

Philosophy 225: Introduction to the Philosophy of Science, Spring 2016

TF 9:50-11:10am, 205 Scott Hall
Professor North (j.north@rutgers.edu)

We will discuss some central questions about the nature of scientific theory and practice. What makes a discipline a science? Does science discover the objective truth about the world? How, and why, do scientific theories change over time? To what extent do observation and experiment determine which theories we accept? What is a good scientific explanation? What are laws of nature? Does physics have a special status compared to other sciences?

READINGS

Almost all readings are in the required textbook, *Philosophy of Science: The Central Issues*, second edition; Martin Curd, J. A. Cover, Christopher Pincock, eds. W. W. Norton. It can be purchased at the bookstore or online, and is on reserve at the library. Readings not in the book will be handed out in class.

REQUIREMENTS AND GRADING

Exams. Two midterm exams and one final exam, all in-class. Each midterm will count for 25% of your final grade and the final will count for 40% of your grade. The exams will comprise short-answer questions. Study questions will be handed out in advance; exam questions will be taken from the study questions. The first midterm is in class on February 23. The second midterm is in class on April 15. The final is on May 11 at 8:00am (<http://finalexams.rutgers.edu/>).

Missed exams. Make-up exams will be offered *only in extraordinary cases*. Written documentation is required as proof of a reason for missing an exam.

Attendance and participation. Attendance and participation count for 10% of your final grade. Attendance is mandatory. Poor attendance will lower your grade, in particular since exam questions will be based on class discussion. If you miss a class, it is *your responsibility* to get the notes and any announcements from a classmate.

ACADEMIC INTEGRITY

Each student is expected to abide by Rutgers' Academic Integrity Policy:

<http://academicintegrity.rutgers.edu/academic-integrity-policy/>

Any work submitted by a student in this course for academic credit will be the student's own work. For this course, collaboration is allowed in discussing exam questions prior to exams. Exams submitted for credit must be entirely your own work. More information is here: <http://academicintegrity.rutgers.edu>

Course materials handed out in class are intellectual property belonging to the author. Students are not permitted to buy or sell any course materials without the

express permission of the instructor. Such unauthorized behavior constitutes academic misconduct.

OFFICE HOURS

Friday 11:15am-12:15 pm, 106 Somerset St., room 530

SCHEDULE

Readings are listed next to the date on which they will be discussed. Page numbers refer to the textbook. Details are subject to change during the semester.

WHAT IS SCIENCE?

- Jan. 19: Popper, "Science: Conjectures and Refutations," 3-10
- Jan. 22: Kuhn, "Logic of Discovery or Psychology of Research?," 11-19
- Jan. 26: Lakatos, "Science and Pseudoscience," 20-26

RATIONALITY, OBJECTIVITY, AND VALUES IN SCIENCE

- Jan. 29: Kuhn, "The Nature and Necessity of Scientific Revolutions," 79-93
- Feb. 2: Kuhn, "Objectivity, Value Judgment, and Theory Choice," 94-110
- Feb. 5: Longino, "Values and Objectivity," 144-164 and Okruhlik, "Gender and the Biological Sciences," 165-180

HOLISM AND UNDERDETERMINATION

- Feb. 9: Duhem, "Physical Theory and Experiment," 227-249
- Feb. 12: Quine, "Two Dogmas of Empiricism," 250-270

INDUCTION, PREDICTION, AND CONFIRMATION; RAVENS AND GRUE

- Feb. 16: Lipton, "Induction," 390-405
- Feb. 19: Popper, "The Problem of Induction," 406-411 and Salmon, "Rational Prediction," 412-423

FEB. 23: MIDTERM EXAM I

You already know the date, so plan ahead. The exam will cover all of the above material.

- Feb. 26: Hempel, "Criteria of Confirmation and Acceptability," 424-438
- Mar. 1: Goodman, "The New Riddle of Induction," 451-455

BAYESIAN CONFIRMATION, REPLIES TO RAVENS AND GRUE

- Mar. 4: Salmon, "Rationality and Objectivity in Science *or* Tom Kuhn Meets Tom Bayes," 518-549, and section 5.1 of the textbook commentary, "Bayes for Beginners," 597-605
- Mar. 8: Mayo, "A Critique of Salmon's Bayesian Way," 550-564

SCIENTIFIC EXPLANATION

- Mar. 11: Carnap, "The Value of Laws: Explanation and Prediction," 651-656
- Mar. 22: Hempel, "Two Basic Types of Scientific Explanation," 657-666 and "The Thesis of Structural Identity," 667-676

LAWS OF NATURE

- Mar. 25: Ayer, "What is a Law of Nature?," 816-832
- Mar. 29, Apr. 1: No class
- Apr. 5: Dretske, "Laws of Nature," 833-852
- Apr. 8: Beebe, "The Non-Governing Conception of Laws of Nature"
- Apr. 12: Cartwright, "Do the Laws of Physics State the Facts?," 871-882

APR. 15: MIDTERM EXAM 2

You already know the date, so plan ahead. The exam is on all of the material since the first midterm.

REALISM AND INSTRUMENTALISM

- Apr. 19: Maxwell, "The Ontological Status of Theoretical Entities," 1049-1059
- Apr. 22: Van Fraassen, "Arguments Concerning Scientific Realism," 1060-1082

INTERTHEORETIC REDUCTION

- Apr. 26: Nagel, "Issues in the Logic of Reductive Explanations," 911-926
- Apr. 29: Fodor, "Special Sciences (or: The Disunity of Science as a Working Hypothesis)," 954-969

FINAL EXAM: MAY 11, 8AM

The final exam is cumulative, covering all the material from the entire semester.

STUDENT-WELLNESS SERVICES

Just In Case Web App. <http://codu.co/cee05e>. Access helpful mental health information and resources for yourself or a friend in a mental health crisis on your smartphone or tablet and easily contact CAPS or RUPD.

Counseling, ADAP & Psychiatric Services. (848) 932-7884, 17 Senior Street, New Brunswick, NJ 08901, www.rhscaps.rutgers.edu/. CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professional within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community and consultation and collaboration with campus partners.

Violence Prevention & Victim Assistance. (848) 932-1181, 3 Bartlett Street, New Brunswick, NJ 08901, www.vpva.rutgers.edu/. The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

Disability Services. (848) 445-6800, <https://ods.rutgers.edu/>, Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854. Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation:

<https://ods.rutgers.edu/students/documentation-guidelines>.

If the documentation supports your request for reasonable accommodations, your campus' disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at:

<https://ods.rutgers.edu/students/registration-form>.

Scarlet Listeners. (732) 247-5555, <http://www.scarletlisteners.com/>. Free and confidential peer counseling and referral hotline, providing a comforting and supportive safe space.