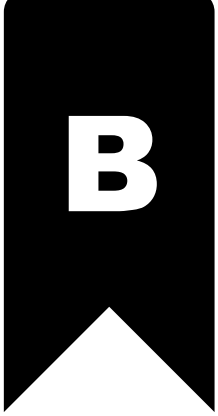

Philosophy of Science

Spring

Tu/Thurs 1:00 - 2:50

Room 200

Prof: Avery Jones

Office: RH 201D

Office hours: Wed 12:00 - 1:00 or by appt.

Email: ajones@generic.edu

Course Description

Philosophy of science is broadly divided into two subfields: The task of the first is to study the nature and methodology of science in general. The task of the second is to study the conceptual and philosophical foundations of particular fields within science. We will first consider topics in the first subfield, including philosophical attempts to describe scientific explanations, laws of nature, and the process whereby theories in science are con-firmed by evidence. We will then consider the nature of scientific theories: what they are, how they change, and how they can and should be interpreted. In the last part of the course, we will survey work in one area of the second subfield in the philosophy of science; this Spring will be the philosophy of quantum mechanics.

Course Objectives

Philosophy of Science Course Objectives

The objectives of the course are to be introduced to the major fields of study in contemporary philosophy of science and to gain a firm understanding of the relation between philosophy and science and the important reciprocally enhancing role each has for the other.

Generic University 's Campus-wide Learning Goals and Objectives

Generic University's is proud that all of its graduates achieve all five of following learning goals and objectives. Find out more about our Critical Thinking Initiative at generic.edu/criticalthinking

Analytical Thinking (AT)

The Generic University graduate will use ways of knowing from mathematics, natural sciences, social sciences, humanities, and arts to access information and critically analyzes complex material in order to evaluate evidence, construct reasoned arguments, and communicate inferences and conclusions.

- Acquires, analyzes, and evaluates information from multiple sources
- Synthesizes and applies the information within and across disciplines
- Identifies and applies, as appropriate, quantitative methods for defining and responding to problems
- Identifies the credibility, use, and misuse of scientific, humanistic and artistic methods

Cultural Understanding (CU)

The Generic University graduate comprehends global and cultural diversity within historical, artistic, and societal contexts.

- Reflects on experiences with diversity to demonstrate knowledge and sensitivity
- Demonstrates awareness of how diversity emerges within and across cultures

Effective Citizenship (ECit)

The Generic University graduate participates as a member of local, national, and global communities and has the capacity to lead in an increasingly interdependent world.

- Understands the structures of local, national, and global governance systems and acts effectively within those structures in both individual and collaborative ways
- Applies knowledge and abilities to solve societal problems in ethical ways

Effective Communication (ECom)

The Generic University graduate uses a variety of media to communicate effectively with diverse audiences

- Identifies how contexts affect communication strategies and practices
- Engages in effective communication practices in a variety of situations and with a variety of media

Integrated Reasoning (IR)

The Generic University graduate integrates discipline-based knowledge to make informed decisions that reflect humane social, ethical, and aesthetic values.

- Critically applies liberal arts knowledge in disciplinary contexts and disciplinary knowledge in liberal arts contexts
- Uses a variety of inquiry strategies incorporating multiple views to make value judgments, solve problems, answer questions, and generate new understandings

Course Materials

Salmon, Merilee et al. (1992) *Introduction to the Philosophy of Science,* Prentice Hall: New Jersey.

- Salmon, Wesley. *Deductive-Nomological Model of Explanation*, pp. 7-39
- Salmon, Wesley. *Hypothetico-Deductivism*, pp. 42-55.
- Salmon, Wesley. *Hume and Induction*, pp. 55-66.
- Salmon, Wesley. *Logical Positivism: Kant and the synthetic a priori*, pp. 104-129.
- Salmon, Wesley. *Scientific Change: Reactions to the Received View*, pp. 145-177

Online Articles:

- Bird, Alexander. (1998) "Laws of Nature", in *Philosophy of Science*, McGill-Queen's: Montreal-Kingston, pp. 25-44; 49-54.
- Hajek, Alan, "Interpretations of Probability", *The Stanford Encyclopedia of Philosophy (Summer 2003 Edition)*, Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/sum2003/entries/probability-interpret/>.

- Kukla, Andre. (1994) "Scientific Realism, Scientific Practice, and the Natural Ontolotical Attitude", *British Journal for the Philosophy of Science* 45, pp. 955-975.
- Vickers, John, "The Problem of Induction", *The Stanford Encyclopedia of Philosophy (Winter 2006 Edition)*, Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/win2006/entries/induction-problem/>.
- Woodward, James, "Scientific Explanation", *The Stanford Encyclopedia of Philosophy (Summer 2003 Edition)*, Edward N. Zalta (ed.), <http://plato.stanford.edu/archives/sum2003/entries/scientific-explanation/>.

Course Assessment

Quizzes

6 short, unannounced quizzes will be given at the beginning of some classes. These will consist of 3 or 4 questions about the reading and are meant solely to encourage good reading habits. You will have 15 minutes to complete them. The best 5 of 6 quiz grades will count towards your total quiz grade.

Worksheets

Worksheets will be completed in groups during a portion of most class days. These will consist in open-book multiple choice, matching, fill in the blank, logic, and short-answer questions about the readings and broader themes of the course. If your group gets stuck you can ask other groups, teaching assistants, or instructors for help. If you are not confident in your answer, you can ask for feedback. Worksheets are graded for completion and given back the following class so that they can be used for study purposes. You cannot receive credit for Worksheets from classes that you miss (unless you provide documentation for the absence), but you are welcome to complete worksheets from classes that you missed so that you can use them for study purposes.

Papers

You will be required to write two papers of about 3 pages each (typed, 10- or 12-point, double-spaced, spell-checked!). Write your name, your paper title, and the class title at the top of your paper. Suggested topics for papers will be provided at least 2 weeks before their due dates. These papers should conform to the guidelines for writing philosophy papers that will be handed out in class.

Poster Presentation

There will be two poster sessions in the second half of the semester. At each session, half of the class will stand by a poster that they created and present it to people from the other half of the class as they make their way to each posters. Each poster and presentater should present a view discussed in class, what they think is the best arguments for it, what they think is the best argument against it, and why they do (or do not) hold the view. After giving people the run-down of their poster, presenters should be able to engage in a conversation about the view with their classmates. Templates for posters can be found on Canvas. Posters can be printed for about $12 at the campus print shop. The print shop can take up to 5 business days to print a poster. Your poster grade consists of (a) the clarity and accuracy of your poster, (b) the coherence and cogency of the presentation, and (c) your one-paragraph summary of at least one classmate's poster presentation.

Tests

One midterm and one final will be given. They will consist of a combination of short answers and short essay questions.

Assessment Grade Distribution

Quizzes: 10% total

Worksheets: 15% total

Papers: 30% total (2 @ 15% each)

Poster presentation: 15%

Midterm: 15%

Final: 15%

Course Policies

Late work

Students are expected to submit classroom assignments by the posted due date and to complete the course according to the published class schedule. As adults, students, and working professionals, it is your responsibility to manage competing demands on your time. Should you anticipate needing additional time to complete an assignment and you contact me before the due date, then full credit may still be possible. Asking for an extension on or after the due date indicates a lack of planning and time management and will be reflected in your grade for the assignment. Also, posters cannot be presented late and therefore, late posters cannot receive full credit.

Incompletes

It is university policy that incompletes can be given only in very extenuating circumstances (medical emergencies, etc.). In particular, an incomplete cannot be given because of a heavy course load, job commitments, or because you've simply fallen behind in the course. For this reason, you should attend every lecture and make sure you're aware of assignment deadlines and exam dates. If for whatever reason you find yourself falling behind during the semester, do not hesitate to see the instructor as soon as possible.

University Honor System

All students should be aware of Generic University's policy on cheating and plagiarism. Cheating on an exam, or plagiarizing on an essay assignment, are sufficient reasons for receiving an F in the course.

Course Schedule

The following schedule may be subject to revision over the course of the semester. Reading assignments must be completed by the date on which they appear)

	Tuesday 1/23	**Thursday 1/25**
Week 1	***Introduction and Course Description***	***I. Laws and Explanation***
		Deductive-Nomological Model of

		Explanation Salmon, pp. 7-20.
Week 2	**1/30** ***I. Laws and Explanation****DN, cont.* Woodward, "Scientific Explanation", Sections 1, 2, 3	**2/1** ***I. Laws and Explanation*** *Laws of Nature* Bird, "Laws of Nature" **QUIZ #1**
Week 3	**2/6** ***I. Laws and Explanation*** *Laws of Nature, cont.*	**2/8** ***I. Laws and Explanation*** *DN and counterexamples* Salmon, pp. 20-33. **PAPER #1 DUE**
Week 4	**2/13** ***I. Laws and Explanation*** *Alternatives to DN* Salmon, pp. 33-39. Woodward, "Scientific Explanation", Sections 4, 5, 6	**2/15** ***I. Laws and Explanation*** *Alternatives to DN, cont.* **QUIZ #2**
Week 5	**2/20** ***II. Confirmation*** *Hypothetico-Deductivism* Salmon, pp. 42-55.	**2/22** ***II. Confirmation*** *HD, cont.*
Week 6	**2/27** ***II. Confirmation*** *Instance Confirmation*	**3/1** ***II. Confirmation*** *Probability and Confirmation* Hajek, "Interpretations of Probability" **QUIZ #3**
Week 7	**3/6** ***II. Confirmation*** *Bayesian Confirmation*	**3/8** ***MIDTERM***
Week 8	**3/13** ***II. Confirmation*** *Bayesian Confirmation, cont.*	**3/15** ***II. Confirmation*** *Hume and Induction* Salmon, pp. 55-66.

		Vickers, "The Problem of Induction", Sections 1, 2, 7
Week 9	**3/20** ***III. Theories, Change, and Realism*** *Logical Positivism: Kant and the synthetic a priori* Salmon, pp. 104-119.	**3/22** ***III. Theories, Change, and Realism*** *Logical Positivism: Reactions to Kant* Salmon, pp. 119-129. **QUIZ #4;**
Week 10	**3/27** ***III. Theories, Change, and Realism*** *The Standard Conception of Theories*	**3/29** ***III. Theories, Change, and Realism*** *Scientific Change: Received View* Salmon, pp. 132-145 **PAPER #2 DUE**
Week 11	**4/3** ***SPRING BREAK***	**4/5** ***SPRING BREAK***
Week 12	**4/10** ***III. Theories, Change, and Realism*** *Scientific Change: Reactions to the Received View* Salmon, pp. 145-177	**4/12** ***III. Theories, Change, and Realism*** *Scientific Realism* Kukla, "Scientific Realism, *etc*." **QUIZ #5;**
Week 13	**4/17** ***Poster Session 1***	**4/19** ***Poster Session 2***
Week 14	**4/24** ***IV. Philosophy of Particular Sciences*** *Philosophy of Quantum Mechanics* **QUIZ #6**	**4/26** ***IV. Philosophy of Particular Sciences*** *Philosophy of Quantum Mechanics* **Last day to ask for clarification**
Week 15	**FINAL (See university website for exact time of the test)**	