a good understanding of the following topics and their applications: 1. Information partition model 2. Formal model of knowledge and common-knowledge 3. Nash equilibrium and Bayesian game 4. Epistemic approach to Game Theory		

TENTATIVE SCHEDULE

DAY	THEME	TOPICS	Remark
Lecture 1	Introduction to the courses	Preliminaries: Binary relation, Partition	
Lecture 2	Information Partition	Dirty faces ladies, Information function, Possibility set	
Lecture 3	Knowledge and Possibility	Knowledge operator, Possibility operator, Information partition, Trinity theorem	
Lecture 4	Common-Knowledge	Mutual knowledge, Infinite regress, Communal operator	
Lecture 5	Agreeing to Disagree	Aumann's theorem: We cannot agree to disagree	
Lecture 6	Communication and Knowledge Revision	Communication network, Revised information, Revision process of conjectures	
Lecture 7	Agreeing to Disagree Revisited	We reach consensus by communication after long run	
Lecture 8	Game and Nash Equilibrium	Strategic game, Mixed strategy, Nash equilibrium	
Lecture 9	Epistemic Condition for Nash Equilibrium (1)	Common-knowledge on conjectures leads to Nash equilibrium	
Lecture 10	Epistemic Condition for Nash Equilibrium (2)	Communication on conjectures leads to Nash equilibrium	
Lecture 11	Cooperative Management (1)	Principal-agent model, Moral hazard,	
Lecture 12	Cooperative Management (2)	Extended Principal-agent model under uncertainty	
Lecture 13	Cooperative Management (3)	Possible resolution of Moral Hazard by common-knowledge	
Lecture 14	Concluding Remarks		
Lecture 15	Final Examination		
References	1. R. J. Aumann, 1976. `Agreeing to disagree', Annals of Statistics Vol. 4, pp.1236—1239 2. R. Aumann and A. Brandenburger. 1995. `Epistemic Conditions for Nash Equilibrium', Econometrica Vol 63 No. 5, pp. 1161-1180 3. K. Binmore. *Fun and Game*. D.C.Heath and Company, Lexington, Massachusetts (1992) 4. M.J. Osborn and A. Rubinstein. *A Course on Game Theory*. MIT Press (1994)		
Grading Plan	TBA		