HY3010: Philosophy of Science

Semester 2, AY2015-2016
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Office Hours: Tuesday after class or by appointment

Course Description:

What is science? What makes something a science? Exactly how do we acquire scientific knowledge? Why has science been so successful? These are typical of the kinds of questions philosophers of science have attempted to answer. Philosophy of science has been particularly influential since the early twentieth century, and it is a major subfield of contemporary philosophy. It is also an excellent topic to know about for future scientists and engineers. This course is an introduction to the philosophy of science for undergraduates. No prior experience in philosophy is needed. The goal is to provide an overview of some of the major themes in twentieth century philosophy of science. A secondary goal is to have students learn basic terminology and concepts in contemporary philosophy.

Classes:

There will be a three-hour class every week. The place and time are as follows:

Place: HSS Seminar Room 7
Time: Tuesday, 14:30-17:30

Readings:

Selections for the reading are taken from the following books:

The Godfrey-Smith book is available as an e-book to all NTU students through the NTU library. It is, in my opinion, the best introduction to philosophy of science book. Godfrey-Smith writes very clearly, even when discussing quite difficult matters. I will also use journal articles that are available through the NTU library. Because of the current bookstore situation, I realize it is difficult to obtain reading sources cheaply. I will therefore make all required readings for this class available to students online, with the exception of the Kuhn book (The Structure of Scientific Revolutions). With regard to Kuhn, I recommend that you purchase this book. It is an extremely widely read book, it is cheap, and used copies are readily available (on Amazon, a new paperback or Kindle book goes for around 8 US dollars, and used copies can be found for pennies).

Recommended Internet Resource:

Stanford Encyclopedia of Philosophy: http://plato.stanford.edu/
This is an extremely useful resource. You can search for pretty much any topic in philosophy on this website, and you will find articles written by top-flight philosophers. The best part is that it’s all free!

Office Hours and Emails:

If you have any questions about the assignments or reading, and you want to talk to me, you can email me at the address given above to set up an appointment. Feel free to drop by even if you don’t have much to discuss with me--I enjoy chatting with students about anything! If you have a short question, you can email me and I’ll give you a response by email, but if you have a long question, or a lot of questions, I would prefer that you come talk to me. Please give me at least 48 hours to respond to any email, and you should understand that I may not be able to respond at all during weekends or holidays.
Grading and Requirements:
Grading will be based on eight items: five short quizzes, two papers, and class participation. There is no final examination in this course.

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<th>Item</th>
<th>Percentage</th>
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<tr>
<td>Quizzes (5)</td>
<td>30%</td>
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<tr>
<td>Paper 1</td>
<td>20%</td>
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<tr>
<td>Paper 2</td>
<td>40%</td>
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<tr>
<td>Class Participation</td>
<td>10%</td>
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**Quizzes:** There are five short quizzes (maybe 15 minutes), each worth 8% of the final grade. They will be closed-book, multiple choice, and cover the material from the previous two weeks.

**Papers:** There are two papers. Paper 1 will be a shorter paper of around 1000 words. Paper 2 will be a longer paper of around 2500 words. I will provide guidance later on what would be suitable topics for these papers.

**Class Participation:** Your class participation grade depends on attendance and how much you contribute to class discussion.

**On Writing:**
I know there is a lot of variation among you with regard to how much writing you have done. I understand your anxiety about this, and when I grade papers I will be looking more for good ideas and ability to present a good argument, than proper grammar or writing style. But this is a philosophy class, and it’s my belief that philosophy classes should involve a lot of writing. For those of you who are worried about how much writing you will be asked to do in this class, think about it this way: this is a really good opportunity to improve your writing!

**On Academic Integrity and Plagiarism:**
I assume that you have all taken the Academic Integrity course (http://academicintegrity.ntu.edu.sg/for-students/module/) and you fully understand the NTU Integrity Policy. In any case, I will take severe action against any form of academic dishonesty including plagiarism, academic fraud, and facilitating academic dishonesty. The people who are affected most by cheaters are fellow students who put in an honest effort. **Plagiarism or cheating will result in an automatic zero for that assignment, and depending upon the severity of the offense, a failing grade for this course.** For your papers, I will be using Turnitin.

**On Late Assignments and Extensions:**
If you want an extension for a paper, you must indicate to me at least a day before the due date that you want an extension. If you get an extension approved by me, we will negotiate a new due date, and you will get full credit for that paper as long as you turn it in by the new due date. **Any papers turned in late, without an approved extension, will result in a cumulative penalty of one grade step per day**—so for example, a paper that would be an A if turned in on time would be an A- if turned in a day late, a B+ if turned in two days late, a B if turned in three days late, and so on.

**IMPORTANT NOTE:**
It is your responsibility to notify me if you have not turned in a paper, or you have missed a quiz. Please do not expect me to seek you out to tell you that you need to turn in a paper or take an exam. **If you never notify me, I will simply assume that you don’t care, and you will get a zero for that paper or quiz!**
**Tentative Schedule and Readings:**

*This is a tentative schedule, and some details may change as the semester progresses.* I will notify you of any changes to the syllabus as soon as I can. Students are expected to show up to lectures having read the assigned reading for that week. Some of the readings are pretty advanced for students with no prior philosophy experience. *Don’t worry if there are terms or concepts in the reading that you don’t understand. I will explain them in more detail in the lectures.*

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<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading Assignment</th>
<th>Papers and Quizzes</th>
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<tbody>
<tr>
<td>12 Jan</td>
<td>Introduction</td>
<td>None</td>
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| 19 Jan | Logical Empiricism: Intro    | PGS, “Ch 1: Introduction”  
                           | PGS, “Ch 2: Logic Plus Empiricism”  
                           | Hempel, “Scientific Inquiry: Invention and Test” |                    |
| 26 Jan | Logical Empiricism: Confirmation | PGS, “Ch 3: Induction and Confirmation”  
                           | Hempel, “The Test of a Hypothesis: Its Logic and its Force”  
                           | Hempel, “Criteria of Confirmation and Acceptability” |                    |
| 02 Feb | Logical Empiricism: Explanation | Carnap, “The Value of Laws: Explanation and Prediction”  
                           | Hempel, “Laws and Their Role in Scientific Explanation”  
                           | PGS, “Ch 13: Explanation” | Quiz 1; Paper 1 Assigned |
| 09 Feb | CHINESE NEW YEAR NO CLASS!!! |                                                                                   |                    |
| 16 Feb | Popper                       | PGS, “Ch 4: Popper: Conjecture and Refutation”  
                           | Popper, “Science: Conjectures and Refutations”  
                           | Popper, “The Problem of Induction” |                    |
| 23 Feb | Holism                       | Duhem, Selections from Ch 4 and Ch 6                                              | Quiz 2             |
| 01 Mar | RECESS WEEK NO CLASS!!!      |                                                                                   |                    |
| 08 Mar | Kuhn: Normal Science         | PGS, “Ch 5: Kuhn and Normal Science”  
                           | Kuhn, “Introduction: A Role for History”  
                           | Kuhn, “The Nature of Normal Science” | Paper 1 due |
| 15 Mar | Kuhn: Revolutionary Science  | PGS, “Ch 6: Kuhn and Revolutions”  
                           | Kuhn, “The Nature and Necessity of Scientific Revolutions”  
                           | Kuhn, “Revolutions as Changes of World Views” | Quiz 3 |
| 22 Mar | Criticisms of Kuhn          | Popper, “Normal Science and its Dangers”  
                           | Kuhn, “Logic of Discovery or Psychology of Research?”  
                           | Lakatos, “Science and Pseudoscience”  
                           | Kuhn, “Objectivity, Value Judgment, and Theory Choice” | Paper 2 assigned |
| 29 Mar | Feminism and Science Studies | PGS, “Ch 8: The Challenge from Sociology of Science”  
                           | PGS, “Ch 9: Feminism and Science Studies”  
                           | Longino, “Beyond Bad Science” | Quiz 4 |
| 05 Apr | Scientific Realism, Part 1   | PGS, “Ch 12: Scientific Realism”  
                           | Maxwell, “The Ontological Status of Theoretical Entities”  
                           | Van Fraassen, “Arguments Concerning Scientific Realism” |                    |
| 12 Apr | Scientific Realism, Part 2   | Musgrave, “Realism Versus Constructive Empiricism”  
                           | Laudan, “A Confutation of Convergent Realism” | Quiz 5 |