UNIVERSITY COLLEGE LONDON
INTRODUCTION TO SCIENCE POLICY STUDIES
COURSE OUTLINE

HPSC 1004
Spring Term 2012

Science and Technology Studies
Convenor: Dr. Inga Kroener
Teaching Assistant: Tim Nissen

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 Tuesdays 10-11am. Seminars will take place on Fridays either 12-1pm or 1-2pm.

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.

- 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.

Most of the required and optional reading material is kept in the **DMS Watson** science library. **Journal articles** are available on-line from the library unless otherwise stated on the reading list. Some material is kept in Senate House Library. You should check the on-line catalogue (eUCLid) for all readings you require.

Electronic readings: A small number of marked readings have been digitized by the Library and can be obtained by clicking Online Resources then Reading Lists on line and searching for the course code (make sure you tick 'show previous years'). There is also a link to this page on the course Moodle site.

You are also encouraged to use the **Wellcome Library**, 183 Euston Road (just around the corner from Gordon Square). The Service is a reference library with a large collection of science policy material.

You are also encouraged to use the internet for research. However make sure you reference the full web address, the site title and date visited. Be critical of what you read and be careful of / avoid purely descriptive sites such as Wikipedia – I will be looking for evidence of some thinking and argument in your essays, not simple regurgitation of basic information. **Also note that plagiarism, particularly involving internet sources, will be treated as a severe exam irregularity**.

Course Assessment

This term's course will be assessed on the basis of *two* essays of 1,400 (+/- 10%) words each (50% of course mark) and *one* exam (50% of course mark). A list of questions is included at the end of this reading list.

The due dates for essays are as follows:

	Date Due
1st Essay	10 February 2012
2nd Essay	23 March 2012

1. You should submit your essay by uploading it through the Moodle site.
2. Please do not e-mail essays directly to me unless this has been arranged beforehand.
3. You are strongly advised to keep a back-up copy of your essay.
4. Late essays will be penalized:

- The full allocated mark will be reduced by 5 percentage points for the first working day after the deadline for the submission of the coursework.

- The mark will be reduced by a further 10 percentage points if the coursework is submitted during the following six days.

Providing the coursework is submitted before the end of the first week of term 3 for undergraduate courses, but had not been submitted within seven days of the deadline for the submission of the coursework, it will be recorded as zero but the assessment would be considered to be complete

Students must submit both pieces of coursework and sit the exam to count as complete on this course.

Schedule of Lectures

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

Date	Lecture Topic
Jan 10th	Science Policy and the Scientific Community
Jan 17th	The Professionalisation of Science and Big Science
Jan 24th	The Scientific Community: Sociology of Science
Jan 31th	Gender and the Scientific Community
Feb 7th	Post WWII Science Policy
Feb 14th	*Reading week*
Feb 21st	Science and Technology
Feb 28th	The Social Shaping of Technology
March 6th	Risk, Science and Technology
Mar 13th	Scientific Controversies
Mar 20th	Science and Social Movements

Section 1: The Management of Science

❖ Week 1: Science Policy and the Scientific Community

Essential Reading

Link to the UK Science Funding statistics
http://www.berr.gov.uk/dius/science/science-funding/set-stats/index.html

Additional Reading

For information on the Malaria example see:
Ntoumi, F and Priebe, G (2010) 'Africanizing Scientific Knowledge: The Multilateral Malaria Initiative on Malaria as A Model' Malaria Journal 2010, 9(Suppl 3):S7 http://malariajournal.com/content/9/S3/S7

❖ Week 2: The Professionalisation of Science and Big Science

Essential Reading

Bowler, P and Morus, I (2005), 'The Organisation of Science' in *Making Modern Science: A Historical Survey* (Chicago: Uni. Chicago Press) (Chapter 14) [Electronic Version Available – See 'Where to Find Material' above]

Capshew, JH and Rader, K (1992), 'Big Science: Price to the Present' in A. Thackray (ed.), Science after '40, Special edition of the journal *Osiris* (1992) 7, pp.3-25.

Additional Reading

Turner, F (1978), 'The Victorian Conflict between Science and Religion: A Professional Dimension', *Isis* 69(3):356-376.

Turner, F (1980), 'Public Science in Britain, 1880-1919', *Isis* 71(4):589-608

Hull, A (1999), 'War of Words: The Public Science of the British Scientific Community and the Origins of the Department of Scientific and Industrial Research 1914-16', *British Journal for History of Science* 32:461-81.

Erickson, M (2005), *Science, Culture and Society: Understanding Science in the 21st Century* (Cambridge: Polity) (Chapter 5: Scientists and Scientific Communities)

Francis Bacon, *The New Atlantis* (1624/1627) in Bacon, *The Advancement of Learning, and, New Atlantis*, edited by Arthur Johnston (Oxford: Clarendon Press, 1974) – pages 239-247 only.

(Also available online from Project Gutenberg at:
http://www.gutenberg.org/dirs/etext00/nwatl11.txt)
Read from "God bless thee, my son; I will give thee the greatest jewel I have. For I will impart unto thee, for the love of God and men, a relation of the true state of Salomon's House" to the end.

Hughes, J (2002), *The Manhattan Project: Big Science and the Atom Bomb*, Cambridge: Icon Books, 2002 (A very short and informative book) (Chapter

De Groot, G (2005), *The Bomb: A Life* (Cambridge, MA: Harvard University Press, 2005), chapters 3-6.

Hughes, T (1989) *American Genesis: A Century of Invention and Technological Enthusiasm* (Harmondsworth: Penguin, 1989), Chapter on "Manhattan Project," pp 381-442

Ravetz, J (2006), *The No-Nonsense Guide to Science* (New Internationalist), Chapter 4 'Little Science, Big Science, Mega Science'

Galison, P and Hevly, B (eds.), *Big Science: the Growth of Large-scale Research*, Stanford: Stanford University Press, 1992. (Introduction and See also the other articles in this collection)

Pestre, D (1997), "Science, Political Power and the State," in John Krige and Dominique Pestre, *Science in the Twentieth Century* (Harwood, 1997), pp. 61-75.

❖ **Week 3:** The Scientific Community: Sociology of Science

Essential Readings

Sismondo, S (2004), *An Introduction to Science and Technology Studies* (Oxford: Blackwell) Chapter 3 (Questioning Functionalism in the Sociology of Science) [Electronic Version Available – See 'Where to Find Material' above]

Mulkay, M (1991), 'Norms and Ideology in Science' in *Sociology of Science: A Sociological Pilgrimage* [TC 3094] or in the journal *Social Science Information*, 15(4/5), 1976, pages 637-656

Additional 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].

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

Ziman, J (1984), *An Introduction to Science Studies* (Cambridge University Press) Especially chapter 6.

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]

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

❖ **Week 4:** Gender and the Scientific Community

Essential Readings

Schiebinger, L (1999), *Has Feminism Changed Science?* (Harvard) (Chapter 4 'The Clash of Cultures)[[Electronic Version Available – See 'Where to Find Material' above]

Additional Readings

Sismondo, S (2004), *An Introduction to Science and Technology Studies* (Oxford: Blackwell) Chapter 4 (Stratification and Discrimination) also Chapter 13 if you want to explore arguments that science is inherently masculine.

Chimba, M and Kitzinger, J (2010), 'Bimbo or boffin? Women in science: an analysis of media representations and how female scientists negotiate cultural contradictions', *Public Understanding of Science* 19(5):609-624.

Wenneras, W and Wold, A (1997), 'Nepotism and Sexism in Peer Review', *Nature* Vol.387 (22 May) pp341-343. [Also reproduced in Lederman, M and Bartsch, I (2001), *The Gender and Science Reader* (London: Routledge).]

Etzkowitz, H *et al* (2007), 'The Coming Gender Revolution in Science', in Hackett, EJ *et al* (eds) *The Handbook of Science and Technology Studies*, Third Edition (Cambridge: MIT Press).

Cockburn, C (1999), 'Caught in the Wheels: The High Cost of Being a Female Cog in the Male Machinery of Engineering', in MacKenzie, D and Wacjman, J (eds) *The Social Shaping of Technology* 2nd Edition (McGraw Hill Education).

Two relatively recent readers have brought together academic writing on women in science and engineering, select any chapters which interest you:

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

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

❖ **Week 5:** Post WWII Science Policy

Essential Readings:

The Royal Society (2010), *The Scientific Century: Securing Our Future Prosperity* (especially the Executive Summary and Part 1). The report and associated press releases, on-line audio etc can be found at:
http://royalsociety.org/The-scientific-century/

Hessels, LK and van Lente, H (2008), 'Re-thinking new knowledge production: A literature review and a research agenda', *Research Policy* 37(4):740-760

Key Readings:

Overviews:

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). [Also available from Senate House library

Agar, J (2003), 'Science and Information Technology' in Hollowell, J (ed) *Britain Since 1945* (Oxford: Blackwell) [TC 5402]

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

Specific Periods of UK Science Policy:

Sandbrook, D (2006), *White Heat: A History of Britain in the Swinging Sixties* (Abacus) (Chapter 3: The Space Age) On the 1960s [Electronic Version Available – See 'Where to Find Material' above]

Edgerton, D with K.S. Hughes (1989), 'The Poverty of Science: A Critical Analysis of Scientific and Industrial Policy Under Mrs Thatcher', *Public Administration*. 67 (Winter 1989), pp. 419-33

Margaret Thatcher, Speech to the Royal Society, September 27, 1988.

(http://www.margaretthatcher.org/speeches/displaydocument.asp?docid=107346)

Tony Blair, "Science Matters," speech April 10, 2002.
(Online at http://www.number10.gov.uk/output/Page1715.asp)

David Willets, Minister of State for Science and Universities, 'Science Innovation and the Economy' Speech at the Royal Institution, London, 9 Jul 2010,
(Online at: http://www.bis.gov.uk/news/speeches/david-willetts-science-innovation-and-the-economy)

Theories

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).

EITHER
Etzkowitz, H and Leydesdorff, L (1998), 'The endless Transition: a 'triple helix' of university-industry-government relations' *Minerva* 36: 203-208 (Models university-industry-government dynamic relationship)
OR
Etzkowitz, H and Leydesdorff, L (2000): 'The dynamics of innovation: from National Systems and ''Mode 2'' to a Triple Helix of university-industry-government relations'. *Research Policy*, 29, 109-123.

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

Nowotny, H; Scott, P and Gibbons, M (2003): ' "Mode 2" Revisited: The New Production of Knowledge'. *Minerva*, 41, 179-194.

WEEK 6: READING WEEK

❖ Week 7: Science and Technology

Essential Reading

Nye, D (2007) *Technology Matters: Questions to Live With* (Cambridge Mass: MIT Press) Chapters 2-4 ('Does Technology Control Us?' 'Is Technology Predictable?' 'How Do Historians Understand Technology?') (Chapter 4 in Electronic Version Available – See 'Where to Find Material' above]

Additional Reading

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).

Balconi, M *et al* (2010), 'In defence of the linear model: An essay', *Research Policy* 39: 1-13.

Godin, B (2006), 'The linear model of innovation: the historical construction of an analytical framework', *Science, Technology & Human Values* 31(6), pp.639-667 (2006)

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).

Wyatt, S (2007), 'Technological Determinism Is Dead; Long Live Technological Determinism' in Hackett, EJ (et al), *The Handbook of Science and Technology studies* (Cambridge, Mass. ; London : MIT Press) (3rd ed)

Brooks, H (1994): 'The relationship between science and technology'. *Research Policy*, 23, 477-486

❖ Week 8: Social Shaping of 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)**.**
(Also widely available on-line, e.g. http://zaphod.mindlab.umd.edu/docSeminar/pdfs/Winner.pdf)

Additional Reading:

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). [Electronic Version Available – See 'Where to Find Material' above]

Ellis, K and Kerr, M (2008), 'iTunes Is Pretty (Useless) When You're Blind: Digital Design Is Triggering Disability When It Could Be a Solution', *M/C Journal* Vol. 11(3): http://journal.media-culture.org.au/index.php/mcjournal/article/viewArticle/55

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).

Pool, R (1997), *Beyond Engineering: How Society Shapes Technology* (OUP), (Chapter 5 for lots of examples such as VHS and QWERTY keyboard). [Electronic Version Available – See 'Where to Find Material' above]

Verrips, J and Meyer, B (2001), 'Kwaku's car: the struggles and stories of a Ghanaian long-distance taxi-driver', in Miller, D (ed.), *Car Cultures*, (Oxford: Berg) pp.153-184.

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] [Electronic Version Available – See 'Where to Find Material' above]

❖ Weeks 9 & 10: Risk, Science and Technology; Scientific Controversies

Essential Reading:

Ravetz, J (2006), *The No-Nonsense Guide to Science* (New Internationalist), Chapters 5 and 6 (Scientific Objectivity; Uncertainty) (Chapter on Uncertainty: Electronic Version Available – See 'Where to Find Material' above)

Additional Reading

Irwin, A (2001), *Sociology and the Environment* (Cambridge: Polity). Chapter 2 'The Risk Society Thesis'

Yearley, S (2005), in *Making Sense of Science: Understanding the Social Study of Science*, London: Sage. 'Chapter 9: Figuring Out Risks'

Lupton, D (1999), *Risk* (Routledge). (Chapter 2). (Intro. to sociology of risk). (Available at: http://ls-tlss.ucl.ac.uk/course-materials/HPSC3006_50366.pdf)

Irwin, A (2001), *Sociology and the Environment* (Cambridge: Polity). Chapter 5. Summarizes some of the case studies discussed in the lectures, including the pesticide safety example. [Electronic Version Available – See 'Where to Find Material' above]

Stirling, A (2007) Science, Precaution and Risk Assessment: towards more measured and constructive policy debate, European Molecular Biology Organisation *EMBO Reports*, Vol.8, April 2007 pp.309-315

Nelkin D (1992), *Controversy: The Politics of Technical Decisions* (3rd Edition) (Newbury Park: Sage). (Introduction and any chapter that appeals)

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.

Stilgoe, J (2005), 'Controlling mobile phone health risks in the UK: a fragile discourse of compliance', *Science and Public Policy* Vol. 32(1): 55-64. (Case study involving the public face of science)

Week 11: Science and Social Movements

Essential Readings

Hess, D *et al* 'Science, Technology and Social Movements' in Hackett, EJ (et al) (2007), *The Handbook of science and technology studies* (Cambridge, Mass: MIT Press) (3rd ed) [Electronic Version Available – See 'Where to Find Material' above]

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). (Case study of an attempt to mobilize expertise to save a peat bog habitat)

Additional Reading

Pickerill, J (2006), 'Radical Politics on the Net', *Parliamentary Affairs* 59(2): 266-282. (Also available at: http://www.antiwarresearch.info/outputs.php)

Bucchi, M and Neresini, F (2007), 'Science and Public Participation', *The Handbook of science and technology studies* (Cambridge, Mass: MIT Press) (3rd ed) (On deficit/contextual models and the trend to engage the public in debates about science)

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

Epstein, S (1995), "The Construction of Lay Expertise: AIDS Activism and the Forging of Credibility in the Reform of Clinical Trials", *Science, Technology & Human Values* Vol.20 No.4 pp408-437. (Classic case study of the role of AIDS activists in affecting science).

Epstein, S (2007), 'Patient Groups and Health Movements' in Hackett, EJ (et al) (2007), *The Handbook of science and technology studies* (Cambridge, Mass: MIT Press) (3rd ed)

Blume, S (2006), 'Anti-Vaccination Movements and Their Interpretations', *Social Science and Medicine* 62(3):628-642.

Jamison, A (2001), *The Making of Green Knowledge* (esp Chapter 6 on how activists create knowledge).

Martin, B (1997) 'Science, Technology and Nonviolent Action: The Case for a Utopian Dimension in the Social Analysis of Science and Technology' Social Studies of Science, Vol. 27, No. 3, 439-463 (1997)

ESSAY TOPICS
INTRODUCTION TO SCIENCE
POLICY STUDIES

FORMAT

Essays should be 1,400 words (+/- 10%), 12 point type, 1.5 line spacing, with page numbers, and with a word count and list of references at the end (don't include the list of references in the word count). Please read the guidelines on how to write an essay.

BEFORE WRITING YOUR FIRST ESSAY YOU SHOULD READ CHAPTERS 5 AND 6 OF 'A. NORTHEDGE, *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. As a rough guideline, I would expect you to draw on the essential reading(s) for the topic plus about 3-4 other sources. Essays will not receive good marks unless you can demonstrate your engagement with the relevant literature on this reading list. Plagiarism will be treated as an exam irregularity:

FIRST ESSAY: SECTION A

What were the main changes in the organisation of science as it professionalised in the nineteenth and twentieth centuries?

Briefly outline the main features of 'big science'? What is the significance of the Manhattan Project in understanding the development of 'big science'?

Is the actual conduct of science governed by Mertonian norms?

The 'leaky pipe-line' model of women in science suggests that getting in is no guarantee of getting on or staying in. Based on your reading of feminist studies of science, what explanations have been offered for this situation and which are the most convincing?

Outline the main features of UK science policy in ***TWO*** of the following periods:
(a) The Wilson Labour Government (1964-1970)
(b) The Thatcher/Major Conservative Government (1979-1997)
(c) The Blair/Brown Labour Government (1997-2010)
(d) The Lib-Con Coalition Government (2010-) (You may need to do some research on-line beyond the reading list if you pick this one)

SECOND ESSAY: SECTION B

Most historians and sociologists of technology agree that technology is not simply applied science. What have they argued is the relationship between science and technology?

Is it possible to make a credible defence of the 'linear model' of innovation?

How, if at all, are technologies socially shaped?

What is the role of government scientific advisors in disputes over science and technology? Your answer should include discussion of examples from the academic literature.

Is it right to claim that science is both an epistemologically and an empirically unreliable friend to the 'green movement'?

Useful Web Addresses

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http://www.dius.gov.uk/science **Department for Business, Innovation and Skills (DIUS) (Particularly on science and innovation in universities)**

www.open.gov.uk Access to all UK government departments.

www.bbsrc.ac.uk Biotechnology and Biological Sciences Research Council
www.epsrc.ac.uk Engineering and Physical Sciences Research Council
www.esrc.ac.uk Economic and Social Research Council
www.mrc.ac.uk Medical Research Council
www.nerc.ac.uk Natural Environment Research Council
http://www.scitech.ac.uk/ Science and Technology Facilities Council (responsible for 'big science' in the UK)

www.royalsoc.ac.uk Royal Society produces some policy reports
www.wellcome.ac.uk Wellcome Trust (including library and information service facilities)
www.susx.ac.uk/spru/ University of Sussex, Science Policy Research Unit (lots of useful information and links to UK and international sites)