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**UNIVERSITY COLLEGE LONDON**  
**INTRODUCTION TO SCIENCE POLICY STUDIES**  
**COURSE OUTLINE**

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**HPSC 112**  
**Spring Term 2004**

Science and Technology Studies  
Dr. Brian Balmer

***About this course***

Science and technology present modern societies with immense challenges and opportunities. This course introduces students to the roles of science and technology in society, and to some of the problems facing contemporary science policy-makers. The course is structured around three key areas of study: the management of the scientific community; the links between science, technology and social change; and the control and regulation of science.

By the end of this course you should:

- Be able to identify the main themes of science policy studies
- Be able to criticize simplistic and popular notions of the relationship between science, technology and society
- Have detailed knowledge of a number of case studies in science policy (and, in particular, the social and political dimensions of the cases)

***About the department:***

You are advised to familiarise yourself with the departmental *Notes for Guidance* and consult them on all procedural matters. The notes are available on the departmental web-site at <http://www.ucl.ac.uk/sts/>

***Lectures***

Lectures will take place on Mondays 11-12am (Gordon House 106) and Wednesdays 11-12am (Edward Lewis LT). There will also be a fortnightly tutorial class either on Mondays 3-4pm (Engineering 212) or Tuesdays 1-2pm (G3, 22 Gordon Square).

Lectures are copyright material and electronic recording of lectures is not permitted without the permission of the lecturer.

***Reading:***

The notes that you take in lectures will not be detailed enough to understand a topic or to write an essay on that topic. It is therefore essential that you make use of the reading list.

- The reading list is divided into essential and additional reading - you are ***not*** expected to read all of the material.
- You will be expected to read all of the required reading (although not necessarily all in the same amount of detail). This amounts to one or two pieces each week.
- The *key* readings are intended to focus your reading if you want to cover a topic in greater depth. You may wish to use the *additional* material for your essays.
- If you cannot get hold of the *required* reading, then you should read an item from the key reading list instead.

### *Where to find the reading material*

No one text covers this course. Three books which will be useful, especially if you intend to carry on with further courses in this area, are:

1. Webster, A (1991), *Science, Technology and Society* (London and Basingstoke: MacMillan).
2. Ziman, J (1984), *An Introduction to Science Studies* (Cambridge University Press).
3. Bridgstock, M *et al* (1998), *Science, Technology and Society: An Introduction* (Cambridge University Press)

Most of the required and optional reading material is kept in the DMS Watson science library. Some is kept in Senate House Library. You should check the on-line catalogue (eUCLid) for all readings you require.

Material marked [TC *nnnn*] is kept in the teaching collection next to the issue desk of the DMS Watson library.

You are also encouraged to use the **Wellcome Information Service** on the ground floor of the Wellcome Building, 183 Euston Road (just around the corner from Gordon Square). The Service is a reference library with a large collection of science policy material - including most of the material on the course.

### *Course Assessment*

This term's course will be assessed on the basis of *two* essays of about 1,500 words each (50% of course mark) and *one* exam (50% of course mark). A list of suggested questions is included at the end of this reading list. Students who wish to write an essay connected with the course but not on the list should see me to discuss a title.

### **The due dates for essays are as follows:**

	Date Due
<b>1st Essay</b>	Friday 13 February (Week 5)
<b>2nd Essay</b>	Friday 26 March (Week 11)

You should hand your essays to me, to the departmental administrator or into my tray in the departmental office. You are strongly advised to keep a back-up copy of your essay. Late essays will be penalized: up to one week late, five points will be deducted; up to two weeks late, eleven points will be deducted; ***after two weeks essays will not be marked.***

*First essay:* you will be allowed to re-write and re-submit your first essay if you wish. However, a re-write must be fairly substantial rather than simply incorporating my comments into the essay verbatim. The re-submission must be made along with the second essay (21 March).

*Any student who has not completed both essays may be refused permission to sit the exam paper.*

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## TOPICS

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### ❖ **Topic 1. Introduction (1 lecture)**

Course outline and the scope of science policy studies.

#### **Essential Reading:**

**Gummett, P (1991), "The Evolution of Science and Technology Policy: A UK Perspective", *Science and Public Policy* Vol.18 No.1 pp31-37. [TC 669]**

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## Section 1: The Management of Science

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### ❖ **Topic 2. The Scientific Community (3 lectures)**

In order to engage seriously with debates concerning science, technology and society it is important to think beyond oversimplified models of the science-society relationship. It is usual to think of science as a body of knowledge or a particular set of methods. These lectures will introduce you to the idea of science as a social institution.

#### **Essential Readings**

**Haralambos, M (ed) (1985), *Sociology: New Directions* (Lancs: Causeway) Chapter 4 [TC 3091]**

**Mulkay, M (1991), 'Norms and Ideology in Science' in *Sociology of Science: A Sociological Pilgrimage* [TC 3094]**

#### *Key Readings:*

Merton, RK (1973), 'The Normative Structure of Science', in *The Sociology of Science* (Chicago: University of Chicago Press), Chapter 13 pp267-278 [TC 1264].

Webster, A (1991), *Science, Technology and Society* (London and Basingstoke: MacMillan) pp6-14.

Ziman, J (1984), *An Introduction to Science Studies* (Cambridge University Press) Especially chapter 6 (see also Chapter 10 on pure and applied science).

Sismondo, S (2004), *An Introduction to Science and Technology Studies* (Oxford: Blackwell) (Chapter 3 – general overview of functionalist approaches to science)

Mitroff, I (1974), 'Norms and counter-norms in a select group of Apollo moon scientists', *American Sociological Review* Vol.39 pp579-95. (Pay attention to the main points of the introduction and conclusion) [TC 2202]

#### *Additional Reading/Background Reading:*

Macionis, J and Plummer, K (1997), *Sociology: A Global Introduction* (London: Prentice Hall) Chapter 3 'Society' (Background reading on industrialisation, technological change, some basic social theory including functionalism).

Barnes, B (1985), *About Science* (Oxford: Blackwell), chapter 2. [TC 664]

Yearley, S (1988), *Science, Technology and Social Change* (London: Unwin Hyman). Chapter 2 (Explores further the idea of science as a profession)

Boronski, T (1987), *Knowledge* (London: Longman) Chapter 3 (Very readable introduction to sociology of science) [TC 3100].

Bridgstock, M *et al*, (1998) *Science, Technology and Society: An Introduction* (CUP), Chapter 5.

Sarewitz, D (1996), *Frontiers of Illusion: Science, Technology and the Politics of Progress* (Philadelphia: Temple Uni. Press) Chapter 3.

Resnik, DB (1998), *The Ethics of Science* (London: Routledge) Ch. 4.

### ❖ **Topic 3: History of Science Policy; ‘Steady State’ Thesis; Mode 2 Science (1 lecture )**

In Western countries, sustained government support for science is a quite recent historical phenomenon. It is important to have some grasp of the way in which this has come about in order to think critically about current science policy.

#### **Essential Reading:**

**Gummett P (1991), "The Evolution of Science and Technology Policy: A UK Perspective", *Science and Public Policy* Vol.18 No.1 pp31-37. [TC 669] (Good short overview, unfortunately ends in 1990).**

#### *Key Readings:*

Agar, J (2003), ‘Science and Information Technology’ in Hollowell, J (ed) *Britain Since 1945* (Oxford: Blackwell) [Submitted to TC]

Ziman J (1987), *Science in A Steady State: The Research System in Transition* (London: SPSG) (Brief summary of the ‘steady state’ thesis)

Wilkie, T (1991), *British Science and Politics Since 1945* (Oxford: Blackwell). Chapters 2 and 6.

Elzinga, A and Jamison, A (1995), ‘Changing Policy Agendas in Science and Technology’, in Jasanoff, S *et al* (eds.) *Handbook of Science & Technology Studies* (London: Sage)

Bridgstock, M *et al*, (1998) *Science, Technology and Society: An Introduction* (CUP), Chapter 9. (On why Governments support and have policies for science)

Gibbons, M *et al* (1994), *The New Production of Knowledge: The Dynamics of Research in Contemporary Societies* (Sage) (Introduction and Chapter 1 for a more theoretical approach to recent changes in science: Mode 1 and Mode 2. Glossary at the back if the language gets too dense).

*Additional Readings / Background Readings:*

Ziman, J (1994), *Prometheus Bound: Science in a Dynamic Steady State* (Cambridge University Press) (Especially chapters 1 and 5).

Wright, S (1994), *Molecular Politics* (Chicago: University of Chicago Press) (Chapter 1 pp19-20, 31-40, 43-54, 59-64) (good overview of trends in science policy)

Low, M *et al* (1999), *Science, Technology & Society in Contemporary Japan* (Cambridge: CUP) Chapter 1.

Turney, J (1997), 'Science Policy in an Age of Ambivalence', in *What is Science Policy to Science - What is Science to Science Policy?* [HIST SCI [QUARTOS] W 5.1 TUR]

Pavitt, K (1991), "What makes basic research economically useful?", *Research Policy*, vol 20, no 2, pp109-20 (argues that the benefits from basic science are far broader than the knowledge produced). [Wellcome Information Service]

❖ **Topic 4. Peer Review and its Discontents**  
(1 lecture)

Research in science promises enormous practical and cultural benefits in return for State and public support. Is it possible - or even desirable - for the State to maintain accountability in this area? Given that society cannot spend an infinite amount of money on research, how can priorities be decided upon?

**Essential Reading:**

*Either*

Turney, J (1990), 'End of the Peer Show?', *New Scientist*, 22 September, pp38-42. [TC 2117] (a useful discussion of peer review)

*Or*

Wessley, S (1998), 'Peer Review of Grant Applications: What do We Know?', *The Lancet* Vol.352 pp301-05 (overview of the empirical evidence) (available at [www.thelancet.com](http://www.thelancet.com))

*Key Readings:*

Irvine J and Martin B, (1984), 'What Direction for Basic Research?' in Gibbons, M *et al* (Eds), *Science and Technology in the 1980s and Beyond* (Harlow: Longman) pp67-98 (N.B. Concentrate on the *general* criticisms of peer review, rather than the somewhat outdated information the UK system) [TC 661]

Ziman, J (1984), *An Introduction to Science Studies* (Cambridge University Press) (Chapters 4-5)

Wenneras, W and Wold, A (1997), 'Nepotism and Sexism in Peer Review', *Nature* Vol.387 (22 May) pp341-343 (see also *New Scientist*, 24 May 1997, p4 for a summary of this research which claims sexism is rife in the peer review system). [Also reproduced in Lederman, M and Bartsch, I (2001), *The Gender and Science Reader* (London: Routledge).]

*Additional/Background Readings:*

- Webster A (1991), *Science, Technology and Society* (London and Basingstoke: MacMillan) Chapter 3 pp38-41 (Discusses some assumptions made in using performance indicators).
- Goodacre, H and Lockwood, S (1999), 'Involving Patients in Clinical Research', *British Medical Journal* Vol.319 pp.724-5 (18 September) [also available at [www.bmj.com](http://www.bmj.com) ].
- Godlee, F and Jefferson, T (eds.) (1998), *Peer Review in Health Sciences* (London: BMA) (Part 1 – especially chapters 1-3 and 5).
- Peters, DP & Ceci, SJ (1982), 'Peer Review Practices of Psychological Journals: The Fate of Published Articles, Submitted Again', *Behavioral and Brain Sciences* Vol.5 pp.187-255.
- Masood, E (1997), 'Gunfire Echoes in Debates on Public Understanding', *Nature* Vol.287 (22 May) p335 (short discussion of public involvement in science policy).
- Daniel, HD (1993), *Guardians of Science: Fairness and Reliability of Peer Review* (Chs. 1, 2, 11, 12)
- Sismondo, S (2004), *An Introduction to Science and Technology Studies* (Oxford: Blackwell) (Chapter 4)
- Goldblatt, D (ed.), *Knowledge and the Social Sciences: Theory, Method, Practice* (London: Routledge) Ch. 1, section 2.1 (pp11-19) (Case study of peer review and 'the memory of water' as unorthodox science)

❖ **Topic 5. The Politics of Antarctic Research (2 lectures)**

Polar science (Arctic and Antarctic) is attracting political and popular interest because of its importance in understanding global climate and environmental change. Antarctic science is of interest from a science policy perspective because participation in scientific research is also a central part of participation in the governance of the region. The case illustrates how science and politics interact at a global level.

**Essential Reading:**

**Elzinga, E, (1991), 'The Antarctic as Big Science' in Hicks EK & van Rossum W (Eds), *Policy Development and Big Science* (North Holland Publ.), pp15-25 [TC 659]**

*Key Readings:*

- Andresen, S and Ostreng, W (1989), *International Resource Management* (New York: Belhaven Press). Chapter 4, pp88-113.
- Elzinga, A (ed) (1993), *Changing Trends in Antarctic Research* (London and Dordrecht: Kluwer Academic Publishers) - especially Chapter 1.
- Elzinga, A and Bohlin, I (1989), 'The Politics of Science in Polar Regions', *AMBIO* Vol.18 No.1 pp71-76

Svedin, U and Hagerhall, A (eds) (1992), *Society and the Environment: A Swedish Research Perspective* (London and Dordrecht: Kluwer Academic Publishers) pp257-283

*Additional Reading/ Background Reading:*

Dodds, K (1997), *Geopolitics in Antarctica* (John Wiley) (Chapters 1-2).

Dodds K. (2000) 'Putting maps in their place: the demise of the Falkland Islands Dependency Survey and the mapping of Antarctica, 1945-1962', *Ecumene*, April 2000, vol. 7, no. 2, pp.176-210(35) {Available on-line from DMS }.

Stokke, O and Davor, V (1996), *Governing the Antarctic: The Effectiveness and Legitimacy of the Antarctic Treaty System* (Intro to Part III, Chapter 7).

Fogg, T (1992), 'Why Antarctica Matters', *Science and Public Affairs* Winter pp32-37

Rothwell, D (1996), *The Polar Regions and the Development of International Law* (C.U.P.) (Chapters 3-4)

Elzinga, A (1992), 'Antarctica: The Construction of a Continent by and for Science', in E. Crawford *et al* (eds), *Denationalizing Science: The Contexts of International Scientific Practice* (London and Dordrecht: Kluwer Academic Publishers) pp73-106.

Beck, P (1986) *International Politics of Antarctica* (London: Croom Helm)

Web-site: [www.nerc.ac.uk](http://www.nerc.ac.uk) for the Natural Environment Research Council who fund UK Antarctic research.

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## Section 2: Science, Technology and Social Change

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### ❖ **Topic 6. Science and Technology: Similarities, Differences and Social Relations (2 lectures)**

What are the links between basic science, technology and the economy? How does technology differ from science? Do new technologies emerge from scientific activities ('science-push'), are they created in response to social and economic demands ('demand-pull'), or is the situation more complex?

#### **Essential Readings**

**Tidd, J, Bessant, J and Pavitt, K (1997), *Managing Innovation: Integrating Technological, Market and Organisational Change* (Wiley) Chapter 1**

**Stokes, DE (1997), *Pasteur's Quadrant: Basic Science and Technological Innovation* (Brookings) (Chapters 1-2)**

#### *Key Reading:*

Pavitt, K (1997), 'Academic Research, Technical Change and Government Policy' (Chapter 9), in Krige, J & Pestre, D (eds), *Science in the Twentieth Century* (Harwood) [TC 3088][D]

- Turney J (1991), 'What Drives the Engines of Innovation?', *New Scientist*, 16 November 1991, pp35-40.
- Gibbons, M and Gummett, P (Eds) (1984), *Science, Technology and Society Today* (Manchester: Manchester University Press). Chapter 6 (On the links between science and technology).
- Ziman, J (1984), *An Introduction to Science Studies* (Cambridge University Press) (Chapter 9) (On the links between science and technology).
- Yearley, S (1988), *Science, Technology and Social Change* (London: Unwin Hyman). Chapter 4 (The links between scientific research and innovation).
- Pavitt, K (1991), "What makes basic research economically useful?", *Research Policy*, vol 20, no 2, pp109-20 (argues that the benefits from basic science are far broader than the knowledge produced). [Wellcome Information Service]
- Additional Reading / Background Reading:*
- De Solla Price, D (1965), 'Is technology historically independent of science?', *Technology & Culture* Vol.6 No.4 pp553-68.
- Barnes B and Edge D (eds) (1982), *Science in Context: Readings in the Sociology of Science* (Milton Keynes: Open University Press) - Part 3 (especially introduction and chapter 9) (On the interaction between science and technology)
- Freeman, C and Soete, L (1997), *The Economics of Industrial Innovation* (3rd Edition) (London: Pinter). Chapter 8 (Success and failure in industrial innovation)
- Webster A (1991), *Science, Technology and Society* (London and Basingstoke: MacMillan) (Chapter 5) (On industrial research)

### ❖ **Topic 7. The Social Shaping of Technology** (2 lectures)

It is usual to think about the 'impact' of technology on society. But can we meaningfully discuss the impact of society on technology?

#### **Essential Reading:**

**Winner, L (1999), 'Do Artefacts Have Politics?', in MacKenzie D and Wajcman J (Eds), *The Social Shaping of Technology* (Milton Keynes: Open University Press) pp28-39** (Also in 1st edition).

#### *Key Readings:*

Agar, J (2003), *Constant Touch: A Global History of the Mobile Phone* (Cambridge: Icon)

Cowan RS (1985), 'How the Refrigerator Got Its Hum' in *The Social Shaping of Technology* (1st edition) (Milton Keynes: Open University Press) pp202-218 (Detailed case study of how technology is affected by social forces).



Edge, D (1995), 'The Social Shaping of Technology', in Heap, N *et al* (eds), *Information Technology and Society: A Reader* (London: Sage) pp14-32 (Succinct overview of the social shaping of technology)

Westrum, R (1991), *Technologies and Society: The Shaping of People and Things* (Wadsworth) (Chapter 6)

Grint, K and Woolgar, S (1997), *The Machine at Work: Technology, Work and Organisation* (Cambridge: Polity) (Chapter 1 – Theories of Technology, especially on social shaping and technological determinism).

*Additional Reading / Background Reading:*

Yearley, S (1988), *Science, Technology and Social Change* (London: Unwin Hyman). Chapter 5 (social shaping of technology).

Street, J (1992), *Politics and Technology* (Basingstoke: MacMillan) (Chapter 2).

Ormrod S (1994), 'Lets Nuke the Dinner: Discursive Practices of Gender in the Creation of a New Cooking Process', in Cockburn C and Dilic RF (eds) (1994), *Bringing Technology Home: Gender and Technology in a Changing Europe* (Milton Keynes: Open University Press) pp 42-58 [Case study of the microwave oven]

MacKenzie D and Wajcman J (eds) (1999), *The Social Shaping of Technology* (2nd Edition) (Milton Keynes: Open University Press) (Introduction and any case studies – try any of chapters 4, 9, 10, 20 or 28).

Armacost, MH (2001), 'The Thor-Jupiter Controversy' in MacKenzie D and Wajcman J (eds) (1999), *The Social Shaping of Technology* (2nd Edition) (Milton Keynes: Open University Press)

Collins, H and Pinch, T (1998), 'A clean kill?: the role of Patriot in the Gulf War', in *The Golem at Large: What you should know about technology* (Cambridge University Press)

Pool, R (1997), *Beyond Engineering: How Society Shapes Technology* (OUP), (Chapter 5 for lots of examples such as VHS and QWERTY keyboard).

Irwin, A (2001), *Sociology and the Environment* (Cambridge: Polity). (Chapter 6).

Williams, R and Edge, D (1996), 'The Social Shaping of Technology', *Research Policy* Vol.25 No.6 pp.865-899.

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### Section 3. The Control and Regulation of Science

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#### ❖ Topic 8. Regulation, Risk and Scientific Advice (3 lectures)

To what extent can, and should, science and technology be controlled? By whom and how? How can we cope with fundamental uncertainties when attempting to reach decisions? What is the role of experts in these policy debates?

**Essential Reading:**

**Sarewitz, D (1996), *Frontiers of Illusion: Science, Technology and the Politics of Progress* (Philadelphia: Temple Uni. Press) Chapter 5.**

*Key Readings:*

Nelkin D (1975), 'The Political Impact of Scientific Expertise', *Social Studies of Science* Vol.5 pp35-54 (dated but still relevant - an argument, with examples, against the neutrality of technical decision-making) [TC 1261]

Gummet P and Johnston R (Eds) (1979), *Directing Technology* (London: Croom Helm). Chapter 7 (J. Reppy, 'The Control of Technology Through Regulation') [TC 2783] [D] (Concentrate on the basic arguments for and against regulating technology)

Irwin A (1984), 'Controlling Technological Risks: The Case of Carcinogenic Chemicals', in Gibbons M and Gummett P (Eds) (1984), *Science, Technology and Society Today* (Manchester: Manchester University Press) pp79-93. (Concentrate on *general* issues rather than the outdated features of the regulatory system)

Irwin, A (1995), *Citizen Science* (London: Routledge) (A very readable synthesis of the literature on sociology of risk and the public understanding of science) (esp. chapters 1 and 3).

Irwin, A (2001), *Sociology and the Environment* (Cambridge: Polity). Chapter 5. Summarizes some of the case studies discussed in the lectures.

DTI Office of Science & Technology (2000), *Science Advice and Policy Making* (Official guidelines on the use of scientific advice in Government) available at: <http://www.dti.gov.uk/ost/aboutost/guidelines.htm>

*Additional Reading / Background Readings:*

Nelkin D (1992), *Controversy: The Politics of Technical Decisions* (3rd Edition) (Newbury Park: Sage). (Introduction and chapter by Hilgartner on the 'Diet-Cancer debate')

Gregory, J and Miller, S (1998), 'An ABC of Risk - Apples, BSE and Comets', in *Science in Public: Communication, Culture, and Credibility* (Plenum) Ch.7.

Bridgstock, M *et al*, (1998) *Science, Technology and Society: An Introduction* (CUP), Chapter 5.

Webster A (1991), *Science, Technology and Society* (London and Basingstoke: MacMillan). Chapter 6 esp. pp126-135.

Gillespie B *et al* (1982), 'Carcinogenic Risk Assessment in the United States and Great Britain: The Case of Aldrin/Dieldrin', in *Science in Context: Readings in the Sociology of Science* (Eds Barnes B and Edge D. Milton Keynes: Open University Press).

Dickson, D (1984), *The New Politics of Science* (Chicago) Chapter 6.

Chubin, DE and Chu, EW, *Science Off the Pedestal: Social Perspectives on Science and Technology* (Wadsworth). Chapter 12.

Lupton, D (1999), *Risk* (Routledge). (Chapter 2). (Intro. to sociology of risk).

### ❖ **Topic 9: Science and Environmental Policy-Making** (2 lectures)

Ozone depletion, acid rain, global warming have all become familiar environmental concerns. With the rise of the 'green movement' and 'green politics' it is essential to assess the extent to which scientific knowledge and expertise provide a sufficient basis for policy-making.

#### **Essential Reading**

**Yearley S (1992), *The Green Case* (London: Harper Collins), Chapter 4 'The Science of Saving the Planet', pp113-148 [TC 2192].**

#### *Key Readings:*

O'Neill, J (1993), *Ecology, Policy and Politics: Human Well-Being and the Natural World* (London: Routledge) (Chapter 9, criticizes Yearley's case) [TC 2193]

Martell L (1994), *Ecology and Society* (Cambridge: Polity) (Chapter 4 on the Green Movement - concentrate particularly on the discussion of Yearley)

Wynne B and Mayer S (1993), 'How Science Fails the Environment', *New Scientist*, 5 June 1993, pp33-35. (Deals specifically with uncertainty in policy-making)

#### *Additional Readings/ Background Reading:*

Böhmer-Christiansen S (1992), 'How much "science" does environmental performance really need?' in Lykke E (ed), *Achieving Environmental Goals: The Concept and Practice of Environmental Performance Review* (Belhaven Press) [TC 1412]

Hannigan, JA (1995), *Environmental Sociology: A Social Constructivist Perspective* (Routledge) (Chapter 4. And 5-6 if you're feeling adventurous)

Yearley, S (1989), 'Bog Standards: Science and Conservation at a Public Inquiry', *Social Studies of Science* Vol.19 pp.421-38. (esp. pp.29-33). (For more details of the Northern Irish peat bog case study)

Irwin, I (1995), *Citizen Science* (London: Routledge) (pp17-21, 28-31, 65-69, 111-17) (Discusses the 2,4,5-T case from Wynne's work below in clear terms)

Irwin, A (2001), *Sociology and the Environment* (Cambridge: Polity). Chapter 5.

Yearley, S and Forrester, J (2000), 'Shell, A Sure Target for Global Environmental Campaigning?', in Cohen, R and Shirin, M (eds.) *Global Social Movements* (London: Athlone).

Jamison, A (2001) *The Making of Green Knowledge: Environmental Politics and Cultural Transformation* (Cambridge: CUP) (A slightly more advanced book placing the Green movement in historical perspective. Try chapters 2 and 6).

## ❖ **Topic 10. Science and Gender**

### *(2 lectures)*

What is the difference between sex and gender? Are women discriminated against in science - and, if so, how? What role does gender play in shaping new technologies? Is there any sense in which science and technology could be viewed as inherently masculine?

### **Essential Reading:**

**Schiebinger, L (1999), *Has Feminism Changed Science?* (Harvard) (Introduction, Chapter 4 and any chapter in Part III).**

### *Key Readings:*

Webster A (1991), *Science, Technology and Society* (London and Basingstoke: MacMillan) pp143-149.

Macionis, J and Plummer, K (1997), *Sociology: A Global Introduction* (London: Prentice Hall) (Chapter 13: Gender and Sexuality) (For general background on sociological approaches to gender).

### *On institutional barriers to women in science*

Zuckerman, H et al (1991), *The Outer Circle: Women in the Scientific Community* (Chapter 1 and any from 6-10).

Low, M et al (1999), *Science, Technology & Society in Contemporary Japan* (Cambridge: CUP), Chapter 9.

Lederman, M and Bartsch, I (2001), *The Gender and Science Reader* (London: Routledge) (Section 1)

Wyer, M et al (2001), *Women, Science and Technology: A Reader in Feminist Science Studies* (London: Routledge) (Section 1).

Web-site: [www.dti.gov.uk/ost](http://www.dti.gov.uk/ost) look under OST Business for their Women in Science, Engineering and Technology (SET) initiative – lots of up to date statistics on women in science.

### *On the 'scientific' portrayal of women:*

Jordanova, L (1999), 'Natural Facts: A Historical Perspective on Science and Sexuality' in Samson, C (ed.) *Health Studies: A Critical and Cross-cultural Reader* (Oxford: Blackwell).

Wyer, M *et al* (2001), *Women, Science and Technology: A Reader in Feminist Science Studies* (London: Routledge) (Section 2).

*Either:*

Gould, S (1981), *The Mismeasure of Man* (Penguin), (Chapter 3)

*or:*

Jordanova, L (1989), *Sexual Visions: Images of Gender in Science and Medicine between the Eighteenth and Nineteenth Centuries* (Brighton: Harvester) (Esp. Chapters 1-3)

Lederman, M and Bartsch, I (2001), *The Gender and Science Reader* (London: Routledge) (Section 5)

*On gender and epistemology:*

Tuana, N (1989), *Feminism and Science* (Indiana University Press) (Esp. Chs. by Harding and Longino) (On the possibility of distinctly feminist science)

Lederman, M and Bartsch, I (2001), *The Gender and Science Reader* (London: Routledge) (Section 3 esp. chapters 13, 14 and 17)

Wyer, M *et al* (2001), *Women, Science and Technology: A Reader in Feminist Science Studies* (London: Routledge) (Section 3).

*Additional Reading/ Background Reading:*

The Wellcome Information Service (see front of reading list) has a large collection of material on issues in gender and science and you are encouraged to explore their resources.

Schiebinger, L (1987), 'The History and Philosophy of Women in Science', *Signs* Vol.12 pp305-332 (Extremely useful overview of the field).

Harding S (1986), *The Science Question in Feminism* (Open University Press) pp15-29 and chapter 2.

Rose, H (1994), *Love, Power and Knowledge: Toward a Feminist Transformation of the Sciences* (Cambridge: Polity) (Especially chapter 1)

Martin, E (1989), *The Woman in The Body* (Milton Keynes: Open University Press) (Section 2)

**ESSAY TOPICS**  
**INTRODUCTION TO SCIENCE**  
**POLICY STUDIES**

Essays should be approximately 1,500 (max. 2000) words long, 12 point type, 1.5 line spacing and with a list of references at the end. Please read the guidelines on how to write an essay.

**BEFORE WRITING YOUR FIRST ESSAY YOU SHOULD READ CHAPTERS 5 AND 6 OF 'A. NORTHEGE, *THE GOOD STUDY GUIDE*'. Copies are in DMS Watson.**

**You must do an essay from SECTION A as your first essay and SECTION B for your second essay.** You should read the *essential* reading and then *selectively* from the relevant essay topics. Essays will not receive good marks unless you can demonstrate your engagement with the relevant literature on this reading list:

**FIRST ESSAY: SECTION A**

1. Does Mulkay's analysis of scientific norms mean that norms are irrelevant to the operation of the scientific community?
2. What have been the most important changes in the relationship between Government and science in the UK since 1945?
3. Briefly define Weinberg's 'internal' and 'external' criteria for assessing scientific work. Should these criteria carry equal weight in the peer review process?
4. What can we learn about the relationship between science and politics from the case of Antarctic research?

**SECOND ESSAY: SECTION B**

5. Science and technology are often closely associated in everyday conversations. Does the academic literature give us a different understanding of their relationship?
6. Briefly state the main features of 'technological determinist' and 'social shaping' approaches to the analysis of technology and society. What, if anything, does the social shaping approach add to our understanding of the relationship between technology and society?
7. Science policy analysts have claimed that adding scientific and technical expertise to controversies frequently makes the controversies more intense, rather than resolving them. Why might this happen?
8. Is it right to claim that science is both an epistemologically and an empirically unreliable friend to the 'green movement'?
9. Imagine a campaign being launched to get women to make up 50% of the scientific community by 2020. Based on your reading of feminist studies of science, how might this be achieved and what effect might this have on the future of science?

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### Schedule of Lectures

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Note that the schedule of lectures is a *guide* only. Some topics may take more or less time to cover in lectures.

<i>Week</i>	<i>Lecture 1</i>	<i>Lecture 2</i>
<b>1</b>	Introduction	The Scientific Community
<b>2</b>	The Scientific Community	The Scientific Community
<b>3</b>	History of UK Science Policy	Peer Review
<b>4</b>	Politics of Antarctic Science	Politics of Antarctic Science
<b>5</b>	Science, Technology and Innovation	Science, Technology and Innovation
<b>6</b>	<i>READING WEEK -</i>	<i>No Classes</i>
<b>7</b>	The Social Shaping of Technology	The Social Shaping of Technology
<b>8</b>	Politics of Expertise	Politics of Expertise
<b>9</b>	Politics of Expertise	Science and the 'Green Movement'
<b>10</b>	Science and the 'Green Movement'	Science and Gender
<b>11</b>	Science and Gender	Science and Gender

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### Useful Web Addresses

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[www.dti.gov.uk/ost](http://www.dti.gov.uk/ost) Department of Trade & Industry, Office of Science & Technology (useful for up to date statistics on science funding, policy documents, links to research council web-sites etc)

[www.open.gov.uk](http://www.open.gov.uk) Access to all UK government departments.

[www.bbsrc.ac.uk](http://www.bbsrc.ac.uk) Biotechnology and Biological Sciences Research Council

[www.epsrc.ac.uk](http://www.epsrc.ac.uk) Engineering and Physical Sciences Research Council

[www.esrc.ac.uk](http://www.esrc.ac.uk) Economic and Social Research Council

[www.mrc.ac.uk](http://www.mrc.ac.uk) Medical Research Council

[www.nerc.ac.uk](http://www.nerc.ac.uk) Natural Environment Research Council

[www.pparc.ac.uk](http://www.pparc.ac.uk) Particle Physics and Astronomy Research Council

[www.royalsoc.ac.uk](http://www.royalsoc.ac.uk) Royal Society produces some policy reports

[www.wellcome.ac.uk](http://www.wellcome.ac.uk) Wellcome Trust (including library and information service facilities)

[www.susx.ac.uk/spru/](http://www.susx.ac.uk/spru/) University of Sussex, Science Policy Research Unit (lots of useful information and links to UK and international sites)