

PHIL 240H  
History and Philosophy of Science  
University of Montana  
Fall 2008

Soazig Le Bihan

## **Part I**

### **Presentation and Introduction**

# Chapter 1

## Syllabus

### 1.1 General Information

- Course Information:
  - Course Number: PHIL 240H
  - Credits: 3
  - Class meets: MWF 1:10 pm - 2:00 pm, LA 306
  - Prerequisites: None
- Instructor Information
  - Office: LA 153
  - Office Hours: Fridays 8:00 - 11:00 am and by appointment
  - Mailbox: LA 101
  - Email: soazig.lebihan@mso.umt.edu
- Course Websites
  - Blackboard: <http://courseware.umt.edu/>
  - The most up-to-date course information (including class notes, homework assignments, announcements, any revision of the schedule, exam questions, links etc.) can be found on the course web site: <http://www.soaziglebihan.org/PHIL240.php>

### 1.2 Course Description

Scientific claims enjoy special epistemic status. They appear to be more secure and less open to interpretations than claims in other disciplines. In this class, we will seek to understand why scientific claims enjoy such a status and to what extent it is deserved.

The history of science features a succession of scientific theories, accepted for long periods of time, and then rejected as false. Consequently, it would seem reasonable to think that our actual theories will be rejected as well in the future. If this is the case, in what sense, if any, can we say that scientific claims are true? One answer to this question is in terms of scientific progress. It is a widespread belief that scientific progress comes from a straightforward accumulation of facts due to technological progress, these facts dictating our scientific theories. In this case, the history of science appears as the generation of theories that are always closer to the final truth about the world. This class is primarily aimed at showing that this view of science is far too naive. The relations between facts, scientific claims, and truth are much more complex than this naive view suggests they are.

To this aim, we shall primarily look into the history of physics, from its origin in the Greek thought, to the challenges offered by the theories of relativity and quantum mechanics. We will also look into the history of the theory of evolution. Our study of the history of the natural sciences will be the basis of a discussion of philosophical issues about science: its truth, its basis, its progress, and its relationship with religion.

### 1.3 Documentation

- (DW) Dewitt, Richard, *Worldviews: An introduction to the history and philosophy of science*, Blackwell
- (E) Larson, *Evolution: the remarkable history of a scientific theory*, The Modern Library
- (Bb) Additional readings available on Blackboard

### 1.4 Course Requirements

Your grade will be based on the following:

1. Attendance and Participation 10 per cent
2. Writing assignments:
  - EITHER: 4 short writing assignments (2 pages), 15 per cent each;
  - OR: one single, longer, research paper for the semester, 60 per cent;
3. An final exam, in class, comprehensive, closed notes and closed books, 40 per cent;

In more detail:

**Attendance** The first requirement for the course is that students carefully read all assignments, and come to class fully prepared.

It is crucial that you attend the classes. Attendance is required. There will be a lot of material covered in this course and most of it is hard. While the in-class discussion should gradually (and somewhat painlessly) make you acquainted with most of the material, you should expect to be lost very quickly and probably to fail if you are not attending the course.

You are allowed to miss 3 classes without penalty. Following that, you will lose 2 per cent per absence up to a maximum of 10 per cent.

You are expected to arrive on time and stay for the duration of the class. Three late arrivals count as one absence. If you have to leave early, please tell me at the beginning of class and sit close to the exit to minimize the disturbance to the class.

To attend a class does not mean merely sitting in class. You are expected to give your full attention to the class. Cell phones or other modes of communications should be turned off for the duration of class. You will be asked to leave if you are doing anything not relevant for class, e.g. reading the newspaper, sleeping, doing work for other classes, etc. Three offenses of this type will count as one absence.

**Participation** You are expected to participate in class. During lecture I will ask basic questions about the readings, and expect you to try to answer them. You will not be penalized for answering incorrectly. If you can't answer the questions I ask, I encourage you to ask questions. Both of these satisfy the class participation requirement. I have found that students learn best when they are asked to contribute to the lecture.

This means that, when reading at home, you have to be an *active* reader. Actively reading the original material will be one of the most important parts of the work you are expected to do for the course. Reading philosophy is hard, and you will sometimes encounter difficulties to understand the material during the semester. I will provide you with study questions to help you get prepared to the discussion in class. *You are expected to take the time to write down and to bring to class your answers to the study questions.* If you read carefully the assignment, and prepare answers to the study questions, you should easily meet the requirements for participation.

Depending on how the class goes (that is, if I notice that some of you do not prepare for class), I may:

- either take and grade some of your homework
- or give surprise quizzes on the readings

You will not be given a grade for your participation in class, but it will influence your final grade up to one step within a letter grade. That is to say, you will be able to go up from B+ to A, or from B- to C, depending on your participating in the discussion in class.

For very useful guidelines on how to read philosophy, see J. Pryor web site: <http://www.jimpryor.net/teaching/guidelines/reading.html>

**Writing Assignments** You have the choice between two options:

1. 4 short writing assignments (1-2 pages, 500 to 800 words)

Writing a philosophy paper is hard. One has to defend a clear claim in producing a clear, valid and sound argument. Feelings or authority do not constitute an acceptable basis for your claims. One aim of this class is to teach you to express your views clearly, and to support them with sound argumentation.

The writing assignments will consist in the exposition and defense of a clear and simple view concerning an issue in the philosophy of science covered in class. For the first assignment, you will be given the opportunity of a *rewrite*, on the basis on my comments. The original assignment and the rewrite will be both graded, and each have the same weight as any other writing assignment, that is, 15 per cent of the final grade. Hopefully, you will learn from this how much one can improve a paper in taking the time to write a full draft and then revise it.

2. 1 Research Paper (8-10 pages, no more than 5000 words):

I strongly recommend taking this option only if you have some background in writing philosophy papers. Please contact me before September 5. if you want to take this option. We will discuss about topic options together.

The total points for a research paper is 60 per cent, divided as follows:

1. You will first turn in a proposal, which consists in both an abstract (a summary of your thesis and your argument) and a bibliography – 5 per cent
2. You will then turn in a 2 to 4 pages progress report – 10 per cent
3. You will give a presentation of your paper in class – 10 per cent
4. Finally, you will turn in your 8-10 page paper – 35 per cent

For very useful guidelines on how to write a philosophy paper, see again J. Pryor website:<http://www.jimpryor.net/teaching/guidelines/writing.html>

**In-class Exam:** The final in-class exam will consist in two parts:

1. Short questions, which will be taken out of a list of topics which will be distributed in advance. These questions cover the *entire course*. I will provide the questions as the semester goes. I strongly encourage you to prepare your answers as you are given the questions.
2. Short Essay on the last part of the course (Darwinian revolution)  
The final exam is mandatory. Absences may be excused only in cases of severe illness (please provide adequate documentation) or other extreme circumstances. Proof of extreme circumstances is required.

**Grading Policies** You can find a detailed explanation of my grading policies on my website: <http://www.soaziglebihan.org/grading.php>.

**Late Assignment Rules** Late Assignments: without prior arrangements being made with the instructor, the grade of any late assignment will be lowered by one letter grade a day.

**IMPORTANT NOTE:** If you encounter difficulties concerning an assignment, it is almost always possible to make arrangements before the assignment is due. No accommodation is possible once the deadline has passed. **COME AND TALK TO ME BEFORE IT IS TOO LATE.**

**Academic Misconduct** You are strictly held to the University of Montana Student Conduct Code (<http://www.umt.edu.SA>).

Unless collaborative work is specifically called for, work on assignments and exams is expected to be your own. In case of plagiarism, your assignment will receive a zero. You may fail the class altogether depending on circumstances. Also, I will report the case to the university.

I will be glad to answer questions you may have about how to document sources properly. Anytime you take a phrase or sentence from someone, you have to quote it. Anytime you take an idea from someone, you have to cite your sources.

The final exam is closed-note: you may not consult anything but your own mind in order to answer questions on the exam. You may not use cell-phones, or any electronic devices to aid you, nor fellow students, nor fellow students' answers on exams, etc. You will receive a zero if you cheat on the final exam. Your conduct will also be reported to the Dean.

**Students with Disabilities** If you are a student with a disability and wish to discuss reasonable accommodations for this course, contact me privately to discuss the specific modifications you wish to request. Please be advised I may request that you provide a letter from Disability Services for Students verifying your right to reasonable modifications. If you have not yet contacted Disability Services, located in Lommasson Center 154, please do so in order to verify your disability and to coordinate your reasonable modifications. For more information, visit the Disability Services website at [www.umt.edu/dss/](http://www.umt.edu/dss/).

## 1.5 Course Schedule

*The course schedule is subject to change.*

(WA): short writing assignment due by noon in my mailbox (hardcopy)

Date	Topics and Readings
8/25	Syllabus and Introduction
8/27	Worldviews DW 1-2, Kuhn (Bb)
8/29	Worldviews, cont'ed
9/1	No class – Labor Day
9/3	Aristotle's worldview DW 2-10, Lindberg 3 (Bb)
9/5	Aristotle's worldview, cont'ed – <b>Choice for course grade due</b>
9/8	Pythagorean Orientation Lindberg 2 (Bb)
9/10	Science and Truth DW 3,4,8
9/12	Science and Truth, cont'ed – <b>WA1</b>
9/15	Toward the New Science DW 11-17
9/17	Toward the New Science, cont'ed
9/19	Toward the New Science, cont'ed
9/22	Newton DW 18-21, Newton, selections (Bb)
9/24	Newton, cont'ed
9/26	Newton, cont'ed
9/29	The Quine-Duhem Thesis DW 5, Duhem (Bb)
10/1	The problem of induction DW 6, Russel (Bb)
10/3	Falsifiability, DW 7, Popper (Bb) – textbfWA2 (rewrite of WA1)
10/6	Relativity: Special Theory DW 22
10/8	Relativity: General Theory DW23
10/10	Scientific Progress, Kuhn 1 and 2 (Bb)
10/13	Scientific Progress, cont'ed
10/15	Scientific Progress, cont'ed
10/17	Quantum Theory DW 24-25
10/20	Quantum Theory, Intro DW 26
10/22	Quantum Theory DW 27
10/24	Quantum Theory, Interpretation DW 27 – <b>WA3</b>
10/27	Quantum Theory, EPR-Bell DW 28
10/29	Catch up day
10/31	Theory of Evolution, background, E 1-2
11/3	Darwinism E 3-4
11/5	No class – Prof. Le Bihan at PSA Conference
11/7	No class – Prof. Le Bihan at PSA Conference
11/10	Evolutionism E 5
11/12	Missing Links E 6
11/14	Genetics E 7
11/17	Human Evolution E 8
11/19	Anti-Evolution Crusade E 9
11/21	Modern Synthesis E 10
11/24	War and Peace E11 – <b>WA 4</b>
11/26-30	Thanksgiving Weekend
12/1	War and Peace, cont'ed van Fraassen, Lipton (Bb)
12/3	War and Peace, cont'ed
12/5	War and Peace, cont'ed <sup>10</sup>
12/11	Final Exam, 1:10 - 3:10