

October 14, 2008

COVER SHEET

Submission of Syllabus for: PHIL 80. Science, Technology and Society

Instructor: Shannon Vallor, Department of Philosophy

Core Area: STS

Undergraduate Bulletin Description:

PHIL 80. Science, Technology and Society*

An investigation of the philosophical questions surrounding the social impact of science and technology, exploring issues such as technological determinism, the impact of technology on moral life, and the complex relationship between science, technology and modern culture. Special attention may be given to the social and ethical implications of specific technologies such as robotics, nanotechnology, neuroimaging, and/or technologies for digital communication.

*Formerly PHIL 117 (Upper Division), now lower division.

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ASSESSMENT PLAN:

Learning Objective 1: This course aims to combat the artificial, shallow and misleading perception, from which all too many students suffer, of science, technology and society as three distinct domains of human experience that can be separately understood and assessed. Instead, this course will aid them in reaching a more complex and nuanced understanding of these as overlapping and mutually reinforcing dimensions of human experience, and to trace specific patterns and dynamics of influence among them.

Learning Objective 2: This course will introduce students to the specific methods and process of scientific inquiry that have made technological development possible (and that reciprocally have been made possible by such developments). Particular emphasis will be given to the science and engineering behind a specific technology such as neuroimaging, robotics or nanotechnology as a means of preparing students for a detailed analysis of that technology's complex relationship to science and society. (See addendum below and attached syllabus)

Learning Objective 3: This course focuses on “the formative influences, dynamics, social impacts and ethical consequences” of technological development, as well as the ways in which technology itself functions as a social enterprise. It will explicitly address the scientific, ethical and political dimensions of technological activity and how it reciprocally shapes and responds to the needs and demands of contemporary culture.

Student achievement will be assessed in the following specific ways:

- By measuring the quality and relevance of their contributions to class and group discussions, and the extent to which these contributions are helping them advance with respect to the learning goals/objectives of the

course. I typically assess students' participation by looking at the number of quality contributions they make in class discussion; the number and consistency of required weekly emails to me in which they are required to pose a question, objection or comment about that week's reading; and/or the quality and consistency of occasional required contributions to an online ANGEL discussion forum (message board or blog). Through these assessments I am able to determine the level and nuance of their understanding of the ideas being discussed (Objectives 1, 2 and 3) as well as their critical abilities to evaluate, challenge and defend particular ideas.

- Students will write an in-class, essay-style midterm exam in which they demonstrate their understanding of various concepts and arguments in the reading and the relationships between them. This exam assesses Objectives 1, 2 and 3 above, but with the strongest emphasis on Objective 1.
- Students will write a 10 page essay in which they are required to carefully present, analyze and defend a particular normative claim, argument or viewpoint with respect to the relationship between technology and the good life, one deeply informed by the texts, lectures and class discussions but departing from them to constitute an independent thesis. They are required to defend their conclusions by presenting arguments or evidence in support, and to anticipate and respond to at least one objection to their conclusion(s). All three of the learning objectives are assessed through this paper.
- Students will also write one 7-10 page take-home final essay that will constitute a careful philosophical reflection upon the social and ethical implications of the emerging technology selected for in-depth examination in the later weeks of the course. Students will be required to demonstrate a basic understanding of the scientific and technical principles behind that technology, as well as evidence of careful critical reflection as to its possible social and ethical impact. This assignment will assess students' achievement with respect to all 3 learning objectives, by asking them to apply what they have learned to a specific technology with future significance for their lives. However, the emphasis will be strongest on objectives 2 and 3.

Overall Course Assessment:

I will use the standard university end-of-term numerical evaluations as well as narrative evaluations customized for this course to assess its overall success.

Addendum to FCC on Scientific Content: Throughout the course, philosophical articles discussing topics such as genetic engineering, artificial intelligence, virtual reality and nanotechnology will regularly incorporate or be supplemented with information about the science underlying those technologies (e.g., the physical structure and properties of chromosomes and genes, or the nature of nanoscale materials), and the methods and processes of these scientific and technological discoveries (the evolution of various types of AI algorithms for different cognitive tasks, techniques of neural network learning). More intensive analysis of the science and engineering behind a technology will be made possible through an in-depth analysis of one particular emerging technology, in which scientific, technical, social and philosophical perspectives will be integrated. For example, an in-depth, two-week analysis of the social and ethical implications of neurotechnology will provide students with an understanding of: 1) the relevant neurobiology, starting from the large structures of the brain and their associations with specific functions to the micro-scale biology of neurotransmitters and synapses; 2) the physical principles behind neural imaging technologies such as fMRI, such as the relationship between the magnetic field and radio waves given off by scanners and the magnetic properties of the hemoglobin or atomic nuclei in brain tissue; and 3) the engineering techniques that render the physical information useful (how a data plot of water density or blood oxygenation is converted to an 2D or 3D image that represents the structure of the brain and its activity) As a consequence of these combined elements, I anticipate a minimum of 30% of scientific/technological course content.

SCIENCE, TECHNOLOGY AND SOCIETY
PHIL 80, Section xxxxx MWF 1:00 p.m. – 2:05 p.m.
Room# – Spring 20xx

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COURSE DESCRIPTION

Technology is a transformative force in human history beside which most other forces pale. Political revolutions, religious upheavals, wars, famine, disease, and natural disasters can all reshape human societies, but the transformations brought about by technology have a distinctive power. This power arises in large part from the fact that while the consequences of technological change for human societies are generally more deeply entrenched and far-reaching than those of any local cataclysm, these consequences often go largely unnoticed until *after* they have fundamentally reordered the way we live and think.

Technology is also distinctive in that it is not a self-contained force – it borrows its power from science. The boundary between science and technology has long been problematic, and philosophers from Plato onward have recognized the importance of clarifying their relationship. For Plato and those who have shared his conception of the good, this task begins with the recognition that in comparison to science, which searches for ultimate and eternal truths, technology is a subordinate good, diminished by the fact that its instrumental utility pertains only to perishable and imperfect things. Contemporary philosophers inspired by this conviction have tended to view technology as a threat to ethical life, not merely because of its sometimes destructive effects, but because *in principle* its dominance in our lives threatens to distort our conception of the highest good. Others have challenged this view by arguing that, rather than a corruption of the purity of scientific knowing, technology is merely the highest expression of scientific rationality as the ultimate instrument of power, control and domination. If this view is right, then the dangers of technology are not so much metaphysical as they are political.

There are also those who view both philosophical and political challenges to the role of technology in modern society as misguided. These proponents of technological progress argue that the risks of technology are overstated in comparison to the potential benefits, and that technological change is unstoppable in any case. Some make the further argument that technology in fact promises to destabilize many of the forms of control inherent in modern societies; they encourage us to embrace technological creativity and use it to liberate ourselves.

In the 20th century, the philosophy of technology has been informed by many viewpoints, but one of the most influential has been that of Heidegger. Heidegger's existential-phenomenological critique of technology has inspired much thought and commentary, and his views will receive careful attention in this course, along with other philosophical perspectives from both the continental and analytic traditions.

Our primary aim in this course will be to understand the complex and evolving relationships between science, technology and human societies, in the interest of informing meaningful critical reflection on the ethical significance of technology for our lives.

CORE LEARNING OBJECTIVES FOR STS

Through this course, students will develop the ability to:

1. Recognize and articulate the complexity of the relationship between science, technology and society.
2. Comprehend the relevant science and technology and explain how technology advances through the processes of inquiry and experiment.
3. Analyze and evaluate the social impact of technology and how technology is itself impacted by the needs and demands of society.

COURSE REQUIREMENTS

- 1) **Class participation** – The classroom is a forum for the open exchange of ideas and insights, and for this reason students are expected to be present and prepared to discuss the readings at each class session. You should be aware that due to the high level of in-class work required, including occasional group activities, your participation level will factor significantly into your course grade. Your participation grade will be determined by three factors: attendance level, verbal participation in class discussion, and biweekly submission of reading questions and comments (the latter requirement will be discussed at length on the first day of class).
- 2) **Paper** – One major paper (approx. 10 pages) is required. A statement of your proposed topic or thesis and a preliminary outline must be submitted and approved in advance. Grades for the paper will be based on the quality of your understanding and explication of the relevant issues and texts; the organization and clarity of your written expression; and the presence of original, coherent and sound arguments, or other evidence of careful critical reflection on the subject matter. I will be happy to meet with you to discuss the paper before you turn in the final product. However, once the final version is submitted for grading no rewrites will be allowed. One-half letter grade is deducted for each day that a paper is late.
- 3) **Midterm** – This will be a short essay examination, open book/open notes. Grades will be based upon the quality of your understanding and explication of the relevant issues and texts.
- 4) **Final Exam** – This will be a take-home essay exam, with the topic given on the last day of class, and due on or before the scheduled day and time for the final exam.

GRADING

Class Participation – 20%

Midterm – 25%

Paper – 30%

Final – 25%

In addition to instructor feedback provided with graded assignments, students are encouraged to use office hours as an opportunity to receive more detailed feedback on their progress.

DISABILITY ACCOMODATION POLICY

To request academic accommodations for a disability, students must contact Disability Resources located in The Drahnann Center in Benson, room 214, (408) 554-4111; TTY (408) 554-5445. Students must provide documentation of a disability to Disability Resources prior to receiving accommodations.

ACADEMIC INTEGRITY

The issue of honesty and integrity is taken seriously in any academic discipline, and certainly no less so in philosophy. In particular, the issue of plagiarism can be problematic in this field, given the delicate balance between the requirement for originality of thought and the necessity of the free exchange of ideas. For written assignments in this class it is essential to cite any outside source used for particular ideas, statements or facts contained in your paper. This includes information taken from any published source such as books, websites, journals or newspapers as well as information obtained from individual persons – even if you are unable to trace the information back to its original source. The work you submit is graded according to the content and clarity of *your* thought alone, and for this reason any uncited use of outside sources (whether intentional or not) will be treated as a serious offense according to the guidelines published in the Undergraduate Bulletin and Community Handbook. Every case of plagiarism will result in the consequences below – *I make no exceptions for personal hardship or any other reason*. To give you a sense of how these guidelines are applied, a paper containing a plagiarized sentence or paragraph receives an 'F' with no rewrite allowed, and the incident is reported to the Assistant Dean for Student Life for a hearing to determine if further action is warranted. Papers containing *more* than a paragraph of plagiarized material result in an 'F' for the entire course, in addition to referral to the Assistant Dean for Student Life for further action.

REQUIRED TEXTS

- Scharff and Val Dusek, *Philosophy of Technology: The Technological Condition* (Blackwell:2003)
- Winston and Edelbach, *Society, Ethics and Technology* (Wadsworth: 2006)

CALENDAR

SESSION (TR)	TOPIC/READING ASSIGNMENT
1	Introductory Lecture: Sophia and Technē
2	The Nature of Modern Science and Technology Francis Bacon, selections from <i>Novum Organum</i> (Handout) Morton Winston, 'Children of Invention', 1-19
3	Science, Technology and Social Transformation (Part I) J.J. Rousseau, 'On the Sciences and Arts', 60-65 K. Marx and F. Engels, 'Capitalism and the Modern Labour Process', 66-79

- 4 **Science, Technology and Social Transformation (Part II)**
Rosalind Williams, 'History as Technological Change' 60-69
Corlann Gee Bush, 'Women and the Assessment of Technology' 69-81
Freeman Dyson, 'Technology and Social Justice' 130-140
- 5 **Science, Technology and Ethics (Part I)**
Jacques Ellul, 'On the Aims of a Philosophy of Technology' 182-186
Hans Jonas, 'Toward a Philosophy of Technology' 191-204
- 6 **Science, Technology and Ethics (Part II)**
Martin Heidegger, 'The Question Concerning Technology' 252-264
- 7 **Science, Technology and Ethics (Part III)**
Albert Borgmann, 'Focal Things and Practices' 293-314
- 8 **Critical Perspectives**
Hubert L. Dreyfus and Charles Spinosa, 'Highway Bridges and Feasts:
Heidegger and Borgmann on How to Affirm Technology' 315-326
Andrew Feenberg, 'Critical Evaluation of Heidegger and Borgmann' 327-337
- 9 **AI, Nanotechnology and Society**
Bill Joy, 'Why the Future Doesn't Need Us' 216-233
Ray Kurzweil, 'Promise and Peril' 233-238
Max More, 'Embrace, Don't Relinquish the Future' 238-244
- 10 **Biotechnology and Society**
Lee M. Silver, 'A Glimpse of Things to Come' 258-264
Leon Kass, 'Preventing a Brave New World' 264-276
Michael J. Sandel, 'The Case against Perfection' 276-287
- 11 **MIDTERM**
- 12 **Information Technology and Society (Part I)**
Michael H. Heim, 'Heidegger and McLuhan' & 'The Essence of Virtual
Reality' 539-555
Andrew Ross, 'Hacking Away at the Counterculture' 556-570
- 13 **Information Technology and Society (Part II)**
Albert Borgmann, 'Information & Reality at the Turn of the Century' 571-577
Hubert L. Dreyfus, 'Anonymity versus Commitment: The Dangers of
Education on the Internet' 578-584
- 14 **Technology, Labor and Control**
Robert L. Heilbroner, 'Do Machines Make History?' 398-404
Herbert Marcuse, 'The New Forms of Control' 405-412
- 15 **Neurotechnology and its Implications (Part I)**
Fundamentals of Neurobiology

- 16 **Neurotechnology and its Implications (Part II)**
Fundamentals of Neurotechnology –Psychopharmacology and its Medical and
'Cosmetic' Uses
- 17 **Neurotechnology and its Implications (Part III)**
Fundamentals of Neurotechnology -fMRI
- 18 **Neurotechnology and its Implications (Part IV)**
Fundamentals of Neurotechnology –Neural Implants/Interfaces
- 19 **Neurotechnology and its Implications (Part V)**
Neurotechnology: Commerce, Medicine and Government
- 20 **Neurotechnology and its Implications (Part VI)**
Neurotechnology: Privacy, Justice and Autonomy