

Course Name	Logic (Seminar): Introduction to Logic		
Semester, Year	First Semester, 2019	Number of Credits	2 credits
Course level	5000	Course Number	027006
Instructor(s) (Institution)	Katsuhiko SANO 大学院文学研究院		
Course Objectives	<p>Logic is a basic tool for evaluating a reasoning. A given reasoning may be evaluated in terms of truth of a sentence or correctness of the use of logical vocabulary. From these two perspectives, this course provides basics of propositional, first-order and modal logics. This course aims to provide basics of propositional logic, first-order logic and modal logic from both semantic and proof-theoretic perspectives. In particular, the course will cover the following topics for each of the three logics:</p> <ol style="list-style-type: none"> 1. What is a general framework of logic? What are syntax, semantics and proof theory? 2. How can we translate or formalize a given natural language sentence into a formula in a logic? 3. How can we establish a validity of a given reasoning or argument? 4. How can we falsify (or provide a counterexample against) a given reasoning or argument? 5. What is a relationship between semantic and proof-theoretic approaches, i.e., an approach based on the notion of truth and an approach based on the behavior of logical connectives? 		
Course Goals	<p>By the end of this course, you will be able to:</p> <ol style="list-style-type: none"> 1. Understand a general framework of logic. 2. Formalize a fragment of English sentences into a formula of a logic. 3. Check if a given reasoning holds in term of both tableau calculus and natural deduction calculus. 4. Provide a counterexample when a given reasoning does not hold, with the help of tableau calculus. 5. Understand the relationship between semantic and proof-theoretic approaches. 		
Course Schedule	<p>Lecture 1: A general framework of logic and semantics of propositional logic: Truth table Lectures 2-3: Proof-theory of propositional logic: Tableau calculus. Lectures 4-5: Proof-theory of propositional logic: Natural deduction calculus, and summary on propositional logic Lectures 6: Syntax of first-order logic and difficulties in multiple quantifications Lectures 7-8: Proof-theory of first-order logic: Tableau calculus. Lecture 9: Semantics of first-order logic: Model Theory Lectures 10-11: Proof-theory of first-order logic: Natural deduction calculus, and summary on first-order logic. Lecture 12: Syntax and Kripke Semantics of Modal logic Lectures 13-14: Proof-theory of modal logic: Tableau Calculus Lecture 15: Proof-theory of modal logic: Natural deduction calculus, and summary on modal logic.</p>		
Homework	<p>All related notions will be introduced and explained in the lectures. To achieve the course goals, it is quite important and necessary for you to solve exercises to check if you understand the contents property. In this respect, there will be exercise sessions in almost all lectures. Moreover, there will be four homework assignments during the whole schedule.</p>		
Grading System	<p>Your grade will be determined by how well you demonstrate your achievement of the Course Goals though:</p> <ol style="list-style-type: none"> 1. Your contributions to exercise sessions (20%) 2. Homework assignments (80%, there will be four assignments and each is counted as 20%) 		
Textbooks / Reading List	<p>None. English handouts will be distributed in each lecture. Will be provided during the course.</p>		
Websites	<p>https://www.let.hokudai.ac.jp/news/2018/08/14772/ For more information (invited lecturers, course details, etc.), please visit the website below: https://hokkaidosummerinstitute.oia.hokudai.ac.jp/courses/CourseDetail=G096</p>		
Website of Laboratory			
Additional Information	<p>Please visit the following URLs that show actual class activities in 2018 in Japanese: https://www.let.hokudai.ac.jp/news/2018/08/14772/ in English: https://www.let.hokudai.ac.jp/en/2018/12/11/introduction-to-logic-was-held-hokkaido-summer-institute-2018/ Recommended Course (Course highly recommended to be taken together with this course): Contemporary Philosophy : Dynamic Epistemic Logic and its Applications 2019</p>		