



DEPARTMENT OF ARTS AND EDUCATION

COURSE OUTLINE – FALL 2014

**PH2650 (A2) INTRODUCTION TO THE PHILOSOPHY OF SCIENCE - 3
(3-0-0) 45 Hours**

INSTRUCTOR: Tom Enders, PhD

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OFFICE HOURS: Mon: 12:30–2 pm, Thurs: 2:30-4 pm and by appointment

PREREQUISITE(S)/COREQUISITE(S): None

REQUIRED TEXT/RESOURCE MATERIALS:

- Gillian Barker and Philip Kitcher, *Philosophy of Science: A New Introduction*. New York: Oxford University Press, 2014
- Peter Godfrey-Smith, *an introduction to the philosophy of science: Theory and Reality*. Chicago: University of Chicago Press, 2003.
- Readings posted on Moodle, class handouts, internet and database readings.

Recommended Readings:

- Alan Chalmers, *What is This Thing Called Science?* (3rd or 4th edition). Indianapolis: Hackett Publishing Company, 1999, 2013.
- Samir Okasha, *Philosophy of Science: A Very Short Introduction*. New York: Oxford University Press, 2002.
- Theodore Schick, Jr., editor, *Readings in the Philosophy of Science: From Positivism to Postmodernism*. Mountain View, California: Mayfield Publishing Company, 2000.

CALENDAR DESCRIPTION:

This is an introduction to the central issues in contemporary philosophy of science. Topics may include theory of evaluation, paradigm shifts and theory change, laws of nature, causation and explanation, the rationality of science and its social and historical setting.

CREDITS/CONTACT HOURS: 3 credits / 3 hours per week

DELIVERY MODE:

Classroom time will be used for lectures and discussions.

OBJECTIVES:

This introductory course is intended to familiarize you with:

1. relevant background information about philosophy, including different branches of the discipline such as metaphysics, epistemology, and logic
2. basic concepts, ideas and perspectives used by philosophers of science
3. general topics and debates in the field

Ultimately, as an introductory course, the main goal is to equip you with basic knowledge of the field, and assist you in being philosophical about science, whether on your own or in conjunction with further studies.

TRANSFERABILITY:

UA, UC, UL, AU, AF, AF, GMU, KUC

* The grade of D or D+ may not be accepted for transfer to other postsecondary institutions. You are cautioned that it is your responsibility to contact the receiving institutions to ensure transferability.

Please be informed that it is not the instructor's policy to allow exams or assignments to be rewritten, or extra work done to increase marks. You are welcome, however, to consult with the instructor prior to exams and assignment due dates.

EVALUATIONS

First exam..... 20%
Second exam..... 25%
Journal assignment..... 25%
Final exam 30%

Marks will be given in percentage figures before conversion to a letter grade.

GRADING CRITERIA:

Alpha Grade	Percentage Guidelines		Alpha Grade	Percentage Guidelines	Alpha Grade	Percentage Guidelines	Alpha Grade	Percentage Guidelines
A+	9-100		B+	76-79	C+	67-69	D+	55-59
A	85-89		B	73-75	C	64-66	D	50-54
A-	80-84		B-	70-72	C-	60-63	F	00-49

For conversion of letter grades to the four-point scale, see the GPRC calendar.

Student Responsibilities:

* You are expected to devote time in the classroom to the class itself. Use of cell phones and use of laptops for non-class purposes is unacceptable. It is also not acceptable to socialize or do work on other courses (or even *other* work for this course) during the class.

* You are strongly advised to keep a copy of your own of any work you submit for grading at least until you have your work returned to you.

** Students who miss an excessive number of classes (i.e. more than six, without reasonable justification such as illness) may be denied the opportunity to write the final exam, as stated in the Calendar.

**You are expected to write the final exam in December when scheduled by the Registrar's Office - with possible exceptions in the case of compelling and urgent circumstances beyond your control. Take this into account when making any travel plans. Also note and observe other key dates during the term as provided in the Calendar.

STATEMENT ON PLAGIARISM AND CHEATING:

* You are required to reference sources fully and properly for written assignments. You are responsible for familiarizing yourself with College Calendar information pertaining to cheating and plagiarism, for which there are various penalties depending on the severity of the offense. You can also refer to the College Policy on Student Conduct at https://www.gprc.ab.ca/files/forms_documents/Student_Misconduct.pdf

**Note: all Academic and Administrative policies are available at <https://www.gprc.ab.ca/about/administration/policies/>

Please note: Details of this course outline are subject to change. Any changes will be discussed in class.

COURSE SCHEDULE/TENTATIVE TIMELINE:

10, 12 September

I. Introduction.

A. What is philosophy? What is science? What is philosophy of science? Branches of philosophy including metaphysics and epistemology (and main positions)... Some historical background.

17, 19 September

B. Distinguishing between science and non-science. Astrology. The scientific method. Logical positivism and alternative approaches.

24, 26 September, 1 October

II. **Logic and scientific reasoning.**

A. An introduction to logic and logical fallacies. Deduction, induction and abduction or inference to the best explanation.

[FIRST EXAM: Friday 3 October]

8, 10 October

B. Problems of induction, hypothetical-deductive reasoning, and confirmation

15, 17 October

III. **Laws of nature and explanation.** The nature of scientific theories.

22, 24 October

IV. Explanation in the **social sciences**. The status of the social and behavioural sciences.

29, 31 October

V. **The unity of science and reductionism.** Are all sciences (natural and social) reducible to physics? Demarcation, again - what counts as a science?

5, 7 November

VI. **Theory and observation.** Thomas Kuhn and paradigm shifts.

[SECOND EXAM: Wednesday 12 November]

14, 19 November

VII. **Realism and anti-realism** with consideration of “unobservables” or theoretical entities. Criteria of adequacy of theories.

21, 26 November

VIII. **Critical voices.** Challenges from sociology of science and feminist perspectives.

28 November, 3 December.

IX. **Science and religion.** Creationism and Darwinism. Return to the demarcation question: what qualifies as a science? What are the limits of science?

5 December

X. **Future directions for philosophy of science.**

Reading list is to be provided separately...

Some thoughts on science from David Suzuki. He says that science is:

... [w]ondrous, because science is a journey without end - and an unpredictable one at that.... We are always operating at a certain level of ignorance. Science is not a game of absolutes....

On a personal level, science means the world to me. It is, after all, how I discovered nature. As a boy, I simply explored the world and wondered at the diversity of it all - the beaches, insects, mountains, forests, fish, and ponds. All evoked wonder and curiosity, inspiring me to learn more....

As powerful and as useful as it is, science is one-dimensional. It is elegant but imperfect. It offers us a way of thinking and a logical method of observation and repetition that give us insight into the world around us. But because of its reductionist nature, science can never provide us with a complete understanding of how the world works.... Nature does not operate in a vacuum. Interconnections among the various parts of the natural world are what actually drive it. When we pull it apart, we lose context - and that can mean everything.

.... The great strength of science is that it gives us the capacity to probe nature and learn its secrets.... But we also should not blindly accept every new discovery as gospel or every new technology as a savior.

.... [T]he beauty of science is that when we're presented with new information, it allows us to change our minds.

From David Suzuki and Dave Robert Taylor, *The Big Picture: reflections on science, humanity and a quickly changing planet*. Vancouver: Greystone Books, 2009, pp. 5-7.

Additional Information:

Course introduction 2014:

Philosophy of science explores basic, fundamental questions about the nature, methods, and findings of science. What is science? What distinguishes science from non-science and pseudoscience? How does it reach conclusions? How much confidence should we have in it? Why? Many people consider science to be the pinnacle of human intellectual achievement. But it does have its critics - certain religious believers, feminists and postmodernists among them. Do they have any or many strong points?

Philosophy of science is a careful, reasoned, logical and systematic exploration of questions about science in general, but with the possibility of application to more specific topic areas. Consequently, what we say about science may vary according to the topic. Are we discussing the natural sciences or the social sciences? Are we attempting to offer explanations of origins of the universe, discuss behaviour of subatomic particles, explain human interaction, assess claims of religion, predict the impact of human contributions to climate change or comment on other matters? Our degree of confidence in science, or science as it is practised in different areas, may vary. How much should it?

Questions such as these will be our focus.

Philosophers can also reflect upon big picture questions which go beyond the contents of this course. How important is it for students and the general population to be science literate? Why? How much should government and society rely on science? For what? What should determine the research goals of science? How should science be used? What are unethical directions? Who should decide?