

**PHI 3400: Philosophy of Natural Science
Syllabus - Spring 2024**

M/W/F 11:45AM - 12:45PM
Matherly Hall, Room 0115

Instructor Information

Chris Dorst
cdorst@ufl.edu
Office: 312 Griffin-Floyd Hall
Office Hours: Wednesdays 1:00pm - 3:00pm
Phone (office): (352) 273-1813

Course Description

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? Should we interpret our scientific theories as literally true descriptions of reality, or merely as pragmatic tools meant to improve our capacities for predicting and controlling the world? And lastly, how do the personal values of individual scientists affect the objectivity of science? We will approach each of these questions from multiple perspectives, and in the process we will cover many of the prominent themes, principles, terminology, and concepts employed in the field.

Course Goals

This course is designed to introduce students to the practice of philosophy of science through the study of central questions and arguments, as represented by a selection of historical and contemporary readings. Students will learn some of the basic principles of good reasoning, including how to understand arguments, represent them clearly and fairly, and evaluate them for cogency. Students will also learn to develop their own arguments and views regarding the philosophical questions studied in the course in a compelling fashion. In these ways the course aims to develop students' own reasoning and communication skills in ways that will be useful in any further study of philosophy they undertake and beyond the bounds of philosophy itself.

Course Objectives

Students will demonstrate their competencies in understanding and assessing the philosophical theories studied in the course primarily via a set of assigned papers, in which they will be assessed for their abilities to: (i) understand and apply basic concepts of good reasoning, (ii) accurately and fairly describe and explain philosophical views represented in works assigned for the course, (iii) formulate arguments of their own while anticipating possible lines of objections and responding in a conscientious fashion, and (iv) speak and write clearly and persuasively

about abstract and challenging matters of the sort raised by the philosophical material in the course.

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 CRITICAL THINKING—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 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 assignment. 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.

COVID-19 Recommendations

In response to COVID-19, the following recommendations are in place to maintain your learning environment, to enhance the safety of our in-classroom interactions, and to further the health and safety of ourselves, our neighbors, and our loved ones.

- If you are not vaccinated, get vaccinated. Vaccines are readily available and have been demonstrated to be safe and effective against the COVID-19 virus. Visit one.ufl.edu/screening/testing and vaccination opportunities.
- If you are sick, stay home. Please call your primary care provider if you are ill and need immediate care or the UF Student Health Care Center at 352-392-1161 to be evaluated.
- Course materials will be provided to you with an excused absence, and you will be given a reasonable amount of time to make up work.

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.

Campus Resources

Health and Wellness

- [U Matter. We Care](#): If you or someone you know is in distress, please contact umatter@ufl.edu, 352-392-1575, or visit the U Matter, We Care website to refer or report a concern and a team member will reach out to the student in distress
- [Counseling and Wellness Center](#): Visit the Counseling and Wellness Center website or call 352-392-1575 for information on crisis services as well as non-crisis services.
- [Student Health Care Center](#): Call 352-392-1161 for 24/7 information to help you find the care you need, or visit the Student Health Care Center website.
- [University Police Department](#): Visit UF Police Department website or call 352-392-1111 (or 9-1-1 for emergencies).
- [UF Health Shands Emergency Room / Trauma Center](#): For immediate medical care call 352-733-0111 or go to the emergency room at 1515 SW Archer Road, Gainesville, FL 32608; Visit the UF Health Emergency Room and Trauma Center website.
- [GatorWell Health Promotion Services](#): For prevention services focused on optimal wellbeing, including Wellness Coaching for Academic Success, visit the GatorWell website or call 352-273-4450.

Academic Resources

- *E-learning technical support*: Contact the [UF Computing Help Desk](#) at 352-392-4357 or via e-mail at helpdesk@ufl.edu.

- [Career Connections Center](#): Reitz Union Suite 1300, 352-392-1601. Career assistance and counseling services.
- [Library Support](#): Various ways to receive assistance with respect to using the libraries or finding resources.
- [Teaching Center](#): Broward Hall, 352-392-2010 or to make an appointment 352-392-6420. General study skills and tutoring.
- [Writing Studio](#): 2215 Turlington Hall, 352-846-1138. Help brainstorming, formatting, and writing papers.
- *Student Complaints On-Campus*: [Visit the Student Honor Code and Student Conduct Code webpage](#) for more information.
- *On-Line Students Complaints*: [View the Distance Learning Student Complaint Process](#)

Course Text

There is one required textbook for this course:

- *Philosophy of Science: The Central Issues, Second Edition*, edited by Martin Curd, J. A. Cover, and Christopher Pincock. Published by W. W. Norton and Company.

This book is available from the bookstore and on Amazon. The majority of our readings will come from it; 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, I suggest that you repeatedly ask yourself the following types of questions: What is the author's main claim? What are their principal reasons in support of that claim? What alternative position(s) do they consider, and why do they not adopt those alternatives? To reward you for doing this work, there will be unannounced reading quizzes interspersed throughout the semester. Each quiz will contain one to three true/false, multiple-choice, or short answer questions about the required reading for that day's class. If you miss a reading quiz, you will not be able to retake it, but at the end of the semester I will drop your two lowest reading quiz

grades. The drop policy is meant to accommodate unexcused absences. If you will miss a reading quiz for a religious holiday, medical reason, or another official university activity, you must notify me as soon as possible and provide supporting documentation; 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. A rubric for paper grades will be provided on Canvas.

Midterm Exam

The midterm exam is a take-home exam due by March 3 at 11:59pm (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, and your goal should be to demonstrate your understanding of the material. 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 April 28 at 11:59pm (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, and your goal should be to demonstrate your understanding of the material. 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

89-87=B+	B+=3.33
86-83=B	B=3.00
82-80=B-	B-=2.67
79-77=C+	C+=2.33
76-73=C	C=2.00
72-70=C-	C-=1.67
69-67=D+	D+=1.33
66-63=D	D=1.00
62-60=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 on Canvas, and the syllabus posted there will be modified. The syllabus is divided into weeks; the items listed for a given week are to be read before classes that week (with the exception of the first day, January 8th). Note: “CCP” stands for Curd, Cover, and Pincock, the course text listed above.

Week 1: January 8, 10, 12

- “What’s Trending in the World of Pseudoscience?” (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: 17, 19 (January 15 is a Holiday)

- 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: January 22, 24, 26

- Wesley Salmon, “The Problem of Induction” (provided on Canvas)

Week 4: January 29, 31; February 2

- Nelson Goodman, “The New Riddle of Induction” (CCP pp. 451-456)
- Frank Jackson, “Grue” (provided on Canvas)
- **Paper 1 due by February 4 at 11:59pm (submit on Canvas)**

Week 5: February 5, 7, 9

- Pierre Duhem, Excerpt from *Physical Theory and Experiment* (CCP pp. 227-249)
- W. V. O. Quine, “Two Dogmas of Empiricism” (CCP pp. 250-270)

Week 6: February 12, 14, 16

- Larry Laudan, “Demystifying Underdetermination” (CCP pp. 288-320)

Week 7: February 19, 21, 23

- 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: February 26, 28; March 1

- Alex Rosenberg, “Scientific Explanation” (provided on Canvas)
- Philip Kitcher, “Explanatory Unification” (CCP pp. 711-734)
- **Midterm Exam due by March 3 at 11:59pm (submit on Canvas)**

Week 9: March 4, 6, 8

- James Woodward, “The Manipulability Conception of Causal Explanation” (CCP pp. 735-753)
- Alex Rosenberg, “Why Do Laws Explain?” (provided on Canvas)

— Spring Break: March 11-15

Week 10: March 18, 20, 22

- David Lewis, Excerpt from *Counterfactuals* (provided on Canvas)
- Tim Maudlin, Excerpt from *The Metaphysics within Physics* (provided on Canvas)

Week 11: March 25, 27, 29

- 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: April 1, 3, 5

- Grover Maxwell, “The Ontological Status of Theoretical Entities” (CCP pp. 1049-1059)
- Bas van Fraassen, “Arguments Concerning Scientific Realism” (CCP pp. 1060-1082)
- **Paper 2 due by April 7 at 11:59pm (Submit on Canvas)**

Week 13: April 8, 10, 12

- Alan Musgrave, “Realism versus Constructive Empiricism” (CCP pp. 1083-1107)
- Juha T. Saatsi, “On the Pessimistic Induction and Two Fallacies” (CCP pp. 1129-1139)

Week 14: April 15, 17, 19

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

Week 15: April 22, 24

- Makeup days/TBD

Final Exam due by April 28 at 11:59pm (submit on Canvas)