SCIENCE, TECHNOLOGY AND HUMAN VALUES

Science and Technology Studies 101 / History of Science 101

Fall 2002

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Bronfman 117; 7-2239

The purpose of this course is to examine and assess the nature of science and technology, and their interactions with each other and with society, focussing especially on their influence on what humans value. As an introduction to science and technology studies (STS), it provides acquaintance with the major positions and schools in STS. The course employs a variety of perspectives and approaches, including the historical, philosophical, sociological, and quantitative. Consequently it is concerned with obtaining a broad overview of the diversity of thought about science and technology rather than a deep analysis of any one school or interpretation. The attempt to acquire a more sophisticated and comprehensive picture of science and technology is ultimately aimed at enabling a more critical and knowledgeable consideration of how social and individual values mold, and in turn are molded by, scientific and technological developments. To that end, the course concerns itself with questions in ethics, social responsibility, human nature, and public policy.

Class meetings (MWF 10:00 - 10:50 a.m.) primarily consist of discussion of issues and questions raised in the assigned reading.

Requirements: Class participation, 3 exercises, 2 papers (#1: 3-5 pp, #2: 5-7 pp), and 2 hour exams, each respectively worth approximately 20%, 20%, 30%, and 30% towards the final grade, which will be sensitive to active class participation [attendance, quality & frequency of interaction]

Textbooks: The required texts for the course are:

Bronowski, J. Science and Human Values
Collins/Pinch The Golem: …. Science
Collins/Pinch The Golem at Large: ….Technology
Goodfield, J. An Imagined World
Kuhn, T. The Structure of Scientific Revolutions
Teich, A. Technology and the Future [8th edition]
Volti, R. Society and Technological Change [4th edition]
Winner, L. The Whale and the Reactor

In addition, the following packet of items assigned as reading is available at cost [$9.00] in Bronfman 189 from Ms. Kate Fletcher, Administrative Assistant:

1. H. Bauer So-called "scientific method" (Sep. 11)
2. J. B. Conant There is no scientific method (Sep. 11)
3. Karl Popper Science: conjectures and refutations (Sep. 11)
4. M. Black Is Induction an acceptable scientific tool? (Sep. 11)
5. B. Brody Confirming….:the New Riddle of Induction (Sep. 11)
6. E. McMullin Reactions to the Logical Positivist… (Sep. 11)
7. Troxell/Snyder Causes and David Hume (Sep. 11)
8. C. Hempel A Philosopher…. Scientific Method (Sep. 13)
9. M. Martin Two Models for Explanation in the Sciences (Sep. 13)
10. J. Hospers What is Explanation? (Sep. 13)
11. R. Root-Bernstein Setting the Stage for Discovery (Sep. 13)
12. A. Sayre The Making of a Discovery (Sep. 16)
13. Gross/Levitt Higher Superstition: Academic Left ff (Sep. 27)
14. Et al Excerpts on Ethics (Oct. 4)
15. R. S. Morison Visions (Nov. 1)
16. Franke/Chasin The Kerala Experiment (Nov. 11)
17. K. Coyle ACCESS: Not Just Wires (Nov. 15)
18. N. Postman Informing Ourselves to Death (Nov. 15)
19. Et al Computer Ethics, Privacy, Scenarios (Nov. 18)
20. L White, Jr. Historical Roots of our Ecological Crisis (Nov. 20)
21. Gross/Levitt Environmentalism (Nov. 22)
22. J. Tierney Recycling is Garbage (Nov. 22)
23. W. F. Allman Staying Alive in the 20th Century (Nov. 25)

SCHEDULE OF CLASS MEETINGS AND READINGS

1. Introduction, Orientation.

1. Fri., Sept. 6 Science and technology studies (STS); component disciplines and approaches. Interrelation of science, technology, society, and values. What questions does this approach answer?

2. Science - A Cult of Creativity? A Moral Model? A Social System? Source of Values?

2. Mon., Sept. 9 Creativity in art and science. Origins of scientific

ideas. Do scientists invent or discover? Does science instill a higher moral sensitivity? What human values are most consonant with science? How might science contribute to ethics? Bronowski, Chapters 1- 3.

3. Philosophy of Science: Is there a "Scientific Method"? How do we know what we know? What assumptions do we make about the ultimate nature of reality?

3. Wed., Sept. 11 What different types of scientific "method" are there? What makes a science "science" - Experiment? Observation? The (il)logic of "proof." Falsification. The problem of induction. Cause. Bauer "So-called" 25-37; Conant "No Method" 206-7; Popper "Refutations" 81-86; Black "Induction"154-161; Brody "New Riddle"216-18; McMullin "Positivism" 229-237; Troxell/Snyder "Causes" 242-247

4. Fri., Sept. 13 Inseparability of method and metaphysics. The Primer Syndrome - simplicity/complexity. Reductionism, holism. Why do we trust scientific explanation? Discovery, verifiability, justification. Hempel "Method" 193-205; Martin "Explanation" 257-264; Hospers "Explanation?"265-274; Root-Bernstein "Discovery"108-118

4. Sociology of Science - How is science structured socially? How did science change in moving from little science to Big Science? Is there much place left for the lone scientist?

5. Mon., Sept. 16 What are the norms and values of the scientific community? What social institutions embody or support science? What practices challenge established norms? [Lecture - discussion] Sayre "Making a Discovery" 124-131

6. Wed., Sept. 18 How did science and research practice change in moving from little science to Big Science? Science as profession. "Technoscience." The End of Science? [Lecture - Discussion]

5. The Structure of Scientific Revolutions: An Influential Model. Scientific Knowledge as Social Construction

Scientific "progress" as non-linear, non-cumulative, and socially constructed. Paradigms, normal science, crises, and revolutions. The jigsaw puzzle model of science. Objectivity. Relativism.

7. Fri., Sept. 20 — Kuhn, Preface, 1-110 (paradigm, normal science, anomalies, crisis, revolution)

8. Mon., Sept. 23 — Kuhn, 111-210, (revolution; resolution, incommensurability, "progress," postscript)

6. Science - A Separate Culture?

9. Wed., Sept. 25 — What does it mean to be a research professional? A woman in science? What different kinds of research organization and methods are practiced?
Goodfield, An Imagined World. (entire)

10. Fri., Sept. 27 — Do the two cultures exist? Need they? Is their separation harmful? What are the “Science Wars”? Bronowski, Chapter 4: "The Abacus and the Rose";
EXERCISE #1: Read Gross and Levitt The Higher Superstition, 1-15; 71-106; 234-257, and write a one page position paper on it for discussion as a current example of the Two Cultures.

7. What do we really need to know about science and how it works?

11. Mon., Sept. 30 — Case Studies I: Golem, Ch. 1-3

12. Wed., Oct. 2 — Case Studies II: Golem, Ch. 4-7

8. Scientific Knowledge and Its Social Problems

13. Fri., Oct. 4 — Ethics and Social Responsibility
What is, has been, and should be the relationship between ethics and science? Can ethics survive modern science? In the light of what we think we know, how ought we to behave?
Excerpts on Ethics

14. Mon., Oct. 7 — Ethical Issues. What about fraud in scientific research? Can scientific research be objective and unbiased? Is scientific knowledge neutral?

FIRST PAPER: Reporting Science to the Public

9. Thinking about Technology

15. Wed., Oct. 9 What technology "is", how and why it changes and a brief social history of its development and diffusion.
Volti, Chapters 1-5 (3-85)

16. Fri., Oct. 11 Different Ways to Think about Technology
Teich, pp 1-49 [Marx, Postman, Hughes, [Weinberg, Berry]

----------**FALL READING PERIOD**----------

17. Wed., Oct. 16 More Ways to Think about Technology
Teich, pp 50-80 [Mesthene, McDermott, Florman]

10. Philosophy of Technology

18. Fri., Oct. 18 An introduction. Winner, Chapters 1-3 (56 pp)

Review and Consolidation

19. Mon., Oct 21 **Hour Exam**

11. What do we really need to know about technology? How technology really works?

20. Wed., Oct. 23 The Golem at Large:

21. Fri., Oct. 25 The Golem at Large:

12. Communication

22. Mon., Oct. 28 Volti, Part 4 (pp 181-215)

13. Transformation of Work

23. Wed., Oct. 30 Volti, Part 3 (pp 129-175)
Teich, Zuboff, Jenkins [294-301; 121-136]

14. Biomedicine, Public Health, and Ethical Dilemmas

24. Fri., Nov. 1 — What is all this health for? What limits ought there to be on biomedical technology, if any?
Teich, Weinberg, Charo, Kass: [213-255]
Morison, "Visions"
Volti, Ch. 7 (pp. 107-123)

25. Mon., Nov. 4 — Public Health, Risk, and Medical Ethics
Continuing discussion; no reading assigned
SECOND PAPER: Technological Literacy

15. The Control of Technology

26. Wed., Nov. 6 — Is Technology Autonomous? What can individuals, institutions, governments do?
Volti, Chs. 15-17, (pp 265-308)
Teich, Sclove [pp. 103-120]

27. Fri., Nov. 8 — Is there any hope in technology assessment?
Teich, Cerruzzi, Kahn and Wiener; Brody; Cerruzzi; Coates, Mahaffie, and Hines [169-212]

16. Appropriate Technology - The Lure of Decentralization

28. Mon., Nov. 11 — Is there a better way to integrate technology with society?
Teich, Schumacher, Goodman, Wajcman [pp. 81-102; 137-149]
Exemplar from Kerala [Franke/Chasin]

29. Wed., Nov. 13 — Questioning Appropriate Technology and Decentralization
Winner, Chs. 4,5 (61-97)
EXERCISE #3 Due: Terms and Phrases in STS

17. Computer Technology

30. Fri., Nov. 15 — Revolution? or "Mythinformation"?
Should the "computer society" be X-rated?
Winner, Ch. 6 (98-117)
Teich, Negroponte, Norman [303-336]
Coyle, "ACCESS," Postman, "Informing"

31. Mon., Nov. 18 — Computers, Ethics and Privacy

Teich, Morrison and Forester; Cate [259-293]
Examples and Scenarios [from Packet, “et al”]

18. The Fate of Nature in a Technological World

32. Wed., Nov. 20 Is Western technology antithetical to nature?
Winner, Ch. 7 (121-137)
White, " Historical Roots of Ecological Crisis"
Volti, Ch. 6 (pp. 88-104)

33. Fri., Nov. 22 Are Deep Ecology, Recycling, and Environmentalism Overdone?
Tierney, "Recycling"
Gross/Levitt, 149-178; 227-228; 231-233

19. Living With "Risk"

34. Mon., Nov. 25 Winner, Ch. 8 (138-154)
Teich, Morone and Woodhouse [132-156]
Allman, "Staying Alive"

----------**THANKSGIVING**----------

20. Science, Technology, and Human Values - or is it Embarrassment?
Technology and Politics, Now and Future

35. Mon., Dec. 2 Winner, Ch. 9 (155-163), Ch. 10 (164-178)
Looking at STS.

21. STS: Retrospect and Prospect

36. Wed., Dec. 4 **Hour Exam**

37. Fri., Dec. 6 Review; Suggestions; SCES