PHL 372: Philosophy of Science

MWF 2:00-2:50 AB4 302
Fall 2007 SHSU

Neisser
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Hours: 3:00 – 4:30 MW & by appointment Phone: x4-3779

This course is a survey of topics in philosophy of science including the logic of explanations in both the physical and social sciences, and the relations of science to the realm of values. Towards the end of the semester the course will focus on contemporary neuroscience. OBJECTIVES: (1) To introduce students to the variety of views about the nature of science; (2) to acquaint students with some of the conceptual issues raised in particular areas of science; (3) to foster development of their own views on the matters discussed.

Texts:

Theory and Reality: An introduction to the philosophy of science By Peter Godfrey-Smith
The New Brain Sciences: Perils and Prospects Dai Rees & Steven Rose, Editors
Plus various handouts

Grading:

Exams: There will be **four** take home essay exams, **each** worth **22%** of the overall grade.

Participation and preparation: **12%** Students are expected to come to class prepared. Preparation includes reading the assignments and being ready to discuss them. To earn full participation/preparation credit, you must actively engage the material, the instructor, and your classmates. This means not only attending class, but also regularly contributing to class discussion.

Attendance: If you have **six** unexcused absences, **you will lose one letter grade overall.** An additional letter grade will be assessed for each **two** additional unexcused absences. So, if you have eight absences, you cannot earn better than a C in this course. If you have 12 absences or more, you cannot pass the course. Any and all absences can also result in a reduced score for class participation. **It is your responsibility to keep track** of the number of times you have missed class. I will not provide a running tab for you.

Schedule:

8/20: Introduction: Why philosophy of science?

8/22: Some further background
Read: *Theory & Reality* Chapter 1, pp.1-18

8/24: Galileo and the Scientific Revolution
Read: Galileo, *The Starry Messenger* handout

8/27: Central ideas of Logical Empiricism
Read: *Theory & Reality* Chapter 2, pp.19-30

8/29: Philosophy as science, science as philosophy
Read: Schlick, 'The Turning Point in Philosophy' handout

8/31: Problems of Logical Empiricism
Read: *Theory & Reality* Chapter 2, pp.30-38

9/5: The classical problem of induction
Read: *Theory & Reality* Chapter 3, pp.39-50
Russell, 'On induction' handout

9/7: The new riddle of induction
Read: *Theory & Reality* Chapter 4, pp.50-56

9/10: Falsificationism
Read: *Theory & Reality* Chapter 4, pp.57-74
Popper, 'Science: Conjectures and refutations' handout

9/12: Science vs. pseudoscience
Read: Thagard, 'Why astrology is a pseudoscience' handout

9/14: Review and discussion **Exam One Assigned**

9/17: The idea of a scientific paradigm and 'normal science'
Read: *Theory & Reality* Chapter 5, pp.75-86

9/19: Revolutionary science
Read: *Theory & Reality* Chapter 6, pp.87-101
Kuhn, 'Objectivity, value judgment, and theory choice' Handout

9/21: After Kuhn: Lakatos, Laudan, Feyerabend
Read: *Theory & Reality* Chapter 7, pp.102-121
Exam One Due

9/24: Sociology of science
Read: *Theory & Reality* Chapter 8, pp.122-135

9/26: Some political aspects of scientific theory and practice
Read: *Theory & Reality* Chapter 9, pp.136-148

9/28: Naturalism in philosophy and in science
Read: *Theory & Reality* Chapter 10, pp.149-162

10/1: Scientific realism
Read: *Theory & Reality* Chapter 12, pp.173-181

10/3: Constructivism
Read: *Theory & Reality* Chapter 12, pp.181-189

10/5: Instrumentalism
Read: Van Fraasen, 'The Pragmatic Theory of Explanation'

10/8: Scientific explanation, covering laws, and causal mechanisms
Read: *Theory & Reality* Chapter 13, pp.191-200

10/10: Truth and explanation
Read: *Theory & Reality* Chapter 13, pp.200-202
Cartwright, 'The truth doesn't explain much' handout

10/12: Review and discussion of Godfrey-Smith's philosophy of science
Read: *Theory & Reality* Chapter 15, pp.219-231
Exam Two Assigned

10/15: Philosophy and neuroscience
Read: *The Brain's New Sciences* Introduction by Steven Rose, pp.3-14

10/17: Scientific reduction and human freedom
Read: Midgley, 'Do we ever really act?' in *The Brain's New Sciences* pp.17-33

10/19: Neurobiology and the origins of the human mind
Read: Donald, 'The definition of human nature' in *The Brain's New Sciences* pp.34-44
Exam Two Due

10/22: Neurobiology and the history of human nature
Read: Donald, 'The definition of human nature' in *The Brain's New Sciences* pp.44-58

10/24: Consciousness raising
Read: Rose, 'Consciousness and the limits of neurobiology' *The Brain's New Sciences* pp.59-70

10/26: Neurophilosophy
Read: Churchland, 'Can neurobiology teach us anything about consciousness?' handout

10/29: Neural correlates of consciousness
Read: Chalmers, 'What is a neural correlate of consciousness?' Handout

10/31: Self and brain
Read: Kolleck, 'Mind metaphors, neurosciences, and ethics' in *The Brain's New Sciences* pp.71-87

11/2: Gene expression and the problem of free will
Read: Lipton, 'Genetic and generic determinism: A new threat to free will?' in *The Brain's New Sciences* pp.88-100

11/5: Review and Discussion **Exam Three Assigned**

11/7: Legal implications of neuroscience
Read: Smith, 'Human action, neuroscience and the law' *The Brain's New Sciences* pp.103-122

11/9: The neurobiology of violence
Read: Radford, 'Programmed or licensed to kill? The new biology of femicide' in *The Brain's New Sciences* pp.131-148
Exam Three Due

11/12: The lobotomy attitude
Read: Dudai, 'The neurosciences: the danger that we will think that we have understood it all' in *The Brain's New Sciences* pp.167-180

11/14: On the biological basis of intelligence
Read: Clarke, 'On the dissecting the genetic basis of behaviour and intelligence' in *The Brain's New Sciences* pp.181-194

11/16: Stem cells and science
Read: Hodges et al, 'Prospects and perils of stem cell repair of the central nervous system: a brief guide to current science' in *The Brain's New Sciences* pp.195-212

11/19: Stem cells and ethics
Read: Wert, 'The use of human embryonic stem cells for research: an ethical evaluation' in *The Brain's New Sciences* pp.213-222

11/26: Prozac
Read: Cornwell, 'The Prozac story' in *The Brain's New Sciences* pp.223-231

11/28: Marketing psychotropic drugs

Read: Healy, 'Psychopharmacology at the interface between the market and the new biology' in *The Brain's New Sciences* pp.232-248

11/30: Ritalin

Read: Cooper, 'Education in the age of Ritalin' in *The Brain's New Sciences* pp.249-262

12/3: Review and discussion **Exam Four Assigned**

121/5: Big Finish

General policies:

(1) ACADEMIC DISHONESTY:

All students are expected to maintain complete honesty and integrity in the academic experiences both in and out of the classroom. Any student found guilty of dishonesty in any phase of academic work will be subject to disciplinary action. The University and its official representatives may initiate disciplinary proceedings against a student accused of any form of academic dishonesty including, but not limited to, cheating on an examination or other academic work which is to be submitted, plagiarism, collusion, and the abuse of resource materials. See University Academic Policy Statement 810213. **Electronic and online resources including turnitin.com may be used in this course to detect academic dishonesty. All student work may be subject to these and other detection systems.**

(2) CLASSROOM RULES OF CONDUCT:

Students must refrain from behavior in the classroom that intentionally or unintentionally disrupts the learning process and, thus, impedes the mission of the university. **This means:** (1) Do not surf the web during class. (2) Cellular phones, pagers, and music players must be turned off and earphones removed before class begins. (3) Do not make offensive remarks, read the newspapers, talk at inappropriate times, use tobacco, or engage in any other form of distraction. Inappropriate behavior in the classroom will result in a directive to leave class. In accordance with university policy, students who are especially disruptive also may be reported to the Dean of Students for disciplinary action.

(3) VISITORS IN THE CLASSROOM:

Unannounced visitors to class must present a current, official SHSU identification card to be permitted in the classroom. They must not present a disruption to the class by their attendance. If the visitor is not a registered student, it is at the instructor's discretion whether or not he/she will be allowed to remain.

(4) STUDENT ABSENCES ON RELIGIOUS HOLY DAYS:

Section 51.911(b) of the Texas Education Code requires that an institution of higher education excuse a student from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. Section 51.911(a)(2) defines religious holy days as: "a holy day observed by a religion whose places of worship are exempt from property taxation under Section 11.20, Tax Code…." A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an examination or complete an assignment from which the student is excused within a reasonable time after the absence. University policy 861001 provides the procedures to be followed by the student and instructor. A student desiring to absent himself/herself from a scheduled class in order to observe (a) religious holy day(s) shall present to each instructor involved a written statement concerning the religious holy day(s). The instructor will notify the student of a reasonable timeframe in which the missed assignments and/or examinations are to be completed.

(5) NOTICE TO PERSONS WITH A DISABILITY:

It is the policy of Sam Houston State University that individuals otherwise qualified shall not be excluded, solely by reason of their disability, from participation in any academic program of the university. Further, they shall not be denied the benefits of these programs nor shall they be subjected to discrimination. Students with disabilities that might affect their academic performance are expected to visit with the Office

of Services for Students with Disabilities located in the Counseling Center. They should then make arrangements with their individual instructors so that appropriate strategies can be considered and helpful procedures can be developed to ensure that participation and achievement opportunities are not impaired.

SHSU adheres to all applicable federal, state, and local laws, regulations, and guidelines with respect to providing reasonable accommodations for students with disabilities. If the student has a disability that may affect adversely their work in this class, then he or she needs to register with the SHSU Counseling Center and to talk with the instructor about how they can best be helped. All disclosures of disabilities will be kept strictly confidential. NOTE: no accommodation can be made until the student registers with the Counseling Center. There will be no retroactive accommodations.