Philosophy 3400: Philosophy of Natural Science
Syllabus

PHIL 3400; Section 03FH
Fall 2019
T 1:55pm-2:45pm; R 1:55pm - 3:50pm
Griffin-Floyd Hall, Room 100

Instructor Information

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Office Hours: T/R 10:35am - 11:35am, or by appointment
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Course Description and Objectives

This course is a general introduction to the philosophy of science. We will focus on both classic and contemporary issues in the field, including questions such as: What is the difference between science and pseudoscience? How do we confirm scientific theories, and what justifies our confidence in their correctness? What is the nature of scientific explanation, and how does it work? What are laws of nature, and why does science seek to discover them? How should we understand the relationship between sciences focused on different levels of nature, like physics and biology? How do the personal values of individual scientists affect the objectivity of science?

General Education Objectives and Learning Outcomes

This course is a Humanities (H) subject area course in the UF General Education Program. Humanities courses provide instruction in the history, key themes, principles, terminology, and theory or methodologies used within a humanities discipline or the humanities in general. Students will learn to identify and to analyze the key elements, biases and influences that shape thought. These courses emphasize clear and effective analysis and approach issues and problems from multiple perspectives. A minimum grade of C is required for general education credit.

PHI 3400 accomplishes these goals by familiarizing students with some key philosophical topics and arguments concerning science: its methods, aims, presuppositions, and justification. Students will become adept at thinking critically, analyzing arguments, and writing clearly and persuasively.

The General Education Student Learning Outcomes (SLO's) divide into three areas: CONTENT—students demonstrate competence in the terminology, concepts, theories and methodologies used within the discipline; COMMUNICATION—students communicate knowledge, ideas and reasoning clearly and effectively in written and oral forms appropriate to the discipline; and CRITICALTHINKING—students analyze information carefully and logically

from multiple perspectives, using discipline-specific methods, and develop reasoned solutions to problems.

Students will satisfy the CONTENT SLO by demonstrating a mastery of some key philosophical concepts as well as central arguments in the discipline. The COMMUNICATION SLO will be achieved by two papers, take-home midterm and final exams, and regular participation in class. Students will be required to explain and evaluate various views in the philosophy of science. Students will also demonstrate achievement of the CRITICAL THINKING SLO through the papers and exams, which will be on assigned topics designed to test students' critical thinking abilities. These assignments will be graded on the basis of a student's comprehension of the relevant issues, development and cogent defense of her or his position, clarity of expression, and mechanics.

In short, at the end of the course, students will be able to:

- Explain some traditional positions in the philosophy of science as well as common objections to them
- Analyze, evaluate, construct, and present persuasive and cogent arguments for particular philosophical positions
- Think critically about difficult and complex topics

Academic Honesty

UF students are bound by The Honor Pledge, which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: 'On my honor, I have neither given nor received unauthorized aid in doing this assignment.'"

The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor. Plagiarism on any assignment will automatically result in a grade of "E" for the course. Plagiarism is defined in the University of Florida's Student Honor Code as follows: "A student shall not represent as the student's own work all or any portion of the work of another. Plagiarism includes (but is not limited to): a. Quoting oral or written materials, whether published or unpublished, without proper attribution. b. Submitting a document or assignment which in whole or in part is identical or substantially identical to a document or assignment not authored by the student." Students found guilty of academic misconduct will be prosecuted in accordance with the procedures specified in the UF honesty policy.

Attendance and Classroom Policies

Students are expected to attend class and to have done all assigned reading in advance. Failure to do so will adversely affect students' ability to perform well in this course. The use of smart phones during class is not permitted. Requirements for class attendance and make-up

exams, assignments, and other work in this course are consistent with university policies that can be found at:
https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.

Canvas e-Learning Environment
This course is supplemented by online content in the e-Learning environment known as "Canvas." To login to the e-Learning site for this course, go to https://lss.at.ufl.edu/, click the **e-Learning in Canvas** button, and on the next page enter your Gatorlink username and password. You can then access the course e-Learning environment by selecting PHIL 3400 from the **Courses** pull-down menu at the top of the page. If you encounter any difficulties logging in or accessing any of the course content, contact the UF Computing Help Desk at (352) 392-4537. Please do not contact the course instructor regarding computer issues.

Online Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

Accommodation for Students with Disabilities
Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.

Counseling and Wellness Center:
http://www.counseling.ufl.edu/cwc/Default.aspx, 392-1575
University Police Department:
392-1111 or 9-1-1 for emergencies.

Course Text
There are two textbooks for this course:

- *Philosophy of Science: The Central Issues, 2nd Edition*, edited by Martin Curd, J. A. Cover, and Christopher Pincock. Published by W. W. Norton and Company.
- *Philosophy of Science: A Contemporary Introduction, 3rd Edition*, by Alex Rosenberg. Published by Routledge.

These books are available from the bookstore and on Amazon. The majority of our readings will come from these books; other readings will be provided on Canvas.

Course Requirements
Participation: 5%
Reading Quizzes: 15%
Paper 1: 15%
Paper 2: 20%
Take-Home Midterm Exam: 20%
Take-Home Final Exam: 25%

Participation
Respectful participation is expected of everyone. It can take a variety of forms: contributing to class discussions, coming to office hours, emailing me with questions, etc. Each class has assigned readings, which will require critical engagement and reflection. You should come to class prepared to discuss these readings and demonstrate that you have thought critically about them beforehand.

Reading Quizzes
To prepare for our discussions, we need to study the readings carefully. As you study the reading, to outline what the author's main claim is, what their principal reasons for that claim are, what alternative position(s) they consider, and the reason(s) why they do not adopt those alternatives. To reward you for doing this work, there will be daily quizzes during the course of the semester. Each quiz will contain two or three true-false, multiple-choice, or short answer questions about the required reading for that day's class. I will drop your three lowest reading quiz grades. If you miss a reading quiz, you will not be able to retake it. If you miss a reading quiz, you will not be able to retake it. The drop policy is meant to accommodate unforeseen illnesses, emergencies, and the like. If you will miss a reading quiz for a religious holiday or another official university activity, you must notify me ahead of time; quizzes missed for these reasons will *not* count toward your three dropped quizzes for the semester.

Papers
You will write two papers for this course. For each paper, you will be given the choice of several prompts, of which you must choose one and write a 4-5 page paper in response. The prompts will concern topics we have read about and discussed in class. The papers give you the opportunity to illustrate your understanding of the material, as well as to develop your own views. (For a basic overview of how to write a philosophy paper, the following website is worth exploring: http://www.jimpryor.net/teaching/guidelines/writing.html.) Late papers will be deducted 1/3 of a letter grade (i.e. a +/- increment) for each day past the due date.

Midterm Exam
The midterm exam is a take-home exam due by Friday, October 18 at 5pm (to be submitted on Canvas). The exam prompts will be provided at least a week before the due date. You will have to choose a subset of them to answer with a relatively short essay. The questions will concern the readings and topics we have discussed over the first half of the semester. While you may

discuss the question prompts with other students, *you may not work with anyone else on the preparation of your answers.*

Final Exam

The Final Exam is a take-home exam, due by Friday, December 6 at 5pm (to be submitted on Canvas). The exam will be similar in format to the midterm: it will consist of around five questions, and you will have to choose a subset of them to answer with a short essay. The questions will concern the readings and topics we have discussed over the course of the entire semester. While you may discuss the question prompts with other students, *you may not work with anyone else on the preparation of your answers.*

Grading

The following grade scale will be used to assign final letter grades for the course. See UF grading policies for assigning grade points at: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx.

Grade Scale	Grade Value
100-93=A	A=4.0
92-90=A-	A-=3.67
89-86=B+	B+=3.33
85-82=B	B=3.00
81-79=B-	B-=2.67
78-76=C+	C+=2.33
75-72=C	C=2.00
71-69=C-	C-=1.67
68-66=D+	D+=1.33
65-62=D	D=1.00
61-60=D-	D-=0.67
59-0=E	E=0.00

Course Schedule

The following is a tentative schedule for the course. Any changes to the schedule will be announced in class and over email. The syllabus is divided into weeks; the items listed for a given week are to be read before classes that week. Note: “CCP” stands for Curd, Cover, and

Pincock, the first course text listed above; “ROSE” stands for Rosenberg, the second course text listed above.

Week 1: August 20, 22

- Article from *The Conversation:* “Pseudoscience is taking over social media – and putting us all at risk” (provided on Canvas)
- Karl Popper, Excerpt from *Conjectures and Refutations* (CCP pp. 3-10)
- Imre Lakatos, “Science and Pseudoscience” (CCP pp. 20-26)

Week 2: August 27, 29

- Paul Thagard, “Why Astrology is a Pseudoscience” (CCP pp. 27-36)
- Michael Ruse, “Creation Science is not Science” (CCP pp. 37-46)
- Larry Laudan, “Commentary: Science at the Bar—Causes for Concern” (CCP pp. 47-52)

Week 3: September 3, 5

- Chapter 10 of ROSE, “Induction and Probability” (pp. 179-200)
- Wesley Salmon, “The Problem of Induction” (provided on Canvas)

Week 4: September 10, 12

- Peter Achinstein, “Explanation v. Prediction: Which Carries More Weight?” (CCP pp. 439-450)
- Nelson Goodman, “The New Riddle of Induction” (CCP pp. 451-456)

Week 5: September 17, 19

- Pierre Duhem, Excerpt from *Physical Theory and Experiment* (CCP pp. 227-249)
- Recommended Reading: Chapter 11 of ROSE, “Confirmation, Falsification, Underdetermination” (pp. 200-217)

Paper 1 Due by September 20 at 5pm (submit on Canvas)

Week 6: September 24, 26

- W. V. O. Quine, “Two Dogmas of Empiricism” (CCP pp. 250-270)
- Larry Laudan, “Demystifying Underdetermination” (CCP pp. 288-320)

Week 7: October 1, 3

- Rudolf Carnap, “The Value of Laws: Explanation and Prediction” (CCP pp. 651-656)
- Carl Hempel, “Two Basic Types of Scientific Explanation” (CCP pp. 657-666)

Week 8: October 8, 10

- Chapter 3 of ROSE, “Scientific Explanation” (pp. 39-59)
- Philip Kitcher, “Explanatory Unification” (CCP pp. 711-734)

Week 9: October 15, 17

- James Woodward, “The Manipulability Conception of Causal Explanation” (CCP pp. 735-753)
- Chapter 4 of ROSE, “Why Do Laws Explain?” (pp. 61-80)

Midterm Exam due by October 18 at 5pm (submit on Canvas)

Week 10: October 22, 24

- David Lewis, Excerpt from *Counterfactuals* (provided on Canvas)
- Fred Dretske, “Laws of Nature” (CCP pp. 833-852)

Week 11: October 29, 31

- Nancy Cartwright, “Do the Laws of Physics State the Facts?” (CCP pp. 871-884)

- Sandra Mitchell, “Dimensions of Scientific Law” (provided on Canvas)

Week 12: November 5, 7

- Chapter 8 of ROSE, “Epistemic and Metaphysical Issues about Scientific Theories” (pp. 135-160)
- Paul Feyerabend, “How to Be a Good Empiricist—A Plea for Tolerance in Matters Epistemological” (CCP pp. 927-948)

Week 13: November 12, 14

- Jerry Fodor, “Special Sciences (or: The Disunity of Science as a Working Hypothesis)” (CCP 954-969)
- Lindley Darden and Nancy Maull, “Interfield Theories” (provided on Canvas)

Paper 2 Due by November 15 at 5pm (Submit on Canvas)

Week 14: November 19, 21

- Thomas Kuhn, “Objectivity, Value Judgment, and Theory Choice” (CCP pp. 94-110)
- Helen Longino, “Values and Objectivity” (CCP pp. 144-164)

Week 15: November 26

- **No Class**

Week 16: December 3

- Course wrap-up

Final Exam due by December 6 at 5pm (submit on Canvas)