

Course Name	Contemporary Philosophy (Lecture) : Dynamic Epistemic Logic and its Applications		
Semester, Year	First Semester, 2019	Number of Credits	2 credits
Course level	5000	Course Number	027005
Instructor(s) (Institution)	Katsuhiko SANO 大学院文学研究院		
Course Objectives	Epistemic logic models knowledge and belief in multi-agent systems. Dynamic epistemic logic models change of knowledge and belief. We provide a comprehensive and basic introduction into dynamic epistemic logic, going in detail into the semantics, with lots of examples and hands-on exercises, and treating topics such as expressivity, axiomatization, and bisimulation. The course will cover: (i) knowledge and belief, and group epistemic notions general knowledge, common knowledge, and distributed knowledge; (ii) Public announcement logic, and unsuccessful updates; (iii) Action model logic, semi-public events, fully private events; (iv) Plausibility models and belief revision, i.e., integrated knowledge and belief change, including modellings of (the event of) lying; (v) Factual change, embeddings into temporal epistemic logic (protocol-generated forests), and various matters involving change of distributed knowledge and common knowledge. This includes the so-called resolution of distributed knowledge: how to make (some of it) common knowledge.		
Course Goals	By the end of this course, students will be able to 1. use formal languages of the dynamic logics to describe examples, 2. derive consequences from the assumptions captured in these languages, and 3. use formal language to discuss various conceptual issues.		
Course Schedule	Lectures 1-3: Epistemic logic (knowledge and belief, and alternative notions of knowledge; general knowledge, common knowledge, and distributed knowledge) Lectures 4-6: Public announcement logic, and unsuccessful updates (including interaction with group epistemic notions and applications to cards cryptography) Lectures 7-9: Action model logic, semi-public events, fully private events. Lectures 10-12: Plausibility models and belief revision, i.e., integrated knowledge and belief change, including modellings of (the event of) lying Lectures 13-15: Factual change, embeddings into temporal epistemic logic (protocol-generated forests), resolving distributed knowledge		
Homework	Students will be given exercises both in the class and for homework		
Grading System	Your grade will be determined how well you demonstrate your achievement of the course goals in the paper in which you 1. use formal language(s) of the dynamic logics to describe examples you discuss (30%), 2. derive consequences from the assumptions captured in these languages (30%), and 3. discuss the conceptual issue(s) you choose for your final project (40%).		
Textbooks / Reading List	There is no main textbook for this course. The principal material consists in slides of lectures, which will be regularly made available online prior to the start of the course. In addition, we will refer to a number of textbooks and materials. The materials listed in the following "Reading List" will be of much help. One Hundred Prisoners and a Light Bulb Hans van Ditmarsch, Barteld Kooi Springer 2015 Dynamic Epistemic Logic Hans van Ditmarsch, Wiebe van der Hoek & Barteld Kooi Springer 2007 Logical Dynamics of Information and Interaction Johan van Benthem 2011 2011 Handbook of Epistemic Logic Hans van Ditmarsch, Joe Halpern, Wiebe van der Hoek, Barteld Kooi (eds.) College Publications 2015 1) Japanese translation (ISBN 9784535788282). In particular, the chapter Dynamic Epistemic Logic. https://www.amazon.co.jp/dp/4535788286 http://personal.us.es/hvd/lightbulb.html		
Websites	This course will be provided as part of the Hokkaido Summer Institute. For more information (invited lecturers, course details, etc.), please visit the website below: https://hokkaidosummerinstitute.oia.hokudai.ac.jp/courses/CourseDetail=G099		
Website of Laboratory			
Additional Information	You can learn how the last year's class was by visiting the following page: in Japanese: https://www.let.hokudai.ac.jp/news/2018/09/14881 in English: https://www.let.hokudai.ac.jp/en/2018/12/11/dynamic-epistemic-logic-and-its-applications-was-held-hokkaido-summer-institute-2018/ Required Equipment for a class: A laptop or tablet will be useful to download the above materials. Recommended Course (Course highly recommended to be taken together with this course): Logic: Introduction to Logic 2019		