Department of Philosophy
www.philosophy.ualberta.ca
2016 - 2017 (Fall Term)
PHIL 265: Philosophy of Science
Tuesday & Thursday 9:30-10:50 AM, T 1-005

Instructor: Hassan Masoud
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Office Hours: Thursday 3-4 PM, or by appointment
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Course Website:
https://eclass.srv.ualberta.ca/PHIL 265 - PHILOSOPHY OF SCIENCE (LEC A1 Fa16)

I. Course Information

• Course Prerequisite: None

• Course-based Ethics Approval in place regarding all research projects that involve human testing, questionnaires, etc? No, not needed. No such projects approved.

• Community Service Learning component: N/A

• Past or Representative Evaluative Course Material Available: Document distributed in class

• Additional mandatory Instructional fees (approved by Board of Governors): No

II. Course Description and Objectives

This course provides an introduction to the philosophy of science. It consists in a critical examination of science with focus on both its methodology and its claims about reality. We discuss the nature of science and what distinguishes science from other attempts at making sense of the world. Different accounts of the scientific method are discussed and compared. It is investigated whether one can reasonably claim that scientific knowledge grows in a progressive way, and to what extent the study of the real practice of scientists and the history of science is significant for a philosophical account of science. We also critically assess the relation between scientific results and reality by discussing notions such as laws of nature, realism, and instrumentalism as well as the relation between scientific endeavors and current social values or predominant paradigms.

At the end of the term, you will have a philosophical understanding of several concepts such as theory, experiment, observation, and confirmation, and different positions concerning scientific methodology such as empiricism, falsificationism, Bayesianism, and new experimentalism. Also, you would be familiar with ideas such as research program, normal science, paradigm shift, and scientific revolution, which have had significant impact even beyond the boundaries of science.

Note: There are no formal prerequisites for this course. This is an Arts course and is useful for students with all backgrounds. All the concepts and arguments are explained from the scratch; however, to gain a good grasp of philosophical issues, you are encouraged to read the assigned material prior to each session and spend a few moments thinking about the subject and come to class with a few questions. Like any other philosophy course, participating in class discussions is crucial.

III. Required Texts

- A. Chalmers (2013). *What Is This Thing Called Science?* 4th edition. Hackett Publishing Company.

- M. Curd, J.A. Cover, & C. Pincock (ed.) (2013). *Philosophy of Science: The Central Issues.* 2nd edition. W. W. Norton & Company.

Both books are available at the University bookstore. Note that the latest editions of the texts (as mentioned above) are required. In the schedule of readings at the end of this syllabus, the first text is referred to as 'Chalmers', and the second, which is an anthology, as 'CCP'.

IV. Evaluation

Grade distribution is as follows:

30%: Assignments (3 short essays, worth 10% each)
10%: Group presentation
10%: Participation
20%: Midterm exam
30%: Final exam

• Assignments are comprised of your essay-like answers to one or two questions regarding the topics discussed in class. Assignment questions will be posted on e-Class. Your short essays (between 700-1000 words) have to be typed and printed and submitted at the beginning of the class. For the due dates refer to the schedule at the end of this syllabus.

• Extensions for assignments can only be granted for serious reasons and if you email me *before* the due time. Late assignments will be penalized 3% (from the total of 10%) per day. Assignments will not be accepted more than 3 days after the deadline unless an extension has been granted.

• Each of you has to participate in a group presentation. Each group will give a 15-minute presentation on a figure or an episode of the history of science. We will set the schedule of presentations in the first session.

• Participation is evaluated based on attendance as well as preparedness and contribution to small-group and class-wide discussions.

• The midterm exam will be on Tuesday, Oct. 18, at the usual time and place of the class. The midterm consists of multiple choice questions and possibly some short answer questions.

• The final exam is scheduled for Thursday, Dec.15, at 9:30 AM. The final also consists of multiple choice questions and possibly some short answer questions. The final exam is cumulative with an emphasis on the topics discussed after midterm.

V. Required Notes:

"Policy about course outlines can be found in the 'Evaluation Procedures and Grading System' section of the University Calendar."

• Academic Integrity
"The University of Alberta is committed to the highest standards of academic integrity and honesty. Students are expected to be familiar with these standards regarding academic honesty and to uphold the policies of the University in this respect. Students are particularly urged to familiarize themselves with the provisions of the Code of Student Behaviour (online at http://www.governance.ualberta.ca/en/CodesofConductandResidenceCommunityStandards/CodeofStudentBehaviour.aspx) and avoid any behaviour that could potentially result in suspicions of cheating, plagiarism, misrepresentation of facts and/or participation in an offence. Academic dishonesty is a serious offence and can result in suspension or expulsion from the University."

• Learning and working environment
The Faculty of Arts is committed to ensuring that all students, faculty and staff are able to work and study in an environment that is safe and free from discrimination and harassment. It does not tolerate behaviour that undermines that environment. The department urges anyone who feels that this policy is being violated to:
- Discuss the matter with the person whose behaviour is causing concern; or
- If that discussion is unsatisfactory, or there is concern that direct discussion is inappropriate or threatening, discuss it with the Chair of the Department.
For additional advice or assistance regarding this policy you may contact the Office of the Student Ombuds. Information about the University of Alberta Discrimination and Harassment Policy and Procedures is described in UAPPOL.

• Academic Honesty:
All students should consult the information provided by the Office of Student Conduct and Accountability regarding avoiding cheating and plagiarism in particular and academic dishonesty in general (see the Academic Integrity Undergraduate Handbook and Information for Students). If in doubt about what is permitted in this class, ask the instructor.
Students involved in **language** courses and **translation** courses should be aware that on-line "translation engines" produce very dubious and unreliable "translations." **Students in language courses** should be aware that, while seeking the advice of native or expert speakers is often helpful, **excessive editorial and creative help** in assignments is considered a form of "cheating" that violates the code of student conduct with dire consequences.
An instructor or coordinator who is convinced that a student has handed in work that he or she could not possibly reproduce without outside assistance is obliged, out of consideration of fairness to other students, to report the case to the Associate Dean of the Faculty. See the Academic Discipline Process.

• Recording of Lectures:
Audio or video recording of lectures, labs, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Recorded material is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the instructor.

• Attendance, Absences, and Missed Grade Components:
Regular attendance is essential for optimal performance in any course. In cases of potentially excusable absences due to illness or domestic affliction, notify your instructor by e-mail within two days. Regarding absences that may be excusable and procedures for addressing course components missed as a result, consult the Calendar regarding Attendance and Examination sections of the University Calendar. Be aware that unexcused absences will result in partial or total loss of the grade for the "attendance and participation" component(s) of a course, as well as for any assignments that are not handed-in or completed as a result.

• Student Accessibility Services:
If you have special needs that could affect your performance in this class, please let me know during the first week of the term so that appropriate arrangements can be made. If you are not already registered with Student Accessibility Services, contact their office immediately (1-80 SUB; Email sasrec@ualberta.ca; Email; phone 780-492-3381).

• Date of deferred Final Examination (if applicable): N/A

VI. Grading:

Marks for assignments, quizzes, and exams are given in percentages, to which letter grades are also assigned, according to the table below ("Department of Philosophy Undergraduate Grading Scale"). The percentage mark resulting from the entire term work and examination then produces the final letter grade for the course.

Letter grade	Percentage	4-point value	Descriptor
A+	95-100	4.0	Excellent
A	90-94	4.0	
A-	85-89	3.7	
B+	80-84	3.3	Good
B	75-79	3.0	
B-	70-74	2.7	
C+	67-69	2.3	Satisfactory
C	63-66	2.0	
C-	60-62	1.7	
D+	57-59	1.3	Poor
D	50-56	1.0	Minimal pass
F	0-49	0	Failure

Final grades will be absolute, that is, will be determined just by obtained marks and no curves will be applied.

VII. Schedule of Classes, Readings, Assignments, and Exams:

Date	Topics and Readings
What is philosophy of science?	
Sep. 1	Introduction to the course
Sep. 6	Chalmers, Ch. 1: 'Science as knowledge derived from the facts of experience'
Scientific explanation	
Sep. 8	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)
Sep. 13	Philip Kitcher: 'Explanatory unification' (CCP, pp. 711-734)

The problem of induction; Falsificationism	
Sep. 15	Chalmers, Ch.4: 'Deriving theories from the facts: induction' Carl Popper: 'The problem of induction' (CCP, pp. 406-411)
Sep. 20	Chalmers, Ch. 5: 'Introducing falsificationism'
Sep. 22	Chalmers, Ch. 7: 'The limitations of falsificationism' • Assignment 1 due
Theory, observation, and experiment	
Sep. 27	Chalmers, Ch. 2: 'Observation as practical intervention' Chalmers, Ch. 3: 'Experiment'
Sep. 29	Wesley Salmon: 'Rational prediction' (CCP, 412-423)
Oct. 4	Peter Achinstein: 'Explanation v. Prediction: Which carries more weight?' (CCP, 439-450)
Scientific revolutions	
Oct. 6	Chalmers, Ch. 8: 'Theories as structures I: Kuhn's paradigms'
Oct. 11	Thomas Kuhn: 'The nature and necessity of scientific revolutions' (CCP, 79-93)
Oct. 13	Thomas Kuhn: 'Objectivity, value judgment, and theory choice' (CCP, 94-110) • Assignment 2 due
Oct. 18	*MIDTERM EXAM* (at 9:30 AM)
Research programs	
Oct. 20	Chalmers, Ch. 6: 'Sophisticated falsificationism, novel prediction, and the growth of science'
Oct. 25	Chalmers, Ch. 9: 'Theories as structures II: research programs'
Demarcation problem	
Oct. 27	Thomas Kuhn: 'Logic of discovery or psychology of research?' (CCP, 11-19) Imre Lakatos: 'Science and pseudoscience' (CCP, 20-26)
Nov. 1	Lary Laudan: 'Kuhn's critique of methodology' (CCP, 131-143)
Nov. 3	Chalmers, Ch. 10: 'Feyerabend's anarchistic theory of science'

Nov. 8	No Class, Fall Reading Week
Nov. 10	
Science and values	
Nov. 15	Chalmers, Ch. 11: 'Methodical changes in method' • Assignment 3 due
Nov. 17	Helen Longino: 'Values and objectivity' (CCP, 144-164) Kathleen Okruhlik: 'Gender and the biological sciences' (CCP, 165-180)
Bayesianism; New experimentalism	
Nov. 22	Chalmers, Ch. 12: 'The Bayesian approach'
Nov. 24	Wesley Salmon: 'Rationality and objectivity in science or Tom Kuhn meets Tom Bayes' (CCP, 518-549)
Nov. 29	Chalmers, Ch. 13: 'The new experimentalism'
Ontological discussions	
Dec. 1	Chalmers, Ch. 14: 'Why should the world obey laws?' Fred Dretske: Laws of nature (CCP, 833-852)
Dec. 6	Chalmers, Ch. 15: 'Realism and anti-realism' Grover Maxwell: 'The ontological status of theoretical entities' (CCP, 1049-1059)
Dec. 15	*FINAL EXAM* (at 9:30 AM)