WESTERN UNIVERSITY
DEPARTMENT OF PHILOSOPHY
Undergraduate Course Outline 2019-20

Philosophy 2300F: Philosophy of Science

Fall Term 2019	**Instructor: Wayne C. Myrvold**
Tue, 9:30–11:30, Thu, 9:30–10:30	**Office: Stevenson Hall 4143**
TC 205	**Office Hours: Tue, Thu, 12:30–13:30, or by appointment**
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DESCRIPTION

Philosophy of science addresses questions such as: What is the difference between science and non-science? What sort of knowledge can we expect from science? Does it give us objective knowledge of the world? If so, can this knowledge extend beyond knowledge of what is directly observable? What is the proper role of science in society, and what are the ethical obligations of scientists?

We will address these questions in connection with two case studies of scientific revolution: and the Darwinian revolution in the 19th and 20th centuries, and the Copernican revolution at the birth of modern science. Both of these have implications for the relation between science and the wider culture. We will look at writings of the scientists involved, as well as major works by philosophers of science. The aim is for students to form their own thoughts on the questions to be addressed.

TEXTS

Assigned readings will be made available on course OWL site.

OBJECTIVES

The chief objective of this course is to introduce the students to key issues in philosophy of science. Students will be able to distinguish between scientific realism and various forms of anti-realism, to identify the strengths and weaknesses of the major approaches to scientific inference, and to apply these concepts to our two case studies, the Copernican revolution and the Darwinian revolution. Students will be able to describe the hypothetico-deductive approach to scientific inference, and to identify its limitations. They will able to outline the basics of statistical hypothesis testing, and to explain the differences between classical and Bayesian approaches. Students will also be able to identify core ethical issues connected with science, and to describe the main positions on these issues.

REQUIREMENTS

Attendance and active participation in class discussions, two tests; two short writing assignments; term paper.

Writing assignment 1 (3–4 pp.), due Oct. 3	10%
A simple experiment:	
Experimental protocol, due Oct. 15	5%
Experimental report, due Nov. 21	15%
Term paper:	
Draft, due Nov. 14	5%
Term paper (7–8 pp.), due Dec. 6	15%
Test 1, Oct. 24	25%
Test 2 date TBA, during exam period	25%
	100%

For written assignments, both hard copy and turnitin submission is required. Hard copy is to be handed in by 3:45 PM on the due date, and turnitin submission, by 11:59 PM. If you are unable to hand your assignment directly to the instructor, place it in the Philosophy Department drop-off box, which is on the first floor of Stevenson Hall. *Make sure that your name and the instructor's name are on your assignment.* Late assignments will be penalized 5% per day late.

AUDIT

Students wishing to audit the course should consult with the instructor prior to or during the first week of classes.

DEPARTMENT OF PHILOSOPHY POLICIES

The **Department of Philosophy Policies** which govern the conduct, standards, and expectations for student participation in Philosophy courses is available in the Undergraduate section of the Department of Philosophy website at http://uwo.ca/philosophy/undergraduate/policies.html.
It is your responsibility to understand the policies set out by the Senate and the Department of Philosophy, and thus ignorance of these policies cannot be used as grounds of appeal.

ACCOMMODATION

Students seeking academic accommodation on medical grounds for any missed tests, exams, participation components and/or assignments worth 10% or more of their final grade must apply to the Academic Counselling office of their home Faculty and provide documentation. Academic accommodation cannot be granted by the instructor or department. Documentation shall be submitted, as soon as possible, to the Office of the Dean of the student's Faculty of registration, together with a request for relief specifying the nature of the accommodation being requested.
The UWO Policy on Accommodation for Medical Illness and further information regarding this policy can be found at
http://uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_medical.pdf.

SELF- REPORTED ABSENCE FORM

Students who experience an unexpected illness or injury or an extenuating circumstance (48 hours or less) that is sufficiently severe to temporarily render them unable to meet academic requirements (e.g., attending lectures or labs, writing tests or midterm exams, completing and submitting

assignments, participating in presentations) should self-declare using the online Self-Reported Absence portal. This option should be used in situations where the student expects to resume academic responsibilities within 48 hours or less.
The following conditions are in place for self-reporting of medical or extenuating circumstances: http://westerncalendar.uwo.ca/PolicyPages.cfm?Command=showCategory&PolicyCategoryID=1&SelectedCalendar=Live&ArchiveID=#SubHeading_322

EVALUATION OF ACADEMIC PERFORMANCE
At least three days prior to the deadline for withdrawal from a course without academic penalty, students will receive assessment of work accounting for at least 15% of their final grade. For 3000- or 4000-level courses in which such a graded assessment is impracticable, the instructor(s) must obtain an exemption from this policy from the Dean and this exemption must be noted on the corresponding course syllabus. In rare instances and at the Dean's discretion, other courses could receive a similar exemption, which also must be noted in the course syllabus.

COURSE ASSIGNMENT
The last day of scheduled classes in any course will be the last day on which course assignments will be accepted for credit in a course. Instructors will be required to return assignments to students as promptly as possible with reasonable explanations of the instructor's assessment of the assignment.

ACADEMIC OFFENCES
Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

PLAGIARISM CHECKING
All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com http://www.turnitin.com.

SUPPORT SERVICES
Registrarial Services http://www.registrar.uwo.ca
Student Support Services https://student.uwo.ca/psp/heprdweb/?cmd=login
Services provided by the USC http://westernusc.ca/services/
Student Development Centre http://www.sdc.uwo.ca/

Students who are in emotional/mental distress should refer to Mental Health@Western http://www.uwo.ca/uwocom/mentalhealth/ for a complete list of options about how to obtain help. Immediate help in the event of a crisis can be had by phoning 519.661.3030 (during class hours) or 519.433.2023 after class hours and on weekends.

Topics and readings

Subject to revision, with ample notice. In particular, we may choose to spend more time than scheduled on certain items, with re-adjustment elsewhere.

Week 0 Sept. 5
Introduction: What is philosophy of science?

I. Case Study: The Copernican Revolution

Week 1. Sept. 10, 12
Background to the Copernican revolution.

1. Singham, "The Copernican Myths"

Week 2: Sept. 17, 19

1. Excerpt from Galileo Galilei, *Dialogue Concerning the Two Chief World Systems*. tr. Stillman Drake (Berkeley: University of California Press, 1967).

II. Scientific Methodology

Week 3: Sept. 24, 26
Hypothetico-Deductivism; statistical hypothesis testing

1. Instructor's notes.

Recommended:

1. Excerpt from Ronald A. Fisher, *The Design of Experiments*

Week 4: Oct. 1, 3
Statistical hypothesis testing, continued.

Thursday, Oct. 3: Assignment 1 due.

Week 5: Oct. 8,10
Probabilistic, or Bayesian approaches

1. Instructor's notes.

Week 6: Oct. 15, 17
The crisis of reproducibility

1. John P.A. Ioannidis, "Why Most Published Research Findings are False"
2. Open Science Collaboration, "Estimating the Reproducibility of Psychological Science"

Oct. 15: Experimental protocol due

Test 1 (Oct. 24) covers all of the above material

III. Case study: the Darwinian Revolution

Week 7: Oct. 22
Darwin's theories and Darwin's methodology

1. Excerpts from Darwin, *Origin of Species*
2. Excerpts from Jerry A. Coyne, *Why Evolution is True*.

Week 8: Oct. 29, 31
Darwin's theories and Darwin's methodology, continued.

Nov. 4–8: Fall Reading Week

IV. General Issues in the Philosophy of Science

Week 9: Nov. 12, 14
Realism and anti-realism

1. Boyd, "On the Current Status of the Issue of Scientific Realism"
2. Laudan, "A Confutation of Convergent Realism"

Nov. 14 term paper drafts due.

Week 10: Nov. 19, 21
Underdetermination

1. Excerpts from Duhem, *The Aim and Structure of Physical Theory*.
2. John Norton, "Must Evidence Underdetermine Theory?" in Martin Carrier, Don Howard, and Janet Kourany, eds., *The Challenge of the Social and the Pressure of Practice* (University of Pittsburgh Press, 2008), pp. 17–44.

   Recommended:
   Laudan, "Demystifying Underdetermination," in Martin Curd and J. A. Cover, eds., *Philosophy of Science: The Central Issues* (New York: W. W. Norton & Company, 1998), pp. 320–353.

Nov. 21 Experimental reports due

Week 11: Nov. 26, 28
Scientific Revolutions

1. Excerpts from Thomas S. Kuhn, *The Structure of Scientific Revolutions.*
2. Thomas S. Kuhn, "The Road Since Structure," in *The Road Since Structure* (Chicago: The University of Chicago Press, 2000), pp.13–32.

Week 12: Dec. 3, 5
Science and Values; Science in the larger culture

1. Percy Bridgman, "Scientists and Social Responsibility"
2. Heather Douglas, "The Moral Responsibilities of Scientists"

3. James Robert Brown, “Privatizing the University: The New Tragedy of the Commons.” *Science* **290**, pp, 1701–1702.
4. Heather Douglas, “Bullshit at the Interface of Science and Policy: Global Warming, Toxic Substances, and Other Pesky Problems,” in Gary L. Hardcastle and George A. Reisch, eds., *Bullshit and Philosophy* (Open Court) , pp. 213-226.

Term paper due Thursday, Dec. 5.