

HPSC0105 Sociology of Science and Technology

Course Syllabus

2021-22 session | Dr Melanie Smallman | m.smallman@ucl.ac.uk

Course description

The module will introduce you to a set of theories and ideas from the sociology of science that will allow you to understand and examine science and technology as social institutions and systems of knowledge production, as well as their relationship with society. Drawing on historical, philosophical and contemporary studies, the module will introduce you to the key ideas that are and have been influential in the sociology of science and provide a theoretical underpinning to inform other more practice-focused sociology and politics of science modules.

Basic course information

Moodle Web site:	HPSC0105
Assessment:	Assessment: Essay 1 (2500 words) – 50%; Essay 2(1000 words) – 50%. Level 6/iBSc students: Essay 1 (3000 words) – 50%; Essay 2 (1500 words) – 50%
Timetable:	Reading material and pre-class material is all on moodle. Face to face class 10-11am Tuesdays, Term 1.
Prerequisites:	No pre-requisites
Required texts:	No required texts. Each week there are two or three essential readings
Course tutor(s):	Melanie Smallman
Contact:	m.smallman@ucl.ac.uk
Web:	www.ucl.ac.uk/sts/staff/smallman
Office hours:	12-13.00 Tuesday; 16.00-17.00 Thursday (Office Hours will be online. To book, please send a Teams meeting request for a 15 min slot within the hours above)

Schedule

Week	Topic	Date	Activity
1	Introduction to the sociology of science – How do we think about science?	5 October	Do the essential reading before each class and check moodle for online activities
2	The Strong Programme and the principle of symmetry	12 October	Do the essential reading before each class and check moodle for online activities
3	Laboratory Studies	19 October	Do the essential reading before each class and check moodle for online activities
4	Laboratory Studies 2 - Actor Network Theory	26 October	Do the essential reading before each class and check moodle for online activities
5	Studying Controversies	2 November	Do the essential reading before each class and check moodle for online activities
6	Reading Week	9 November	No class
7	Constructing Technologies	16 November	<i>Essay 1 Due in this week</i> Do the essential reading before each class and check moodle for online
8	Constructing measures, numbers and objectivity	23 November	Do the essential reading before each class and check moodle for online activities

9	Constructing Expertise	30 November	Do the essential reading before each class and check moodle for online activities
10	Coproduction of Science and Society	7 December	Do the essential reading before each class and check moodle for online activities
11	How can sociology of science help us understand the world today?	14 December	<i>Essay 2 due in this week</i> Do the essential reading before each class and check moodle for online

Objectives

At the end of the module, students will:

- Have an understanding of the different theories available to help understand and examine how science (and its relationship with society) are constructed and interact
- Have a theoretical underpinning about how society both influences and is influenced by science and technology, to inform other more practice-focused sociology and politics of science modules
- Have an understanding of how ideas from history of science, philosophy of science and sociology of science interact

Assessments

See end of this syllabus for assignment instructions and criteria.

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.

Coursework 1 (50%)	Assessment 1: Case study essay	2500 words	9am 15 November 2021
Coursework 2 (50%)	Assessment 2: Essay	1000 words	9am 15 December 2021

For students taking the module at Level 6/iBSc students:

Coursework 1 (50%)	Assessment 1: Case study essay	3000 words	9am 15 November 2021
Coursework 2 (50%)	Assessment 2: Essay	1500 words	9am 15 December 2021

Format of classes

For 2020/21 this module will be taught online. The majority of classes will involve a series of pre-recorded lectures accompanied by online activities – usually via a Moodle forum. Any ‘live’ seminars will take place during the timetabled slot and will be flagged up on Moodle and via the Moodle Forum, at least a week in advance, so please keep engaged with the Moodle page for this module.

Course expectations

Students are expected to attend and participate in all classes. Since classes will be online this year, that means watching the pre-recorded lectures and participating in the online forum and any live seminars in the sequence recommended and on a weekly basis. There will also be two or three readings a week. You will be expected to read those (as a minimum) outside the classes - I will make suggestions for the order in which you read the recommended readings, but in most cases that will be in advance of watching the lectures and joining the discussions. I have explained more about reading below.

Students should also be prepared to talk about the ideas in the readings and module, in the fora and online seminars. Learning takes many forms and for some (like me) thoughts form most clearly when we speak out loud. Sometimes, hearing others explain something you have read can also help improve understanding. So I hope we can create a supportive atmosphere in the ‘classroom’, where speaking (or writing) out loud is not a test, but a really important way of helping each other understand the key ideas in the module – and for me to get a sense of how well I am explaining things so I can make adjustments, if needed. In particular, when giving and receiving feedback, please do so in the spirit of helping one another. In keeping with that then, all students should be mindful of UCL’s [Code of Conduct for Students](#) and Guidance on [Good Online Behaviour](#).

If you have difficulties accessing or understanding any of the classes or readings, if my feedback isn’t clear or if you have any concerns about participating in the discussion fora, please let me know and feel free to make an appointment to talk to me during my office hours (which is time I have booked in my diary to talk to students outside class), and I will support you the best I can. I love this topic and I think it will change how you see the world, so am always happy to

talk and explain things. But I get really sad if I can only do that in feedback to your final essay, so don't wait until it is too late for me to help you!

Reading list

An electronic reading list containing links to all of the references, as well as a guide to the readings is available via Moodle.

Below is a list of **essential** and **advanced** readings for this module.

In class we will discuss at least the **essential** readings. If you haven't read them in advance, then you will gain the gist of the material during the lecture, although be aware that this level of understanding is insufficient to achieve good marks in this module. If you have read the papers in advance however, the lecture will help you make the cross connections, comparisons and critiques that you will need in order to do more than pass this module. The choice is yours!

If you have time, you should also read the **advanced** pieces to gain the highest marks in your assessments. It is also expected that you will explore additional material to inform your essays and class discussions.

Additional readings, referred to in lectures and to inform discussion, blog posts and essays, will be put on Moodle nearer the time.

A Note about Reading

The readings on this module are not easy – wherever possible I have given you the original sources, and the connections between them is not always obvious. You might need to read each one several times and discuss them with your classmates before their meanings and connections become apparent.

Eventually (in the lecture) I will make these meanings and connections explicit. But this is not a trick. If you wait for me to explain them to you – if you skip the readings and skip the discussions with your colleagues – you will miss the point of this class. Because the point is not to have your head filled with new information, but to learn new ways of thinking and understanding the world. Just like taking up a new sport, it requires training and exercise. Rather than looking for me to give you the 'right' answer, you need to work through ideas in your head yourself.

Because ultimately, the ideas that will be needed to solve the problems that humanity will face in your lifetimes won't be found in a textbook. You will have to figure them out yourselves. So, while the content of the course which will change how you see the world (I promise), beyond that, I am trying to help you train your minds so that you can live – and maybe make a better world – in the future.

Week 1: Introduction to the sociology of science – How do we think about science?

In this session, after introducing the module and the practical details relating to it, we will think about how science is ‘traditionally’ thought about – how it is presented in the mainstream media, how you might talk about it to friends in the pub and how scientists might think about science.

From there, we will look at descriptions of science from the academic literature and consider what these might reveal to be missing from these ‘traditional’ or ‘common sense’ descriptions of science – and how we can begin to take a deeper and more meaningful look at science and technology.

Essential Reading

R. K. Merton, “The Normative Structure of Science,” in R.K. Merton, *The Sociology of Science: Theoretical and Empirical Investigations* (Chicago: University of Chicago Press, 1973), pp. 267-278.

http://sciencepolicy.colorado.edu/students/envs_5110/merton_sociology_science.pdf

M. J. Mulkay, “Norms and Ideology in Science,” *Social Science Information* 15:637-656 (1976).

<https://journals.sagepub.com/doi/abs/10.1177/053901847601500406>

Additional Reading

Sismondo (2010) *An Introduction to Science and Technology Studies*. Wiley-Blackwell. Chapter 1: The prehistory of science and technology Studies (e-book available on UCL Library website)

Week 2: The Strong Programme and the principle of symmetry

In this class we will begin to consider how we can investigate and think about science in ways that move us beyond the ‘traditional’ or ‘common sense’ understandings. We will look at The Strong Programme, which is considered to be one of the foundational influences on the sociology of science. In particular we will look at their principle of symmetry and how it helped us to begin to understand the work that goes into making scientific knowledge, and how vital the ‘social’ is in this process. We will also consider some of the critiques of the Strong Programme and how it may or may not be useful today.

Essential Reading

Bloor, D (1991 [1976]), *Knowledge and Social Imagery* (Routledge) esp. Chapter 1 ‘The Strong Programme in the Sociology of Knowledge’ (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.

Additional Reading

Sismondo (2010) *An Introduction to Science and Technology Studies*. Wiley-Blackwell. Chapter 5 – The Strong Programme.

Week 3: Laboratory Studies

Following on from last week's discussion about how vital the 'social' is in knowledge production, this class will look at how that idea has been explored further through laboratory studies. In particular this week we will look at how the distinction between the natural and the social worlds becomes blurred when you start looking at what scientists do in the laboratory.

Essential Reading

Latour, B. Woolgar, S. (1986) *Laboratory Life: The Construction of Scientific Facts*. Chapter 1 FROM ORDER TO DISORDER (pp. 15-42)

Electronic copy available through UCL Library Catalogue

Knorr-Cetina, K. D. (1981) 'Social and Scientific Method or What Do We Make of the Distinction Between the Natural and the Social Sciences?', *Philosophy of the Social Sciences*, 11(3), pp. 335–359. doi: 10.1177/004839318101100304.

Advanced Reading

Knorr Cetina (1995) *Laboratory Studies: The Cultural Approach to the Study of Science* Chapter 7 in: *Handbook of Science and Technology Studies* **Edited by:** Sheila Jasanoff, Gerald E. Markle, James C. Peterson & Trevor Pinch

Available online via UCL Explore.

Week 4: Laboratory Studies 2: Actor Network Theory and stabilising 'facts'

Building on the ideas from last week's class, this week will look at how the ideas gained from 'following the science' in early laboratory studies, developed into Actor Network Theory and how this theory helps us understand how 'facts' become established or stabilised in science.

Essential Reading

Chapter 8 Actor Network Theory in Sismondo (2010) *An Introduction to Science and Technology Studies*. Wiley-Blackwell

Available online via UCL Explore.

Chapter 2 "The Laboratory" in Latour, B. (1987). *Science in Action: How to Follow Scientists and Engineers Through Society*. Milton Keynes, Open University Press.

On brian's reading list

AND

Amsterdamska, O (1990), 'Surely you are joking, Monsieur Latour!', *Science, Technology and Human Values* Vol.15, Fall, pp495-504.

Additional Reading

Latour, Bruno, (1999) *Pandora's hope : essays on the reality of science studies*, Cambridge, Mass: Harvard University Press

Week 5: Studying Controversies

In this week's class, we continue our investigation of the sociology of science – and how facts and knowledge is produced – by looking at studies of controversies, which are instances where the negotiations through which people come to know what they know, is visible. We will take two particular examples – one historic study, where the researchers knew the ending, and another contemporaneous study, where the outcome was not known from the start.

Essential Reading

Collins, H., & Pinch, T. (2012). A new window on the universe: The non-detection of gravitational radiation. In *The Golem: What You Should Know About Science* (Canto Classics, pp. 91-108). Cambridge: Cambridge University Press.
doi:10.1017/CBO9781107295612.010

Leviathan and the Air Pump Chapter 1: Understanding Experiment
E book available on UCL Explore

Additional Reading

Mackenzie, D. Spinardi G. (1995) Tacit Knowledge, Weapons Design, and the Uninvention of Nuclear Weapons in *American Journal of Sociology* (101) 44-99.

Week 6: Social construction of technology

Having thought about how science is constructed, we will continue our examination of the relationship between the social and the natural or technical, to consider two ways of thinking about this relationship in the context of constructing technologies.

Essential Reading

Trevor J. Pinch; Wiebe E. Bijker (1984) The Social Construction of Facts and Artefacts: or How the Sociology of Science and the Sociology of Technology might Benefit Each Other. *Social Studies of Science* 14 (3) 399-441.

Mackenzie, D & Wajcman J (1999) Chapter 1: The Social Shaping of Technology. Open University Press.

<https://eprints.lse.ac.uk/28638/1/Introductory%20essay%20%28LSERO%29.pdf>

Additional Reading

Langdon Winner (1993) Upon Opening the Black Box and Finding It Empty: Social Constructivism and the Philosophy of Technology. *Science, Technology, & Human Values* [Vol. 18, No. 3 \(Summer, 1993\)](#), pp. 362-378 (17 pages)
<https://www.jstor.org/stable/689726?seq=1>

Week 7: Constructing measures and objectivity

Science -and in particular the numbers and data it relies upon - is often seen as an objective way of looking at the world. In this week's class, we will look at the work that goes into constructing the measures, numbers and the objectivity that science relies upon and considers what this means for power and authority.

Essential Reading

Daston L, Galison P. (1992) The Image of Objectivity. *Representations* [No. 40, Special Issue: Seeing Science \(Autumn, 1992\)](#), pp. 81-128.

Benjamin, R (2019) *Race after Technology* (Chapter 1) Polity Press.

D. Haraway, *Primate Visions* (New York: Routledge, 1989), Ch. 3 ("Teddy Bear Patriarchy"), pp. 26-58.

Porter, T. (1992) Quantification and the Accounting Ideal in Science in *Social Studies of Science* 22(4) 633-651. <https://journals-sagepub-com.libproxy.ucl.ac.uk/doi/10.1177/030631292022004004>

Additional Reading

T. Porter, *Trust in Numbers* (Princeton, NJ: Princeton University Press, 1995), Ch. 7 ("U.S. Army Engineers and the Rise of Cost-Benefit Analysis"), pp. 148-189.

Haraway, D. Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective. *Feminist Studies* [Vol. 14, No. 3 \(Autumn, 1988\)](#), pp. 575-599

Week 8: Constructing expertise

In this week's session we consider whether expertise is constructed and if so, how. Specifically, we will look at different 'types' of expertise and ask how this relates to work we have previously discussed from the sociology of science, but also for wider societal debates.

Essential Reading

Gieryn TF (1983), "Boundary Work and the Demarcation of Science from Non-Science: Strains and Interests in the Professional Ideologies of Scientists", *American Sociological Review* Vol.48 pp781-795

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*, 20(4), pp. 408–437. doi: [10.1177/016224399502000402](https://doi.org/10.1177/016224399502000402).
<https://journals.sagepub.com/doi/abs/10.1177/016224399502000402>

Additional Reading

Collins, H. M. and Evans, R. (2002) 'The Third Wave of Science Studies: Studies of Expertise and Experience', *Social Studies of Science*, 32(2), pp. 235–296. doi: [10.1177/0306312702032002003](https://doi.org/10.1177/0306312702032002003).

And

Wynne, B. (2003) 'Seasick on the Third Wave? Subverting the Hegemony of Propositionalism: Response to Collins & Evans (2002)', *Social Studies of Science*, 33(3), pp. 401–417.

Or

Jasanoff, S. (2003) 'Breaking the Waves in Science Studies: Comment on H.M. Collins and Robert Evans, "The Third Wave of Science Studies"', *Social Studies of Science*, 33(3), pp. 389–400.

Wynne, B. (1998) 'May the Sheep Safely Graze? A Reflexive View of the Expert–Lay Knowledge Divide', in *Risk, Environment and Modernity: Towards a New Ecology*. London: SAGE Publications Ltd, pp. 44–83. doi: [10.4135/9781446221983](https://doi.org/10.4135/9781446221983). (available as an ebook)

Week 9: Coproduction of science and society

In this week's class we start to move out from the lab or the sites of scientific production, to extend our gaze to wider society (we will discuss why even this is a problematic statement). We will build on a few of the ideas and readings we have already discussed, to think about how science, democracy and social order are co-produced.

Essential Reading

S. Jasanoff, ed., *States of Knowledge: The Co-Production of Science and Social Order* (London: Routledge, 2004), Ch. 2 ("Ordering Knowledge, Ordering Society"), pp. 13–45.

S. Shapin and S. Schaffer, *Leviathan and the Air-Pump* (Princeton: Princeton University Press, 1985), Ch. 8 ("The Polity of Science: Conclusions"), pp. 332–344.

Lee, M. et al. (2018) 'Techniques of Knowing in Administration: Co-production, Models, and Conservation Law', *Journal of Law and Society*, 45(3), pp. 427–456. doi: [10.1111/jols.12122](https://doi.org/10.1111/jols.12122).

Advanced Reading

K. Sunder Rajan, "Two Tales of Genomics: Capital, Epistemology, and Global Constitutions of the Biomedical Subject," Ch.9 in S. Jasanoff, ed., *Reframing Rights*, pp. 193–216.

J. Carson, "The Science of Merit and the Merit of Science: Mental Order and Social Order in Early 20th Century France and America," in Jasanoff, *States of Knowledge*, pp. 181-205.

Week 10: What kind of questions does the sociology of science help us consider?

This week, we will bring things together, to consider what the ideas that we have been exploring throughout the module can help us make sense of the world today. The readings pose the question of whether we are part of the solution or part of the problem, but the majority of this week's work will be focused on our discussions and ideas that will bring to life the key ideas from throughout the module, to support finalising your short essay.

Essential Reading

Jasanoff, S. and Simmet, H. R. (2017) 'No funeral bells: Public reason in a 'post-truth' age', *Social Studies of Science*, 47(5), pp. 751–770. doi: [10.1177/0306312717731936](https://doi.org/10.1177/0306312717731936).

Kuntz, M. (2012) 'The postmodern assault on science', *EMBO Reports*, 13(10), pp. 885–889. doi: [10.1038/embor.2012.130](https://doi.org/10.1038/embor.2012.130).

Advanced Reading

Sismondo S (2020) COVID-19. *Social Studies of Science*. [Vol 50, Issue 2, 2020](#)

Latour, B. (2004) Has Critique Run out Of Steam? *Critical Inquiry*. Vol 30, Number 2 Winter 2004.

<https://www-journals-uchicago-edu.libproxy.ucl.ac.uk/doi/10.1086/421123>

Assessments

Assignments should be submitted via Turnitin, either as a Word or PDF document. It should be in 12 point type, minimum 1.5 line-spaced, with a title, page numbers added and with a word count at the end.

ASSESSMENT ONE: 2500-WORD ESSAY (TERM 2)

For your essay, you will choose and research a case study, that you will analyse using at least one of the sets of readings from the course. Alongside describing both the case study and the academic literature you have chosen, you will be assessed on your ability to critically analyse how work in the sociology of science and technology might be used to make sense of science in society. Consequently, your essay will need to include:

- An overview of your case study, highlighting the substantive issues raised by the case-study, and the context in which the case study emerged

- An overview of the academic approach you have chosen from the sociology of science and technology, demonstrating that you understand what this work assumes about science and society (and their relationship), and the claims that this work allows you to make about science, technology and society
- Critical analysis of the academic approach you've chosen as a means for analysing and understanding your case study. Rather than trying to make your case study fit a particular approach in the sociology of science, your job is to consider what theoretical work illuminates about your case study, and potentially what it fails to illuminate. If your case study highlights a deficiency in a particular theoretical position, how might this deficiency be overcome?
- Some consideration of the methods and methodologies implicated by your case study and your analytical frame. What does your theory presume about the world – is it realist, anti-realist, constructivist etc? Similarly, what methods can be used in applying the theory. Would they work in the context of your case study?
- As you develop your essay, you will need to ensure that you focus on both the case study and a critique/analysis of the relevant theoretical work. It won't do to either present a brilliant analysis of a case study that ignores work from the course, nor to present an entirely theoretical piece in which your case study is side-lined. Your job primarily is to find a case study that permits a critical analysis of a body of theoretical work, using the case study as a way to 'test out' the theory.

Your essay should be no more than 2500 words long with a list of references at the end. Do not include references in your word count. Any footnotes must be included in your word count, though it is unlikely you will need them (if they're a crucial part of your argument, they should be in the main body of your essay anyway). If you make use of any unpublished primary sources for your essay, or pictures, maps, object descriptions etc, you can include these in the end of your essay as an appendix, which is not part of the word count. You are expected to read widely for this assignment in order to answer the question set. As the essay will require you to present a clear case study, part of your job during the course will be to develop this case study alongside your readings for seminars, and to build up your own body of readings. You are welcome to use the office hours to get advice about your case study. I can point you to additional readings that might be helpful, and will help you find sources that can help you flesh out your case studies.

Assessment 2: 1000 word Essay (Term 3)

How can the sociology of science help us understand the place of science in the world today?

Where the first essay allows you to engage closely with one topic from the course, this second essay will assess your understanding of the topics from the course as a whole. I would therefore like you to reflect on the content of the module and the key themes and ideas within it and explain whether the ideas and approaches within the field of sociology of science will

help or hinder us in making sense of social arrangements in the world today – specifically the place of science.

This title is deliberately open, such that you can choose a position but also the ideas that you feel are most relevant. There is no correct answer, but the essay should not be another case study that focuses on one STS approach, but instead draw on multiple ideas to answer your question.

Criteria for assessment

The departmental marking guidelines for individual items of assessment can be found in the STS Student Handbook.

In addition to the criteria indicated in the STS Student Handbook, the following are the main criteria on which your essay will be marked. There are no set numbers/ percentages associated with these criteria, but we will give you qualitative feedback based on them.

1. Answer the question

Read the question carefully and answer it specifically – do not give irrelevant material or drift into answering other questions.

2. Organisation

Is the essay organized into an introduction, main body and conclusion? Does each part flow naturally into the next one? Is the evidence in a logical order? Using signposting sentences (in this section I will argue that...) will help.

3. Introduction

You should give an introduction to your essay in no more than one or two paragraphs. Introduce your topic and your line of argument, no more. Good introductions are concise and precise.

4. Clarity

We place great emphasis on clarity of argument and expression. Avoid ambiguity and vagueness. Do not assume your reader already knows what you are talking about. Try to keep your line of argument clear. It often helps clarity to divide the main body of the essay into sections (typically three or four for a 2500 word essay). Good use of English, accurate spelling, grammar, punctuation and simple, active sentence structure also improve clarity.

5. Argumentation

Is the main argument of the essay clear, coherent and persuasive? Is it properly supported by the evidence available?

6. Conclusion

Your essay should have a conclusion that is clearly marked as such (new paragraph, 'In conclusion...'). It should be substantial in summing up what you have argued and exploring the implications of what you have argued.

7. Reading/ use of sources

How well have the readings and other resources been used? Does the essay reflect them accurately? Is the essay overly dependent on one source?

8. Independent critique?

Does the essay offer some independent critique or thought on the question or does it merely report what is in the literature? In Masters-level courses this is an essential component of essays.

9. Referencing

You must reference all quotes and all references/ summaries of books, etc. Pick one system for referencing and stick to it. Refer to individual page numbers, not just whole texts, whenever possible. Making use of ideas from or paraphrasing material without clearly referencing the original source is plagiarism and has incurs serious penalties.

If you are unsure how to reference, please follow the advice from UCL Library

- UCL explanation of Academic Integrity for students: <https://www.ucl.ac.uk/students/exams-and-assessments/academic-integrity>
- UCL Library guide to referencing and avoiding plagiarism: <https://library-guides.ucl.ac.uk/referencing-plagiarism>
- Tutorial on referencing and avoiding plagiarism (making use of some nice clip art) https://www.ucl.ac.uk/library/forms/articulate/referencing-plagiarism/story_html5.html
- UCL Academic Integrity Moodle Course: <https://www.ucl.ac.uk/teaching-learning/news/2019/nov/introduction-academic-integrity-new-moodle-course-taught-students-goes-live>
- Details of the penalties for academic misconduct: <https://www.ucl.ac.uk/academic-manual/chapters/chapter-6-student-casework-framework/section-9-student-academic-misconduct-procedure#9.3>

10. Bibliography

You need to supply a bibliography of all works referenced at the end of your essay. You must supply author, title, date, place of publication and publisher.

Important policy information

Details of college and departmental policies relating to modules and assessments can be found in the STS Student Handbook www.ucl.ac.uk/sts/handbook

All students taking modules in the STS department are expected to read these policies.
