

PHIL 4160/5160: Philosophy of Science

Fall 2015 (Class #10440/10642), Wednesdays 3:05–6:05pm, Ellis Hall 215

BASIC INFORMATION

Instructor Dr. Yoichi Ishida (pronounced “yo-EE-chee ee-SHEE-da”)
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 Mailbox: Ellis Hall 202
 Instructor website: www.yoichiishida.com

Office & Ellis Hall 220H
Office Hours Mondays and Wednesdays 1–2pm and by appointment

Course Website Blackboard: <https://blackboard.ohio.edu>

Turnitin: <http://turnitin.com/> (Login information will be provided later.)

COURSE DESCRIPTION

Topic of the Course Scientific modeling has been an enormously successful methodology for learning about the real-world systems: Scientists have successfully learned about the world by studying *models* of real-world systems. But scientific models are idealized in one way or another: They represent systems that do not exist in the real world, such as an object moving on a frictionless plane or an infinitely large population of organisms. So how can models help scientists learn about the real world? This course examines the epistemology of modeling, together with other basic questions about scientific modeling, in particular, what a model is, and what it is for a model to be a representation.

Learning Outcomes Upon completion of this course, the students will be able to:

1. Explain important theoretical and empirical problems and disputes regarding the course topic.
2. Explain major theories and models in the literature on the course topic.
3. Think critically about and discuss the problems as well as the proposed solutions.

Prerequisites 3 courses in philosophy or graduate standing

Disclaimer Although the learning outcomes are designed to be suitable for an upper-division undergraduate and a graduate course, students may still vary in their competency

and performance levels on these learning outcomes. They can expect to achieve these outcomes only if they honor all course policies, attend and participate in classes regularly, and complete all assigned work in good faith and on time.

TEXTBOOKS

All readings will be posted on Blackboard. You must bring your copies of a week's required readings to class.

ASSESSMENT OF STUDENT LEARNING

The assignments listed below are required in this course and count toward your final grade as described in this section. Note that there are two different sets of assignments, one for undergraduate students and the other for graduate students.

ASSIGNMENTS (Undergraduate)

Discussion Questions By 3pm on Tuesday each week, you will post on Blackboard one question about the week's reading that you would like to discuss in the seminar on Wednesday. Your question will be viewed by other people in class.

Contribution to Discussion You are to contribute to the discussion in each seminar meeting by asking questions or making comments that are relevant to the topic at hand. In addition, you are expected to answer other students' discussion questions posted on Blackboard. Your contribution to online discussion will be monitored periodically.

Seminar Presentations Each student will lead in-class discussions on a rotating basis. You are expected to meet with me (or communicate via email) at least one day before your presentation to make sure that you have prepared properly.

Your goal is to review the essential content of the reading read for the seminar, proceeding with the assumption that the seminar has read the paper in advance. Your goal is to establish a common understanding of the text's content upon which subsequent discussion is based. You are to identify what are the major theses, the arguments that support them, the important ideas, and the paper's strengths and the weaknesses. Your goal is NOT merely to recapitulate passively what you read. For long readings, it will not be possible to present everything in the paper. Be bold. Select the most important content and concentrate on that. Leave the incidentals. That is better than giving superficial coverage of everything.

You should plan to present for about 15 min and lead the discussion for another 15 min. It is often a good idea to provide handouts so that few notes need to be

taken. I encourage you stand at the blackboard, make strong eye contact with the seminar and deliver the material, writing as needed on the blackboard. This promotes a more engaging presentation than when you sit at the table with your head buried in your notes talking to them.

Essays There will be two essays (approx. 2000 words each) on the topics to be provided. Each essay is worth 10% of the final grade. Both essays must be turned in to turnitin.com by the due dates.

Final Exam The final exam will be comprehensive. It is closed book and scheduled for 12/9.

FINAL GRADE (Undergraduate)

In summary, the available points for the assignments are distributed as follows:

Assignments	Weight (%)
Discussion Questions & Contribution to Discussion	20
Seminar Presentations	30
Essays	20
Final Exam	30
Total	100 %

You will receive a final letter grade according to the following grading scale. Your percentage points will be rounded to the nearest one (e.g., 92.5 is rounded up to 93; 89.4 is rounded down to 89). Although not formalized in the table above, your improvements over the course of the semester and exceptionally good participation in class will count favorably toward your final grade.

Grade	Percentage	Grade	Percentage
A	93 or above	C	73-76
A-	90-92	C-	70-72
B+	87-89	D+	67-69
B	83-96	D	63-66
B-	80-82	D-	60-62
C+	77-79	F	59 or below

ASSIGNMENTS (Graduate)

Discussion Questions By 3pm on Tuesday each week, you post on Blackboard two (2) questions about the week's reading that you would like to discuss in the seminar on Wednesday. Your questions will be viewed by other people in class.

Contribution to Discussion You are to contribute to the discussion by asking questions or making comments that are relevant to the topic at hand. The quality of your contribution is important: you should aim to keep the discussion to the point and constructive. In addition, you are expected to answer other students' discussion questions

posted on Blackboard. Your contribution to online discussion will be monitored periodically.

Seminar Presentations Each student will lead in-class discussions on a rotating basis. You are expected to meet with me (or communicate via email) at least one day before your presentation to make sure that you have prepared properly.

Your goal is to review the essential content of the reading read for the seminar, proceeding with the assumption that the seminar has read the paper in advance. Your goal is to establish a common understanding of the text's content upon which subsequent discussion is based. You are to identify what are the major theses, the arguments that support them, the important ideas, and the paper's strengths and the weaknesses. Your goal is not merely to recapitulate passively what you read. For long readings, it will not be possible to present everything in the paper. Be bold. Select the most important content and concentrate on that. Leave the incidentals. That is better than giving superficial coverage of everything.

You should plan to present and lead the discussion for 50-60 minutes. You can use this time in various ways; for example, you may do a more formal presentation followed by discussion or do an informal mix of presentation and discussion. In any case, you should prepare your presentation so that we will have at least 30 min worth of discussion.

It is often a good idea to provide handouts so that few notes need to be taken. I encourage you stand at the blackboard, make strong eye contact with the seminar and deliver the material, writing as needed on the blackboard. This promotes a more engaging presentation than when you sit at the table with your head buried in your notes talking to them.

Term Paper A term paper (approx. 4000-5000 words) is due at the end of the term. By Week 9, each graduate student must see me to discuss potential paper topics.

FINAL GRADE (Graduate)

In summary, the available points for the assignments are distributed as follows:

Assignments	Weight (%)
Discussion Questions & Contribution to Discussion	30
Seminar Presentations	40
Term Paper	30
Total	100

You will receive a final letter grade according to the grading scale given above for undergraduate students.

You can expect to get an A only if you meet the course requirements and expectations in an exemplary manner and you demonstrate that you have attained the learning outcomes at a sophisticated level.

COURSE POLICIES

All students in this course are expected to comply with the following policies.

Academic Integrity Academic integrity and honesty are basic values of Ohio University. Students are expected to follow standards of academic integrity and honesty. Academic misconduct is a violation of the Ohio University Student Code of Conduct subject to a maximum sanction of disciplinary suspension or expulsion as well as a grade penalty in the course.

You are expected to be familiar with the information on academic integrity provided at <http://www.ohio.edu/communitystandards/academic/students.cfm>.

Electronic Devices You may use laptops to take notes during class, but you may not use any electronic devices, such as cellphones, tablets, and laptops, while you are doing graded assignments in class (e.g., exercises, exams).

Turnitin Students agree that by taking this course all required papers may be subject to submission for textual similarity review to Turnitin.com for the detection of plagiarism. All submitted papers will be included as source documents in the Turnitin.com reference database solely for the purpose of detecting plagiarism of such papers. Use of Turnitin.com page service is subject to the Usage Policy and Privacy Pledge posted on the Turnitin.com site.

Attendance Attendance is strongly encouraged, but will not be taken formally. But missing a class will impede your success in many ways.

Classroom Incivility You are expected to behave in a civil manner, carefully listen to whoever is talking at a moment, and respect other people in class. I will not tolerate behaviors that are harmful to the learning of other students, such as disrupting other people's speech, mocking or insulting other people, and showing general disrespect and poor manners toward other people in class.

Grade Disputes If you believe that a grade on any specific assignment was in error, or unfair, you should resubmit that assignment, along with a brief cover note detailing those prima facie errors, or disagreement, together with appropriate evidence. The same procedure should be followed regarding the final grade. A request for re-grading or re-assessment is just that: the revised grade may increase, remain unchanged, or decrease. An explanation will be provided to the student in any case. Note that this policy does not apply to grade *calculation* errors, which should be brought to my attention right away.

Late or Missed Assignments & Exams *Discussion Questions:* You are expected to post your question and participate in discussion in a timely manner, but if you are late, you may still post your question, which will be taken into account in the determination of your final grade. Continuing post-seminar discussion online is welcome, and it will count favorably toward your final grade.

Essays: A late essay will be accepted but penalized at the rate of 4 percentage points for each day (including weekends) the essay is late.

Exams: A makeup for the midterm exam can be arranged only in exceptional circumstances (see below). The final exam is firmly scheduled for 8–10am on 12/12. If you are scheduled for more than three final exams in one day, you may seek relief from the instructor with the examination scheduled *latest* in the day. For more on this procedure, see <http://www.ohio.edu/registrar/info/FALL2014-15/finals.htm>.

Seminar Presentations: You are not to miss your presentation for any reason other than exceptional circumstances outlined below.

Exceptional circumstances: The following are generally considered exceptional circumstances: a medical emergency, the death of a near relative, and a university-related trip (e.g., athletic team commitments). If you are in these circumstances, (i) obtain written documentation from a relevant authority (e.g., doctor, coach, etc.) verifying that you are/were in one of these circumstances, (ii) contact me as soon as you can to set up an appointment, and (iii) show me the documentation. I will then decide how to apply the policy on late or missed assignments and exams to your circumstance, and I will make, by mutual agreement, any necessary makeup assignments or other arrangements.

UNIVERSITY RESOURCES FOR LEARNING

Your success in this course is important to me. I recognize that there are multiple ways to learn and that this multiplicity should be acknowledged in the structure of university courses and the evaluation of their participants. Thus, I encourage you to discuss your learning styles and comprehension requirements with me during my office hours or at another arranged time, if necessary. Every student is entitled to a meaningful and stimulating learning experience, and you are strongly encouraged to use the services provided by the Academic Advancement Center and the Student Writing Center. Disabled students are also strongly encouraged to use the services provided by Student Accessibility Services, including the provision of note-takers, transcribers, and sign-language interpreters.

Student Accessibility Services Any student who feels s/he may need an accommodation based on the impact of a disability should contact me privately to discuss your specific needs and provide written documentation from Student Accessibility Services. If you are

not yet registered as a student with a disability, please contact Student Accessibility Services at 740-593-2620 or visit the office in 348 Baker University Center.

Academic Advancement Center You can discuss any academic matters at the Academic Advancement Center, Alden Library 101, 740-593-2644 (<http://www.ohio.edu/aac/index.cfm>).

Student Writing Center Clear and well-organized writing is absolutely necessary for getting a good grade on the essays in this course. While you work on your essays, you should consider visiting the Student Writing Center in Alden Library (2nd floor), 740-593-2646. You can schedule an appointment online at <http://www.ohio.edu/writing/>.

COURSE SCHEDULE

The following is a *tentative* schedule of topics, reading, assignments, and their due dates. Supplementary readings may be assigned. Expect that this schedule and the assigned readings will be modified throughout the term to meet the students' interests and progress. *You are expected to have done the assigned reading before the first class each week.*

Wk	Date	Topic	Readings	Presenter
1	8/26	Introduction	Suárez , "Scientific Representation." Frigg and Hartmann , "Models in Science." Contessa , "Scientific Models and Representation" (The above are all background readings.)	Ishida
Unit 1. What is a Model?				
2	9/2	Examples of Modeling	Weisberg , <i>Simulation and Similarity</i> , Ch. 2. Roughgarden , <i>Theory of Population Genetics and Evolutionary Ecology</i> , pp. 432–440. Schelling , <i>Micromotives and Macrobehavior</i> , Ch. 4.	Ishida
Add/drop periods ends on Friday, 9/4				
3	9/9	Models as Representational Structures/Entities	Lloyd , <i>The Structure and Confirmation of Evolutionary Theory</i> , Ch. 2–3. Giere , <i>Explaining Science</i> , Ch. 3. Weisberg , <i>Simulation and Similarity</i> , Ch. 3.	
4	9/16	Models as Fictions	Cartwright , <i>How the Laws of Physics Lie</i> , Essays 7–8. Godfrey-Smith , "Models and Fictions in Science." Fine , "Science Fictions: Comment on Godfrey-Smith."	
Unit 2. Representation				
5	9/23	The Concept of Representation	Haugeland , "Representational Genera." Ramsey , <i>Representation Reconsidered</i> , Ch. 1.	
6	9/30	Cont.	Goodman , <i>Languages of Art</i> , pp. 3–43, 170–173. Bailer-Jones , <i>Scientific Models in Philosophy of Science</i> , Ch. 8.	
7	10/7	Peirce's Theory of Signs	Liszka , <i>A General Introduction to the Semeiotic of Charles Sanders Peirce</i> , Ch. 2. Peirce selections (TBA)	

Undergraduate: Essay 1 due by 11:59pm on October 9.

8	10/14	Cont.	Liszka cont. Peirce selections (TBA)	
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Graduate: By week 9, the graduate students must discuss term paper topics with the instructor.

9	10/21	Scientific Representation	Elgin , "True Enough." Van Fraassen , <i>Scientific Representation</i> , Ch. 1 and Appendix to Ch. 1. Giere , "An Agent-Based Conception of Models and Scientific Representation"	
10	10/28	Cont.	Hughes , "Models and Representation" Suárez , "An Inferential Conception of Scientific Representation." Callendar and Cohen , "There is no special problem about scientific representation."	

Unit 3. Epistemology of Modeling

Friday, 10/30: Last day to withdraw from a class

11	11/4	Models, Representation, and Reasoning	Hesse , <i>Models and Analogies in Science</i> , pp. 7–56. Swoyer , "Structural Representation and Surrogate Reasoning."	
12	11/11	Veterans Day		
13	11/18	Models and Idealization	Levins , "The Strategy of Model Building in Population Biology." Wimsatt , "False Models as Means to Truer Theories." Weisberg , "Three Kinds of Idealization."	
14	11/25	Thanksgiving		
15	12/2	Models, Representation, and Similarity	Teller , "Twilight of the Perfect Model Model."	

Undergraduate: Essay 2 due by 11:59pm on December 4.

Final Exam: Wednesday, December 9, 3:05–6:05pm. Graduate student term papers are due in class.

Disclaimer The above schedule, policies, procedures, and assignments in this course are subject to change in the event of extenuating circumstances, by mutual agreement, and/or to ensure better student learning.

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