PHIL3070 - Scientific Knowledge & Scientific Method
Course Outline

Course Co-ordinator: John Wright
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Consultation hours: TBA

Course Overview
Semester: Semester 1 - 2007
Unit Weighting: 10
Teaching Methods: Lecture

Brief Course Description
Introduces the nature of scientific method and the grounds of scientific knowledge as expressions of scientific rationality for both science and humanities students.

Contact Hours
Lecture for 2 Hours per Week for the Full Term

Learning Materials/Texts

Course Objectives
(1) to give students a knowledge of the nature and basic principles of rational scientific method and knowledge claims.

(2) to impart to students the skills required for them to be able to engage in critical assessment of scientific practice and in evaluation of scientific knowledge.

(3) to enable students to effectively communicate their understanding and to interact effectively so as to problem solve with diverse communal groups.

Course Outline Issued and Correct as at: Week 1, Semester 1 - 2007

CTS Download Date: 1 February 2007
(4) to provide students a critical appreciation of the larger framework of Western science as it has developed in relation to society and within which current science practice operates.

Course Content
The course covers the nature of rationally valid argument and its application to scientific method as prediction/explanation, its inadequacy for theory construction and the consequent problems of rational methodology, including induction and statistical inference. It then places these issues in the larger debate about the nature of observation, the multiple aims of science, and economic and socio-cultural influence on theoretical ideas and procedures, and the various proposals made in the light of these concerning the nature of scientific knowledge and objectivity claims.

Assessment Items

| Essays / Written Assignments | Assessment for PHIL3070 will be by written work which will be individually structured to suit the subject matter. It will normally be by 2 essays, one of 2000 words, 40%, the other of 3000 words, 60%, but this may be varied to include more frequent, smaller case studies, summaries and the like earlier on, to equivalent value, as the subject matter requires. These essays will require the student to explain the central concepts, principles and arguments of the material studied, guided by the assigned readings and seminar discussions, the latter providing continual assessment and feedback on individual student ability to properly engage the subject matter. |

Assumed Knowledge
At least 10 credit points of PHIL course at 1000 level or 40 units of any other courses at any level.

Callaghan Campus Timetable
PHIL3070
SCI KNOWLEDGE & SCI METHOD
Enquiries: School of Humanities and Social Science
Semester 1 – 2007
Lecture Thursday 11:00 - 13:00 [MCG25]

Plagiarism
University policy prohibits students plagiarising any material under any circumstances. A student plagiarises if he or she presents the thoughts or works of another as one’s own. Without limiting the generality of this definition, it may include:

- copying or paraphrasing material from any source without due acknowledgment;
- using another’s ideas without due acknowledgment;
- working with others without permission and presenting the resulting work as though it was completed independently.

Plagiarism is not only related to written works, but also to material such as data,
images, music, formulae, websites and computer programs.

Aiding another student to plagiarise is also a violation of the Plagiarism Policy and may invoke a penalty.

For further information on the University policy on plagiarism, please refer to the Policy on Student Academic Integrity at the following link -

The University has established a software plagiarism detection system called Turnitin. When you submit assessment items please be aware that for the purpose of assessing any assessment item the University may -

- Reproduce this assessment item and provide a copy to another member of the University; and/or
- Communicate a copy of this assessment item to a plagiarism checking service (which may then retain a copy of the item on its database for the purpose of future plagiarism checking).
- Submit the assessment item to other forms of plagiarism checking

Written Assessment Items

Students may be required to provide written assessment items in electronic form as well as hard copy.

Extension of Time for Assessment Items, Deferred Assessment and Special Consideration for Assessment Items or Formal Written Examinations

Students are required to submit assessment items by the due date, as advised in the Course Outline, unless the Course Coordinator approves an extension of time for submission of the item. University policy is that an assessment item submitted after the due date, without an approved extension, will be penalised.

Any student:

1. who is applying for an extension of time for submission of an assessment item on the basis of medical, compassionate, hardship/trauma or unavoidable commitment; or

2. whose attendance at or performance in an assessment item or formal written examination has been or will be affected by medical, compassionate, hardship/trauma or unavoidable commitment;

must report the circumstances, with supporting documentation, to the appropriate officer on the prescribed form.

Please go to the Policy and the on-line form for further information, particularly for information on the options available to you, at:

Students should be aware of the following important deadlines:

- **Requests for Special Consideration** must be lodged no later than 3 working days after the date of submission or examination.
- **Requests for Extensions of Time on Assessment Items** must be lodged no later than the due date of the item.
- **Requests for Rescheduling Exams** must be lodged no later than 5 working days before the date of the examination.

Your application may not be accepted if it is received after the deadline. Students who are unable to meet the above deadlines due to extenuating circumstances should speak to their Program Officer in the first instance.

**Changing your Enrolment**

The last dates to withdraw without financial or academic penalty (called the HECS Census Dates) are:

For semester 1 courses: 31 March 2007
For semester 2 courses: 31 August 2007
For Trimester 1 courses: 17 February 2007
For Trimester 2 courses: 9 June 2007

Students may withdraw from a course without academic penalty on or before the last day of semester and prior to the commencement of the formal exam period. Any withdrawal from a course after the last day of semester will result in a fail grade.

Students cannot enrol in a new course after the second week of semester/trimester, except under exceptional circumstances. Any application to add a course after the second week of semester/trimester must be on the appropriate form, and should be discussed with the Student Enquiry Centre.

To change your enrolment online, please refer to [http://www.newcastle.edu.au/study/enrolment/changingenrolment.html](http://www.newcastle.edu.au/study/enrolment/changingenrolment.html)
Contact Details

Faculty Student Service Offices

Faculty of Science and Information Technology
Room V19 (Mathematics Building)
Phone: 02 4921 5562

The Faculty of Education and Arts
Room: Level 3, Shortland Union
Phone: 02 4921 5000

The Faculty of Engineering and Built Environment
Room: EF101 (EF Building)
Phone: 02 4921 6065

The Faculty of Health
Level 2 (Student Services Building)
Phone: 02 4921 7140

The Faculty of Business and Law
Room: SRS130 (Social Sciences Building)
Phone: 02 4921 5983

Ourimbah Focus
Room: AB1.01 (Administration Building)
Phone: 02 4348 4030

The Dean of Students
Dr Michael Hannaford
Phone: 02 4921 5806
Fax: 02 4921 7151
resolutionprecinct@newcastle.edu.au

Deputy Dean of Students (Ourimbah)
Dr Bill Gladstone
Phone: 02 4348 4123
Fax: 02 4348 4145

Various services are offered by the University Student Support Unit:

Alteration of this Course Outline

No change to this course outline will be permitted after the end of the second week of the term except in exceptional circumstances and with Head of School approval. Students will be notified in advance of any approved changes to this outline.

Web Address for Rules Governing Undergraduate Academic Awards

Web Address for Rules Governing Postgraduate Academic Awards
STUDENTS WITH A DISABILITY OR CHRONIC ILLNESS

The University is committed to providing a range of support services for students with a disability or chronic illness.

If you have a disability or chronic illness which you feel may impact on your studies, please feel free to discuss your support needs with your lecturer or course coordinator.

Disability Support may also be provided by the Student Support Service (Disability). Students must be registered to receive this type of support. To register please contact the Disability Liaison Officer on 02 4921 5766, or via email at: student-disability@newcastle.edu.au

As some forms of support can take a few weeks to implement it is extremely important that you discuss your needs with your lecturer, course coordinator or Student Support Service staff at the beginning of each semester.

For more information related to confidentiality and documentation please visit the Student Support Service (Disability) website at: www.newcastle.edu.au/services/disability

Studentmail and Blackboard: www.blackboard.newcastle.edu.au/
This course uses Blackboard and studentmail to contact students, so you are advised to keep your email accounts within the quota to ensure you receive essential messages. To receive an expedited response to queries, post questions on the Blackboard discussion forum if there is one, or if emailing staff directly use the course code in the subject line of your email. Students are advised to check their studentmail and the course Blackboard site on a weekly basis.

Written Assignment Presentation and Submission Details

Students are required to submit assessment items by the due date.

Hard copy submission:

- **Type your assignments:** All work must be typewritten in 11 or 12 point black font. Leave a wide margin for marker’s comments, use 1.5 or double spacing, and include page numbers.
- **Word length:** The word limit of all assessment items should be strictly followed – 10% above or below is acceptable, otherwise penalties may apply.
- **Proof read your work** because spelling, grammatical and referencing mistakes will be penalised.
- **Staple the pages** of your assignment together (do not use pins or paper clips).
- **University Assessment Item Coversheet:** All assignments must be submitted with the University coversheet available at: http://www.newcastle.edu.au/school/hss/studentlinks/studentform.html
- **By arrangement with the relevant lecturer, assignments may be submitted at any Student Hub located at:**

Web Address for Rules Governing Professional Doctorate Awards
Date-stamping assignments: All students must date-stamp their own assignments using the machine provided at each Student Hub. If mailing an assignment, this should be addressed to the relevant School. If the course is listed with the Hub then replace “relevant School” with “Relevant Hub”. Mailed assignments are accepted from the date posted, confirmed by a Post Office date-stamp; they are also date-stamped upon receipt by Schools.

Do not fax or email assignments: Only hard copies of assignments will be considered for assessment. Inability to physically submit a hard copy of an assignment by the deadline due to other commitments or distance from campus is an unacceptable excuse.

Keep a copy of all assignments: It is the student’s responsibility to produce a copy of their work if the assignment goes astray after submission. Students are advised to keep updated back-ups in electronic and hard copy formats.

Online copy submission to Turnitin
In addition to hard copy submission, students are required to submit an electronic version of the following assignments to Turnitin via the course Blackboard website:
- 2 essays, the first of about 2,000 words, the second of about 2,500
- It is acknowledged some assignments are not able to be processed by Turnitin

Remarks
Students can request to have their work re-marked by the Course Coordinator or Discipline Convenor (or their delegate); three outcomes are possible: the same grade, a lower grade, or a higher grade being awarded. Students may also appeal against their final result for a course. Please consult the University policy at:
http://www.newcastle.edu.au/study/forms/

Return of Assignments
Students can collect assignments from a nominated Student Hub during office hours. Students will be informed during class which Hub to go to and the earliest date that assignments will be available for collection. Students must present their student identification card to collect their assignment.

Preferred Referencing Style
In this course any referencing style is permitted, so long as it is clear and consistent. An in-text citation names the author of the source, gives the date of publication, and for a direct quote includes a page number, in parentheses. At the end of the paper, a list of references provides publication information about the source; the list is alphabetised by authors’ last names (or by titles for works without authors). Further information on referencing and general study skills can be obtained from:
- Infoskills:

Student Representatives
Student Representatives are a major channel of communication between students and the School. Contact details of Student Representatives can be found on School websites.

Student Communication
Students should discuss any course related matters with their Tutor, Lecturer, or Course Coordinator in the first instance and then the relevant Discipline or Program
Convenor. If this proves unsatisfactory, they should then contact the Head of School if required. Contact details can be found on the School website.

**Essential Online Information for Students**
Information on Class and Exam Timetables, Tutorial Online Registration, Learning Support, Campus Maps, Careers information, Counselling, the Health Service and a range of free Student Support Services can be found at:

Some general information about the course.

**REQUIRED TEXTS:**
There are no required texts for this subject. Relevant texts will be placed on Short Loans, and for some sections of the course, notes will be provided.

**RECOMMENDED TEXTS:**
One book that you might find helpful is W. H. Newton-Smith *The Rationality of Science*. Some other useful books are David Chalmers *What is this thing called Science?*, Karl Popper *Conjectures and Refutations* and Thomas Kuhn *The Structure of Scientific Revolutions*.

**SYLLABUS:**
It is intended that the course of lectures will follow (more or less) the following format. However, it should be recognised that unforeseen circumstances might mean we could depart a little from this proposed schedule:

**ASSESSMENT:**
Assessment will be by means of two essays, the first will be 2,000 words in length, the second about 2,500. The first will be worth 40%, the second 60%. The first essay will be due around week 8, the second at the end of semester.

There is no examination for this subject.

**SOME SUGGESTIONS CONCERNING ESSAYS**
It is expected that all essays will be accompanied by a *Bibliography*, that is, a list of all the works you studied in preparing for the essay. Typed essays should be double-spaced. Please use a font of at least 11-point. (12-point is preferred.) Do not forget to attach a cover-sheet to the front of your essay when submitting it.
<table>
<thead>
<tr>
<th>Grading guide</th>
<th>Percentage Range</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>49% or less</td>
<td>Fail (FF)</td>
<td>An unacceptable effort, including non-completion. The student has not understood the basic principles of the subject matter and/or has been unable to express their understanding in a comprehensible way. Deficient in terms of answering the question, research, referencing and correct presentation (spelling, grammar etc). May include extensive plagiarism.</td>
<td></td>
</tr>
<tr>
<td>50% to 64%</td>
<td>Pass (P)</td>
<td>The work demonstrates a reasonable attempt to answer the question, shows some grasp of the basic principles of the subject matter and a basic knowledge of the required readings, is comprehensible, accurate and adequately referenced.</td>
<td></td>
</tr>
<tr>
<td>65% to 74%</td>
<td>Credit (C)</td>
<td>The work demonstrates a clear understanding of the question, a capacity to integrate research into the discussion, and a critical appreciation of a range of different theoretical perspectives. A deficiency in any of the above may be compensated by evidence of independent thought. The work is coherent and accurate.</td>
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<tr>
<td>75% to 84%</td>
<td>Distinction (D)</td>
<td>Evidence of substantial additional reading and/or research, and evidence of the ability to generalise from the theoretical content to develop an argument in an informed and original manner. The work is well organised, clearly expressed and shows a capacity for critical analysis.</td>
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<tr>
<td>85% upwards</td>
<td>High Distinction (HD)</td>
<td>All of the above, plus a thorough understanding of the subject matter based on substantial additional reading and/or research. The work shows a high level of independent thought, presents informed and insightful discussion of the topic, particularly the theoretical issues involved, and demonstrates a well-developed capacity for critical analysis.</td>
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**SCHEDULE OF LECTURES**

**WEEK ONE:**
- What is philosophy of science?
- Why study philosophy of science?
- Methodology
  - *Inductivism
  - *The inductive-empiricist view of science.
- Hume's Argument against induction.

**WEEK TWO:**
- Hume's Argument Against induction - continued.
- Attempts to reply to Hume.
  - *Reichenbach, uniformity of nature, inductive justification of induction, Clendinnen, BonJour and others. The appeal to probability.

**WEEK THREE:**
- Further analysis of attempts to reply to Hume.
  - *The linguistic justification of induction, Strawson, Moore and others.
  - Inductive scepticism and its consequences. Russell.

**WEEK FOUR:**
- More problems for inductivism.
  - *The priority of theory to observation.

**WEEK FIVE:**
- The Philosophy of Science of Karl Popper.
  - *The concept of falsifiability.
  - *Popper's conception of science as falsifiable conjectures.

**WEEK SIX:**
- Popper's Philosophy of Science - continued.
  - *Degrees of falsifiability
  - *Falsifiability and content.
  - *Poppers' argument for claim that Probability of laws is zero.

**WEEK SEVEN:**
- Truth, Verisimilitude and Corroboration.

**WEEK EIGHT:**
- The concept of falsifiability
  - *Problems with falsifiability
  - *Holism
  - *Popper on the asymmetry of verification and falsification.

**WEEK NINE:**
- The Popper/Kuhn Controversy
  - *Kuhn's criticisms of Popper. Popper's replies.
  - *The relation between the History of Science and the Philosophy of Science.

**WEEK TEN:**
- T. S Kuhn's Philosophy of Science.
  - *Normal science and revolutionary science. Scientific revolutions.
  - *Paradigms
*Theory comparison. Kuhn on “incommensurability”.
*Criticisms of Kuhn.

WEEK ELEVEN:
Imre Lakatos’s View of Science.
*Lakatos on the History of Science versus the Philosophy of Science.
*Lakatos on Newton’s theory of the solar system.

WEEK TWELVE:
Paul Feyerabend’s scepticism about methodology
*Feyerabend’s sceptical arguments.
*Feyerabend’s “anarchism”.

WEEK THIRTEEN:
Scientific Realism.
*Realism versus Instrumentalism
*Are realists guilty of the fallacy of affirming the consequent?
*Maxwell’s arguments for Realism.
*The theoreticians dilemma.
*Putnam’s “no-miracles” argument
*Critical evaluation of the “no-miracles” argument. How strong is it?