PHIL478P Topics in Philosophical Logic: Reasoning about Knowledge and Beliefs

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Semester:	Fall 2013
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Course Website:	Available on ELMS
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Office Hours:	T 1 - 2 PM
Class Times:	MW 11 - 11:50 AM
Class Location:	Skinner 1115

Course Description

Reasoning about the knowledge and beliefs of a single agent or group of agents is an interdisciplinary concern spanning philosophy, game theory, artificial intelligence, and mathematics. Inspired, in part, by issues in these different "application" areas, many different notions of knowledge and belief have been identified and analyzed in the formal epistemology literature. The main challenge for a logician is not to argue that one particular account of belief or knowledge is primary, but, rather, to explore the logical space of definitions and identify interesting relationships between the different notions. A second challenge is to keep track of the many different formal frameworks used in this broad literature. This course will introduce students to key issues that arise when designing a formalism to make precise intuitions about the knowledge and beliefs of a group of agents. Topics to be discussed include modal logics of knowledge and beliefs (including probabilistic modal logics), formal definitions of common knowledge and common belief, dynamic epistemic logic, modal logics of belief revision, logical omniscience, the surprise examination paradox, the knowability paradox, the absent-minded driver problem, and Aumann's agreeing to disagree theorem.

Literature

The course will be based on readings from various textbooks are journal articles. The reading material for each week will be available on ELMS. The main texts that we will follow for the course include:

1. W. Holliday, Epistemic Logic and Epistemology, Handbook of Formal Philosophy, Springer, forthcoming
2. E. Pacuit, Dynamic Epistemic Logic I: Modeling Knowledge and Belief, Philosophy Compass, 2013
3. E. Pacuit, Dynamic Epistemic Logic II: Logics of Information Change, Philosophy Compass, 2013

4. R. Sorensen, Epistemic Paradoxes, Stanford Encyclopedia of Philosophy, 2011

The following texts are recommended for additional reading and background information:

- J. van Benthem, *Logical Dynamics of Information and Interaction*, Cambridge University Publications, 2011
- R. Fagin, J. Halpern, Y. Moses and M. Vardi, *Reasoning about Knowledge*, The MIT Press, 2004
- H. Rott, *Change, Choice and Inference: A study of Belief Revision and Nonmonotonic Reasoning*, Oxford University Press, 2001
- N. Tennant, *Changes of Mind: An Essay on Rational Belief Revision*, Oxford University Press, 2012

Consult http://pacuit.org/esslli2013/epistemic-puzzles for a abbreviated version of this course and pointers to additional readings.

Attendance and Online Component

This course is officially listed as a "hybrid course". This means that our in class meetings are shorter (50 minutes) and that there is an online component for this course. Since we have less time for in-class meetings, it is *very* important that you attend all the lectures. The online component will consist of a few pre-recorded lectures (covering background material and material we do not have time to discuss during the lectures) and some online quizzes. Consult the course website on ELMS (elms.umd.edu) for more information.

Grading Policy

The course requirements are: participation & short quizzes (30%), 2-3 problem sets (30%), and a final exam (40%).

Schedule

The following is a tentative schedule of the topics we will discuss this semester. A more detailed schedule, including links to the reading material, can be found on the course website.

Week	Date	Topics
1	Wed 9/4	Introductory Remarks
2	Mon 9/9	Analyzing The Surprise Exam, I
2	Wed 9/11	Analyzing The Surprise Exam, II
3	Mon 9/16	**Class Canceled** (Speaking at the Asian Logic Conference)
3	Wed 9/18	**Class Canceled** (Speaking at the Asian Logic Conference)
4	Mon 9/23	Logical Omniscience and Epistemic Closure
4	Wed 9/25	Lottery & Preface Paradox
5	Mon 9/30	Digression: The Knower Paradox
5	Wed 10/2	Logics of Knowledge
6	Mon 10/7	Williamson's Margin of Error Paradox
6	Wed 10/9	Logics of Knowledge and Belief
7	Mon 10/14	Knowability and Fitch's Paradox
7	Wed 10/16	Public Announcement Logic
8	Mon 10/21	Successful and Self-Refuting Sentences
8	Wed 10/23	Introduction to Belief Revsion
9	Mon 10/28	AGM Postulates
9	Wed 10/30	Evaluating Counterexamples to the AGM Postulates
10	Mon 11/4	Alternative Models of Belief Change (Tennant)
10	Wed 11/6	Dynamic Logics of Belief Revision, I
11	Mon 11/11	Dynamic Logics of Belief Revision, II
11	Wed 11/13	Postulates of Iterated Belief Revision
12	Mon 11/18	Logics of Knowledge, Time, Action and Ability, I
12	Wed 11/20	Logics of Knowledge, Time, Action and Ability, II
13	Mon 11/25	The Absent-Minded Driver and the Forgetful Passenger
13	Wed 11/27	Reasoning about Other's Beliefs: The Brandenburger-Keisler Paradox
14	Mon 12/2	Common Knowledge, Common Belief and Common p-Belief
14	Wed 12/4	Aumann's Agreeing to Disagree Theorem and its Generalizations
15	Mon 12/8	Common Knowledge of Rationality and Backwards Induction, I
15	Wed 12/10	Common Knowledge of Rationality and Backwards Induction, II