HPSC0121

Sociology of Science & Technology

Course Syllabus

2018-19 session | Mr Alex Mankoo | Email a.mankoo@ucl.ac.uk

Course Information

This course introduces students to a set of concepts that will allow them to understand science and technology as social institutions and systems of knowledge production. It takes a sociological look at the process by which knowledge is collectively produced by communities, and how this knowledge in turn remakes the world, through historical and contemporary studies. It also provides an introduction to the main scholars and traditions in the sociology of science and technology.

Basic course information

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<td>Course tutor(s):</td>
<td>Mr Alex Mankoo</td>
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<tr>
<td>Contact:</td>
<td><a href="mailto:a.mankoo@ucl.ac.uk">a.mankoo@ucl.ac.uk</a></td>
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<tr>
<td>Web:</td>
<td><a href="http://www.ucl.ac.uk/sts">www.ucl.ac.uk/sts</a> - see current staff</td>
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<tr>
<td>Office location:</td>
<td>22 Gordon Square, room B14</td>
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<td>Office hours:</td>
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Schedule

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**Assessments**

| Assignment 1 | 1000 word article review | Friday 15th February, 5pm | 01/03/2019 |
| Assignment 2 | 4000 word in-depth essay | Tuesday 19th March, 5pm | 24/04/2019 To take Easter break into account |

See end of this syllabus for **assignment instructions**. Essays must be submitted via Moodle. In order to be deemed ‘complete’ on this module students must attempt all parts of the assignment and exam.

**Specific Criteria for Assessment for this Module:**

The departmental marking guidelines for individual items of assessment can be found in the
Module Aims & Objectives

The aim of this course is to undertake a detailed examination of the sociological contribution to the analysis of science and technology. It examines the complex relationship between science and society and also takes a sociological look at the process by which knowledge is constructed. The course introduces students to the main currents of thought which have been influential in sociology of science and technology through both historical and contemporary studies.

By the end of this course you should:

• Have an understanding of how science and technology work as a social processes e.g. the way technical knowledge is produced by communities, and the way this knowledge in turn can reshape social structures and processes

• Have a detailed knowledge of the main concepts and theories in the sociology of science and technology.

• Be aware of the strengths and weaknesses of a range of sociological approaches to the analysis of science and technology.

• Begin to see links between sociological analyses of science and technology and broader debates in science policy, history of science and philosophy of science.

Although this course will draw on more general arguments and ideas in sociology, you will not be expected to become an expert in all of these wider debates. I have provided some reading for any one who wishes to place each topic in a broader sociological context.

Course expectations

Each week the class will be divided into a lecture (approx. 1 hour) and discussion session (approx. 1 hour). You will be expected to have read the week’s essential readings for the seminars and to contribute fully to seminar discussions.

You must attempt both essay assignments in order to complete this course.

Reading list

There are several recent introductory textbooks on the sociology of science, and you are strongly recommended to purchase one:

• Yearley, Steve (2005), Making Sense of Science: Understanding the Social Study of Science (London: Sage) [A good overview, with a leaning towards more contemporary issues] Abbreviated to SY on this reading list;

• Sismondo, Sergio (2010), An Introduction to Science and Technology Studies (Oxford:
Blackwell) 2nd Edition [Another good introduction, with a greater leaning towards philosophy of science than the other texts]. Abbreviated to SS on this reading list.

- Bucchi, Massimiano (2002), *Science in Society: An Introduction to Social Studies of Science* (London: Routledge) [Well written, a little too concise in places but particularly good if you are interested in public understanding/ communication of science] Abbreviated to MB on this reading list;

- David, Matthew (2005), *Science in Society* (Basingstoke: Palgrave). Tends to be aimed more at sociology students, but still a good introduction particularly if you’re interested in wider links with social theory. Abbreviated to MD on this reading list.

You should also be aware of the *Handbook of Science and Technology Studies*, which has overviews of particular topics in STS:


**Lecture Readings:**

**Week 1. Functionalist Sociology of Science, the Strong Programme and the Sociology of Knowledge**

Does it make sense to talk about social scientific knowledge as different from natural scientific knowledge? What should social scientific knowledge about natural science be like?

Part of the lecture contains a re-cap of some material on Mertonian approaches to sociology of science covered in some of the STS undergraduate modules, if you have taken them previously. Although you will not be assessed on this material, it is worth revising:

**Good Reading for Revising Merton and Functionalist Sociology of Science:**

Either
- SY – Chapter 1  
- MB – Chapters 1-2 *(most recommended)*  
- SS – Chapters 3 (and 4)  
- MD – Chapter 1

**The Strong Programme**

The publication of T.S. Kuhn’s *Structure of Scientific Revolutions* in the 1960s opened the door to a sociology of scientific knowledge. Although Kuhn himself eschewed this approach, his theory implied that scientific change of a revolutionary order (the paradigm shift) is rooted in the characteristics of the scientific community. Sociologists began to look at knowledge itself as socially conditioned. Some years later the ‘Strong Programme in the
Sociology of Knowledge’, developed by a group of philosophers, sociologists and historians based in Edinburgh in the 1970s, aimed to interrogate not just the organisation but also the content of scientific knowledge in sociological terms.

See SS – Chapter 2 for a revision of Kuhn.

**Essential Reading:**
Bloor, D (1991 [1976]), *Knowledge and Social Imagery* (Routledge) esp. Chapter 1 ‘The Strong Programme in the Sociology of Knowledge’, 3-23 (for the classic statement of the tenets of the strong programme and the argument against a ‘sociology of error’) and also see Afterword in 2nd Edition for response to critics. [on Moodle]


**Text Book Overviews of the Strong Programme**
SY – Chapters 2-3  *(most recommended)*  OR
MB – Chapters 2-3 *OR*
SS – Chapter 5 *OR*
MD – Chapter 4

**Additional Reading**


**Philosophers go apoplectic about the Strong Programme:**

Chalmers, A (1990), *Science and its Fabrication* (chapters 6-8) (a critical overview of the strong programme)

(Scathing defence of the strong programme) [Response to Laudan’s article above]

Sociologists ignore them and do Case Studies:


Webster, A (1991), Science, Technology and Society (Chapter 2) (Overview, includes discussion of the botanical classification study mentioned in lecture)


**Week 2. Laboratory Studies, Ethnography and The Micro-social Approach**

The ‘strong programme’ argued that broad social and political conditions could influence the content of scientific knowledge. Towards the end of the 1970s sociology of science took a distinctly micro-social (and linguistic) turn. Detailed studies of scientists, in laboratories or making claims in papers, became the preferred methodology of ‘lab anthropologists’. The complex negotiations, contingencies and skills involved in creating ‘a fact’ (and the way that these were all erased from the final product) became the focus of attention.

**Text Book Readings:**

Either
SY – Chapter 6 OR
MB – Chapter 4 OR
SS – Chapters 6, 9 OR
MD – Chapter 5

**Essential Reading:**


[The reading above is based on this more detailed piece:

Additional Reading:

Some nice overviews:


Examples of Ethnographies of Science (try to read at least one):


Week 3. Actor-network theory (ANT)

One of the most influential schools of thought since the 1980s and 1990s has been ‘actor-network theory’ (ANT). Its central idea is that ‘facts’ are created when ‘heterogeneous’ assemblages of actors and objects are mobilized into a ‘network’. Science and society are both co-created as the laboratory is used as a focal point for assembling knowledge and redefining social interests. Science becomes ‘politics by other means’.

Essential Readings


AND

O, Amsterdamska (1990), ‘Surely you are joking, Monsieur Latour!’, Science, Technology and Human Values Vol. 15, Fall, 495-504.

It’s also very worth reading Latour’s ‘defence of science’ in the New York Times magazine:
Text Book Overviews
Either
SY – Chapter 4 OR
SS – Chapter 7

Additional Reading:

If you read one piece of extra reading, read this:

Latour, B (1999), *Pandora’s Hope: Essays on the Reality of Science Studies* (Chapter 2 ‘Circulating Reference’) (Includes a good, relatively clear, illustrative case study of Amazonian soil science in the making – best to ignore the confusing diagrams) [Electronic reading list for course on Moodle]

Further Reading:

Michael, M (2016) *Actor-Network Theory: Trials, Trails and Translations* (London: Sage) Ch.3 and 4 (and 7 if you are interested in brining ANT up to date)


Callon, M (1986), ‘Some Elements of a Sociology of Translation: Domestication of the Scallops and the Fishermen of St Brieuc Bay’, in Biaglio, M (1999), *The Science Studies Reader* (London Routledge) (Ch.5) (Some key ANT jargon explained through a case study of molluscs in Brittany) (Case study also discussed in SY text book)


Collins, HM and Yearley, S (1992), ‘Epistemological Chicken’ in A. Pickering (ed) *Science as Practice and Culture* (Chicago: University of Chicago Press) pp301-26 (attacks the notion that non-humans can be treated as if they were the same as intentional actors) See also:


advanced reading – including Latour claiming that all the terms in actor-network theory, including the hyphen, are problematic).

**Topic 4. The Co-production of Natural and Social Order**

Since the early 2000s, there has been a growing body of literature in STS working within the idiom of ‘co-production’. Put briefly, this school of thought believes that we gain explanatory power by thinking of natural and social order as being produced together – that we cannot separate the ways we know and represent the world from how we choose to live in it.

**Essential Readings**


**Additional Reading:**


Mol, A (1999). “Ontological politics. A word and some questions”, *The Sociological Review* 47(1_suppl): 74-89. A more complex philosophical read, but good if you want to think about how ontologies are inseparable from politics, such that ontologies can be multiple.


demonstrate how certain forms of knowledge (and therefore social rights) get foregrounded or erased in scientific research projects.


Week 5. Boundaries, Classification and Biocapital

Drawing boundaries is an eminently social process. Boundaries are routinely drawn between, for instance, science and non-science, experts and laypersons, science and politics and the social and natural. The way in which boundaries are drawn and the purposes served by the resulting distinctions are an important topic within social studies of science. The consequent classifications are not simply descriptive, but also generative – drawing lines has significant implications for how both scientists and laypersons live in the world. Some scholarship STS has focused on how boundary drawing contributes to the circulation of ‘biocapital’.

Essential Readings:


Or:


If you have time:


Additional Reading:


Gieryn, T (1999), Cultural Boundaries of Science: Credibility on the Line (Chicago) (Esp. Introduction)


Golinski, J (1998), Making Natural Knowledge: Constructivism and the History of Science (Chapter 2 - on historical uses of the boundary problem).

SS – Chapter 1 pp31-32.

Two Recent Case Studies that Use Boundary-Work


Lindberg, K et al (2017), Performing boundary work: The emergence of a new practice in a hybrid operating room, Social Science & Medicine, Volume 182: 81-88

Week 6. Reading Week

Week 7. Science and Identity: Gender, Postcolonialism, Disability
Feminist critiques of science have tended to develop outside of mainstream sociology of science, despite the overlap in perspectives. Studies range from institutional questions (why so few women in science?) to epistemological questions (is there a distinctly feminist science?). Feminist analyses of science form a burgeoning literature. Other inequalities in science remain relatively under-researched.

Essential Reading:

Haraway, D (1988), ‘Situated Knowledges: The Science Question in Feminism and the


**Textbook Reading**

Either

SY – Chapter 5 OR

SS – Chapter 13 OR

MD – Chapter 5

**Starting points for further reading:**


**Additional Reading:**


Lederman, M and Bartsch, I (2001), The Gender and Science Reader (London: Routledge) (Esp. sections 4 and 5)

Hardin, S. (2008), Sciences From Below: Feminisms, Postcolonialisms and Modernities. (Ch. 5)


Saini, Angela (2017). Inferior: The True Power of Women and the Science that Shows It (London: Harper Collins). This is UCL STS’s 1Book for the year 2018-2019. Angela Saini is an accomplished science journalist rather than an academic working in STS, so I’d encourage you to also bring your own STS analysis to what you read.

**Week 8. Experimentation and the Research Subject**

In conducting experiments, researchers select (sometimes knowingly, sometimes unknowingly) subjects and objects to experiment with according to their knowledge, interests, politics, etc. Early parts of the course looked at the social and political aspects of experiments, however this week examines how experiments also function to ‘remake’ the world around us, by generating new forms of knowledge, or by turning some individuals into research subjects. In some instances, scientific research programmes treat certain populations as subjects in alarming ways.

**Essential Reading:**


**Further Reading:**


**Week 9. Experts and the Politics of Science**

Groups in industry, governments, and non-governmental organisations all call upon scientific expertise. This science is brought to bear in regulatory disputes or other areas of controversy. What is the role of science in such situations?

**Essential Reading:**

Compare the two approaches below regarding the question of expertise in the governance of technology:


*The First Hundred Days*, an academic blog coming from Harvard STS dealing with the politics and repercussions of so-called ‘post-truth’ and ‘alternative facts’:
[Read Mike Lynch’s series of three blog posts entitled "Post-truth, Alt-facts and Asymmetric Controversies' on The First Hundred Days]

**Text Book Reading**

*Either*
- SY – Chapter 8 *OR*
- SY – Chapter 9 *OR*
- MD – Chapter 3

**Additional Reading:**


Ravetz, J (2006), *The No-Nonsense Guide to Science* (New Internationalist), Chapters 5 and 6 (Scientific Objectivity; Uncertainty)

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)


Lupton, D (1999), *Risk* (Routledge). Chapter 2 ‘Theorizing Risk’ (Short and excellent introduction to risk in social science) [Electronic copy on e-reading list on Moodle]


**Week 10. Time and Space: Imaginaries, Expectations and the Geography of Science**
This is a session on hope and promise. Recent STS studies of emerging technologies have emphasized the role of ‘expectations’ and ‘imaginaries’ in shaping the development of novel science and technology. This new ‘sociology of expectations’ moves away from ideas of promise as ‘mere hype’ and looking at how promises about future utopias and dystopias actively shape the innovation process. At the same time, there has been increasing attention paid by human and cultural geographers to ideas from STS, giving rise to a burgeoning geography of science.

**Three Essential Readings:**


**Additional Readings on Expectations and Imaginaries**


*The Sociotechnical Imaginaries Project*, useful website run from Harvard STS, particularly the FAQ and antecedents sections: [http://sts.hks.harvard.edu/research/platforms/imaginaries/](http://sts.hks.harvard.edu/research/platforms/imaginaries/)


**Additonal Readings on Geographies of Science**

Week 11. Non-Knowledge: Secrecy, Ignorance and Uncertainty

STS has recently turned from looking at the construction on knowledge to also look at these various forms of non-knowledge. If there can be a sociology of scientific knowledge, can there equally be a sociology of ignorance? With respect to secrecy, a combination of STS with the geography of knowledge has promised to re-think the dynamics of secrecy.

Essential Reading:


Further Reading:


Balmer, B (2012), Secrecy and Science: A Historical Sociology of Biological and Chemical Warfare (Farnham: Ashgate) (Chapter 1 for a review of literature on science and secrecy).


ESSAY TOPICS FOR
SOCIOLOGY OF SCIENCE

Assignments should be word-processed, 12 point type, minimum 1.5 line-spaced, with page numbers added and with a word count at the end.

Assignment 1: 1000 word article review

Your review should be no more than 1000 words long with a list of references at the end (these are not included in word count). This assignment should be taken from a topic on the course for which you do not write an essay. You may submit either:

(1) A brief review of one item from the reading list, but also read at least 3-4 other items to place the review in context. An item from the reading list would be (a) a journal article, (b) all assigned chapters from a single authored book, (c) a single chapter from an edited book collection, or (d) a book. Avoid purely technical pieces. Do not review short news items or commentaries that are less than two pages (if in doubt ask me before starting your review).

(2) A comparative review. Critically compare two different articles from the reading list that you think speak to one other, or contrast one other, in an interesting way. As above, read at least 2-3 other relevant pieces in order to context the review. Think about why you have chosen the two articles in questions. How do they relate to each other? How, and why, are the authors’ perspectives different or similar? Are they trying to address similar problems? Are they fundamentally in disagreement or can they be reconciled? Do you feel one is more compelling than the other? For example:

• You could critically compare two approaches to the sociology of science and technology, e.g. The Strong Programme (Bloor 1991/1976) vs Empirical Programme of Relativism (Collins and Pinch 1993); or technologies as embodying politics (Winner 1986) vs social constructivism (Grint and Woolgar 1992).
• You could examine how do Singer (1972) and Evans (2006) differ in the way that they envision the role of expertise in the public sphere (N.B. Evans’ argument is focused on the case of bioethics).

The best reviews tend to be of items that present a strong argument – articles that merely describe policies or events can be informative but are harder to review. You can then position your review around whether or not you were convinced by the item. You should use the following as a checklist (Not all of the points will be relevant or necessary for every review):

• Clearly set out the title(s) of the piece(s) you are reviewing. You should also give your review a title that captures the main message you want to get across. Note that after the first reference e.g. (Jasanoff 2005) it is okay in this review to simply refer to page numbers (eg. pp20-21) for the main piece you are reviewing.
• Provide the reader with an **outline** of the contents of the pieces(s), including: What question(s) is (are) being asked by the author(s)? What problems are being addressed? What are the main arguments or claims being made? What evidence is used to support this argument? If relevant: what research methods and theoretical perspectives have been used?

However - do not spend too much of your word quota on this descriptive material.

• Your review should also be **analytical**:
  What are the strengths and weaknesses of the argument(s)? What are the strengths and weaknesses of the authors’ use of evidence? If relevant: what are the strengths and weaknesses of the research methods and theoretical perspectives used? Remember that qualitative studies don’t aim to be representative – they go for depth rather than breadth.

• It is essential that you don’t just provide a judgement but also the reasons for your judgement e.g. don’t just say that ‘the argument is strong’, ‘the section on X is good’. Say **why** it is strong or **what** is good about it.

• While the clarity of the piece in question is important and can be commented on, this is not the main point of your review, which should rather focus on the substantive content of the piece reviewed.

• Situate the piece you review within relevant literature – i.e. how does this item fit in with the topic in general (this is why it is important to do two or three other readings for context).

• If reviewing more than one chapter/article: How do the articles relate to each other? How are the perspectives different, and why do you think they are different? Are they fundamentally in disagreement or can they be reconciled?

• Final points - e.g. ask yourself: What use has the book or article(s) been for me (and why)? Are there any remaining questions to be cleared up? Finish with an **overall** judgement about the articles or book.

• The journals *Public Understanding of Science; Social Studies of Science; Science, Technology & Human Values* and *Minerva* have reviews, covering individual books and also longer essay reviews, which may be worth using as models.

**Assignment 2: 4000 word in-depth essay**
Your essay should be no more than 4000 words long with a list of references at the end. Do not include references in your word count. You are expected to read widely (from the syllabus and relevant material outside of it if you wish) for this assignment in order to answer the question you choose in a way that demonstrates a critical understanding of the course material. Wherever possible your essays should discuss empirical case studies from the academic literature.

Please do not do your 4000-word essay on the same topic as Assignment 1.
I am also open to you choosing your own essay topic (for example if you wish to perform a theoretical analysis of a particular technology), but you must discuss it with me first to ensure it relates to the course themes.

1. “What was strong about the Strong programme was its insistence that social science should treat all kinds of knowledge equally.” (Yearley 2005)

   Explain what Yearley is claiming here about the Strong Programme and assess whether the programme succeeded in its analysis of scientific knowledge.

2. What are the strengths and limitations of employing ethnographic methods in the sociology of science?

3. What does it mean to claim that science is socially constructed? Does it matter whether or not the claim is true?

4. Actor-network theory has been described as “a social science whose only goal is to tell inconsistent, false and incoherent stories about nothing in particular” (Amsterdamska 1990). Is this a fair assessment?

5. Why, if at all, is the idiom of co-production valuable for the STS scholar?

6. Bowker and Star (1999) write of classifications: “we stand for the most part in formal ignorance of the social and moral order created by these invisible, potent entities.” What ‘social and moral order’ are they talking about?

7. What can the sociology of science learn from:
   a. Feminist studies?
   b. Postcolonial studies?
   c. Disability studies?
   [Choose one – but say if you feel there is crossover]

8. What does it mean to be a research subject?

9. Do science advisors ‘speak truth to power’ in regulatory disputes?

10. In what ways do imaginaries and expectations shape innovation? Are socio-technical imaginaries merely a re-invention of the sociology of expectations?

11. Does the geography of science tell us anything more than that people believe different things in different places?

12. Is secret science simply open science done behind closed doors?