CONTEMPORARY PHILOSOPHY OF SCIENCE

SCIENTIFIC EXPLANATION

PHIL 6730 Instructor: Andrew Wayne
Fall 2010 Office: MACK 331
Wed. 11:30 – 2:20 Office hours: Tuesday 1:30 – 3:30
Philosophy Seminar room and by appointment
Tel: 519-824-4120 x56787
Email: awayne@uoguelph.ca

Course Outline
Knowing why is a singular achievement, distinct from other scientific accomplishments. Science aims at
describing and representing nature, predicting and controlling it; but science also aims at explanation.
This course focuses on philosophical work on scientific explanation and related issues, with an
emphasis on contemporary work. The first part of the course surveys standard approaches to scientific
explanation due to Hempel, Kitcher, Salmon, Woodward and others. The second part introduces some
significant challenges to these approaches raised by instrumentalism, anti-reductionism, and
idealization in the context of physics (Duhem, van Fraassen, Batterman). The third part investigates
new approaches to scientific explanation that aim to meet these challenges.

Texts and Course Materials
• Coursepack of selected readings, TBA.
• It is recommended that you purchase some or all of the following books: van Frassen 1980, Hempel
• Online materials at http://courselink.uoguelph.ca. You are responsible for accessing CourseLink
  regularly. Some course materials and grading comments may only be available on CourseLink.

Course Requirements
15% One synthesis paper, 5-7 pages
20% Presentation
25% Take-home midterm test, questions handed out Oct. 20, due Oct. 27.
40% Term paper, due Dec. 8.

The synthesis paper is to focus on the readings for one week and is due before or at the beginning of
class that week. No late synthesis papers will be accepted. No late midterm tests will be accepted. Late
term papers will be accepted without penalty only in very unusual circumstances and only if cleared
with the instructor in advance. Late papers not authorized in advance will be penalized one grade for
each day late (for example, after one day a B becomes a B-).

Electronic devices
In order to create a positive learning environment for all participants, this class is conducted in “airplane
mode,” which means that certain electronic devices are permitted on board, but with restricted use.
Phones and other wireless handheld devices may not be used and must be turned off. Laptop
computers may be used solely for purposes directly related to the course, and they must have all
send/receive functions (wifi, bluetooth and network connectivity) disabled.

Additional support
Students with special needs or requiring additional support are encouraged to speak with me as early
in the term as possible to ensure that appropriate arrangements are made.
## Tentative schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Required reading</th>
<th>Presenter</th>
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<tbody>
<tr>
<td>Sep. 15</td>
<td>Introduction</td>
<td>Weinberg 2001</td>
<td>None</td>
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<tr>
<td>Sep. 22</td>
<td>Deductive-nomological models</td>
<td>Hempel 1965, pp. 245-251, 333-354, 412-415</td>
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<tr>
<td>Sep. 29</td>
<td>Unificationist models</td>
<td>Kitcher 1981; Kitcher 1985</td>
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<tr>
<td>Oct. 7</td>
<td>Causal models</td>
<td>Salmon 1984, chs. 1 and 5</td>
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<tr>
<td>Oct. 13</td>
<td>Manipulationist models</td>
<td>Woodward 2003, chs. 1, 5 and 8</td>
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<tr>
<td>Oct. 20</td>
<td>Explanation and understanding</td>
<td>Trout 2007; de Regt 2009</td>
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*Take-home midterm test questions handed out*

### 1. Philosophical accounts of scientific explanation

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*Take-home midterm test due*

### 2. Challenges from physics

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<tr>
<td>Oct. 27</td>
<td>Non-Galilean idealization</td>
<td>Wayne 2010</td>
<td>None</td>
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<tr>
<td>Nov. 3</td>
<td>Instrumentalism</td>
<td>Duhem 1908/1969, chs. 7 and Conclusion; van Fraassen 1980, ch. 5.</td>
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<tr>
<td>Nov. 10</td>
<td>Anti-reductionism</td>
<td>Batterman 2002, chs. 2 and 3</td>
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### 3. New approaches

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<th>Presenter</th>
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<tr>
<td>Nov. 17</td>
<td>Proposed solutions</td>
<td>Batterman 2002, ch. 4; Bokulich 2010</td>
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<tr>
<td>Nov. 24</td>
<td>A better solution</td>
<td>Wayne, TBA</td>
<td>None</td>
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<tr>
<td>Dec. 1</td>
<td>Conclusion</td>
<td>TBA</td>
<td>None</td>
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*Term paper due Dec. 8*
E-mail Communication
As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the university and its students.

When You Cannot Meet a Course Requirement...
When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the undergraduate calendar for information on regulations and procedures for Academic Consideration: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml

Drop Date
The last date to drop one-semester Fall 2010 courses, without academic penalty, is **Thursday November 4**. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml

Copies of out-of-class assignments
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Academic Misconduct
The University of Guelph is committed to upholding the highest standards of academic integrity and enjoins all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. The Academic Misconduct Policy is detailed in the Undergraduate Calendar: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml

Recording of Materials
Presentations which are made in relation to course work—including lectures—cannot be recorded in any electronic media without the permission of the presenter, whether the instructor, a classmate or guest lecturer.

Resources
The Undergraduate Calendar is the source of information about the University of Guelph’s procedures, policies and regulations which apply to undergraduate programs. It can be found at: http://www.uoguelph.ca/registrar/calendars/undergraduate/current/
References


