HPSC0009 Introduction to History, Philosophy and Social Studies of Science

Course Syllabus

2023-24 session | Prof Chiara Ambrosio c.ambrosio@ucl.ac.uk
Dr Erman Sözüdoğru erman.sozudogru@ucl.ac.uk

This course is an introduction to history, philosophy, and social studies of science. We will think critically about key questions that have shaped, and continue to shape, this exciting and dynamic field of study. What grants the authority of science in our society? How have scientists constructed and maintained their identity through time, and has this come at the expenses of other social groups? What are the relationships between science, society and culture, and how have those relationships changed through time? What is the role of scientific experts in society? Should science today be a force behind positive social change, and if so how can we make it happen? Using historical and contemporary case studies, the focus of this module is to encourage students to start thinking critically about these questions, while at the same time developing their skills as independent, interdisciplinary and publicly engaged scholars. This course is intended as a foundation and sampler for later courses in Science and Technology Studies.

Basic course information

Moodle Web site:	https://moodle.ucl.ac.uk/course/view.php?id=7418
Assessment:	Three pieces of coursework: 10% - Essay plan (500 words; referencing and writing skills) 10% - Assessed workshop (oral presentation/argumentation skills; peer feedback) 80% - Individual essay (2,000 words; writing, argumentation and referencing skills)
Prerequisites:	No prerequisites
Required texts:	See reading list below and online reading list via Moodle
Course tutor(s):	Course convenors: Dr Chiara Ambrosio, Dr Erman Sözüdoğru Teaching assistants: Ryan Francis, David Chandler
Contact:	c.ambrosio@ucl.ac.uk erman.sozudogru@ucl.ac.uk ryan.francis.15@ucl.ac.uk david.chandler.22@ucl.ac.uk
Office location:	Ambrosio: 22 Gordon Square, Room 1.2a Sözüdoğru: 22 Gordon Square, room 3.2
Ambrosio office hours:	**Wednesdays 10-12**
Sözüdoğru office hours:	**Mondays 13-15**
Teaching Assistants' office hours:	TBC – these will be posted on moodle.

How this module works

This course is an introduction to History, Philosophy and Social Studies of Science, which aims at building ***key skills***: reading and studying skills, locating bibliographical sources, referencing, argumentation/critical thinking, and oral and written communication skills. You will need these skills throughout your degree and they will be required in ***all*** modules in STS – but they will also be useful in your future professional life! Combining content and skill-building, you will have the opportunity to explore the field and acquire foundational concepts and methods to pursue further study in STS.

The lectures and seminars take place in person on Mondays 9-11 (please consult your timetable for the lecture venue). **Attendance is mandatory**, **and there will be no recordings of the lectures and seminars**. Each class will include a lecture (9-10) which will be immediately followed by a seminar (10-11), in the same venue as the lecture. The lecture will cover the course material assigned for each week and explain the key concepts covered each week. The seminars will start with 15-20 minutes discussing your understanding of the readings, and you will be expected to contribute to the discussion. The remaining portion of the seminars will include activities and short group exercises aimed at developing studying, referencing, argumentation and critical skills.

Please familiarise yourself with the syllabus and with the Moodle page for this module. Make a note of the deadlines for each of the three assessments (detailed assessment instructions are also on Moodle, in the 'Assessment' tab). You will see that the Moodle page is organised in weekly topics. Each topic contains the activities you are expected to engage in each week. It also contains a list of links with the online resources (readings, videos, additional resources) that we will use in the module.

Each week you are expected to complete the assigned readings (from beginning to end!), attend the lecture and seminars, and consult some additional materials which will help you understand the topic and clarify core concepts. You are also expected to use the UCL Library to locate additional literature that will help you gain a deeper understanding of the topics discussed each week (library skills will also be covered in the lectures and seminars). ***It is crucial that you complete the readings and engage in the skill-building activities in the seminars***, as they are specifically aimed at helping you develop studying, referencing, and argumentation skills, build toward each of the three assessments, and discuss the course material and assessment with your peers.

The lecturers and teaching assistants have weekly office hours (see above, and on moodle). In our weekly office hours we will be available to discuss the course material with you, and address any questions you have about the course and assessments. You can come and see us in person in our offices, or you can email us to book an online appointment.

Weekly Schedule

Date	Topic (covered in lectures)	Readings (see reading list below)	Skill-development tasks (covered in seminars) **Note: the first 15-20 minutes of the seminars will be spent discussing your understanding of the readings.**
2 Oct 2023	Welcome and course overview	Chalmers or Erickson Read syllabus; read assessment instructions	*Reading a paper, identifying a thesis statement*
9 Oct 2023	What Makes a Scientist? The Philosopher's Answer	Medawar; Popper	*Exercise: can you reference better than a Nobel Prize?* *Referencing styles and why we use them*
16 Oct 2023	What Makes a Scientist? The Historian's Answer	Whewell; Secord	*Reading and understanding primary sources; finding sources in the UCL Library and other archives* *Group exercise: how do you study (reading, note-taking, summarising arguments, seeking clarification on what you don't understand)?*
23 Oct 2023	What Makes a *Good* Scientist? Ethics Matters!		*How to construct an argument; how to structure an essay*
30 Oct 2023	What Makes a Scientist? The Sociologist's Answer	Gieryn	*Researching, analysing and using examples and case studies.* *Exercise: how to reference and format a bibliography in your essay plan*
6-10 Nov 2023	**Reading week – No readings, no classes Work on your essay plan!**		
13 Nov 2023	How Can we make Science More Inclusive?	Schiebinger; Wills, Harrison, Jones, Lawrence-Mackey and Martin (eds)	*Researching and writing inclusively. The case of Women in Science: A Sourcebook*
14 Nov 2023	**Essay plan (500 words) due at 5pm**		
20 Nov 2023	Picturing Science	Lynch	*Researching Images and writing about them*
27 Nov 2023	Policy, Experts and Social Change	Sözüdoğru (2 articles)	*Locating and using grey literature*
4 Dec 2023	**Assessed workshop, in class 9-11**		
11 Dec 2023	STS and The Meaning of Life	No readings this week. Complete pending readings, work on essay.	*Finalise your essay; last-minute essay troubleshooting*
14 Dec 2023	**Essay due at 5pm**		

Assessments

	Description	Deadline	Word limit
10% of total mark	**Essay plan (500 words)** Skills: referencing, essay structure, argumentation	5pm**, 14 November 2023**	500 words
10%	**Assessed Workshop** Skills: Oral presentation and argumentation, oral peer feedback.	In class, **4 December 9-11**	
80%	**Individual essay (2000 words)** Skills: referencing, essay structure, essay writing, argument-building and delivery, critical thinking	5pm, **14 December**	2000 Words

Coursework

All the coursework for this module is tailored around developing *studying*, *writing*, *research and argumentation skills*. You will build toward your final essay in steps, with each part of the assessment helping you develop the skills you need to construct a clear, critical and well supported argument. You will start by learning the basics: how to locate, read, and annotate your sources. You will then move on to academic writing, starting with a draft plan of the essay you have chosen to write for this course among the suggested essay topics (Assessment 1). You will receive feedback from your tutors prior to the submission of the final essay at the end of term. You will then test your argument by presenting it briefly in an oral form to your peers, and give your peers feedback on their own work (Assessment 2). With feedback on your plan from your tutors, and oral feedback from your peers, you will then be ready to complete and submit your final essay (Assessment 3)

Detailed instructions on each assessment component are available on Moodle, in the Assessment section.

Note that if you want to do well on the assessment *you need to engage with the skill activities in the seminars group each week*. These are geared toward building your skills gradually, and in parallel with the

contents covered in each lecture.

Criteria for assessment
The departmental marking guidelines for individual items of assessment can be found in the STS Student Handbook. Criteria for marking are also explained in each Assessment Guidelines document, and will be discussed in class.

Please note that the assessment for this course falls under Category 1 in UCL's guidelines on using AI in assessment: AI tools cannot be used to complete it. More information, and the pedagogical rationale for this, are in the guidelines for each assessment in Moodle.

Aims and Objectives

Aims

The aim of this course is to provide students with an overview of foundational concepts, debates and methodologies in the field of Science and Technology Studies. Combining content and skill-building, the course will equip students with conceptual and methodological foundations to pursue further studies in history, philosophy, and social studies of science.

Learning Objectives and Outcomes

On successful completion of this course students should be able to:

1. Understand and apply fundamental concepts in History, Philosophy and Social Studies of Science;
2. Locate sources in libraries and archives, and reference them consistently;
3. Analyse a scholarly text, identifying and assessing its key thesis;
4. Research independently, locating literature and case studies and evaluating their relevance in relation to a specific research question;
5. Build a sound argument, justifying its main claims through evidence from the literature;
6. Test the validity and limitations of HPS/STS concepts against independently researched historical or contemporary case studies

Reading List

Note: Not all books in this list are available electronically. But all books on this list are available via the UCL libraries, in electronic or physical copies. Search the UCL library catalogue (https://www.ucl.ac.uk/library) to find out whether a book is available in electronic or physical copy: you can borrow hard copies of books, in addition to the books and articles you can consult online.

Background readings

General background texts for this module include:

- Lisa Bortolotti, *An Introduction to Philosophy of Science*. Cambridge: Polity, 2008
- Alan Chalmers, *What is This Thing Called Science*? Maidenhead: Open University Press, 1999 (3rd Edition).
- Harry Collins and Trevor Pinch, *The Golem: What you Should Know about Science*. Cambridge: Cambridge University Press, 1998 (2nd edition).
- Mark Erickson, *Science, Culture and Society: Understanding Science in the 21st Century*. Cambridge, UK; Malden MA.: Polity Press 2016 (2nd Edition).
- Patricia Fara, *Science: A Four Thousand Year History*. Oxford: Oxford University Press, 2009.

Weekly schedule and readings

Below you will find a breakdown of the topics covered in each lecture every week, and a list of essential and further readings. For the full schedule of the weekly skill development activities please refer to the moodle site.

Topic 1 – Monday 2 October

Welcome and overview of the course

This session will introduce the field of Science and Technology Studies (STS), which comprises History, Philosophy and Social Studies of Science. We will start thinking critically about science and its place in society, and explore how STS will allow you to dissect, evaluate and contextualise the legitimacy and authority of science in society and culture. We will also cover a lot of practical information about the course, its aims and objectives, and your coursework and assessments.

Recommended Readings:

This week you will be busy understanding the practicalities of student life, so the readings assigned are two chapters from books that we will use throughout this term. As you will see, these chapters will come back as suggested readings in subsequent sessions; however it would be good to start reading them in preparation for the first lecture of this module.

Chalmers, A. (1999) *What is this thing called science?* 3rd edition. Open University Press [chapter 1].
OR
Mark Erickson, *Science, Culture and Society: Understanding Science in the 21st Century*. Cambridge, UK; Malden MA.: Polity Press 2016 (2nd Edition) [chapter 1].

Part 1 – What Makes a Scientist?

The first part of this module will look at a crucial question in History, Philosophy and Social Studies of Science: how do we demarcate science from non-science? We will tackle the question via the construction of scientific identity, looking at how philosophers, historians and sociologists have differently investigated how scientists draw boundaries between their own practices and knowledge and other human activities. We will also look at the ethical challenges that arise from scientific research, and in addition to asking "what makes a scientist?" we will ask: "what makes a *good* scientist?"

Topic 2 – Monday 9 October

What Makes a Scientist? The Philosopher's Answer

"Science is identified by its method": this has been a long standing common-sense view among practicing scientists, as well as in popular portrayals of scientific practice. In this section we will explore how some leading philosophers of science have tackled the question of "the" scientific method – and we will see that in doing so they set the foundations for the field of philosophy of science, at the same time constructing a portrayal of "the scientist" that had lasting effects on practitioners themselves.

Essential Readings

Peter Medawar, "is the Scientific Paper a Fraud?", in Peter Medawar, *The Strange Case of the Spotted Mice*, Oxford: Oxford University Press, 1996, pp. 33-39.

Karl Popper, "The Problem of Induction" in Martin Curd and J.A.Cover, *Philosophy of Science: The Central Issues*. New York and London: Norton, 1998, pp. 426-432.
[Note: if you are accessing physical copies of this book, there is a second edition of this anthology, which you can also use].

Further Readings:

Lisa Bortolotti, *An Introduction to Philosophy of Science*. Cambridge: Polity, 2008.
Chalmers, A. (1999) *What is this thing called science?* 3rd edition. Open University Press
[especially chapters 1, 4 and 5. Chalmers has also individual chapters on each of the philosophers we will discuss in the lecture]
Mark Erickson, Science, Culture and Society: Understanding Science in the 21st Century. Cambridge, UK; Malden MA.: Polity Press 2016 (2nd Edition)
[especially chapters 1 and 3].

Each philosopher discussed in class has an entry in the *Stanford Encyclopaedia of Philosophy*, which is a very useful online resource for any philosophy module you will take in the future:
https://plato.stanford.edu/

If you think, like Medawar, that Popper's philosophy can solve all the problems, a wonderful piece by Charlotte Sleigh can give you a critical and historical perspective on some possibly unpleasant consequences of falsificationism:

Charlotte Sleigh, "The Abuses of Popper: How Popperian Falsificationism Enabled the Rise of Neoliberalism", *Aeon*, 16 February 2021, available at https://aeon.co/essays/how-popperian-falsification-enabled-the-rise-of-neoliberalism

Topic 3 – Monday 16 October

What makes a scientist? The Historian's answer

The word "scientist" is relatively recent. In this session we will examine the historical context and circumstances in which this term was introduced, and use this episode in the history of science to think about historiography and historical methods.

Essential Readings

Anonymous [William Whewell], "'On the Connexion of the Physical Sciences', By Mrs Somerville". *The Quarterly Review*, vol. 51, 1834, pp. 54-68.
Available via Hathi Trust, here: https://babel.hathitrust.org/cgi/pt?id=uc1.$b661406&view=1up&seq=64 (the text starts half way through the page, so scroll down and you will find it!). The article is quite long – pay special attention to the introduction (pp. 55-56), pp. 58 (last paragraph) – 60, and pp. 64 to the end.

James Secord, "Mary Somerville's Vision of Science", *Physics Today*, vol. 71 no. 1, pp. 46-52.

Further Readings:

Patricia Fara, *Science: A Four Thousand Year History*, Oxford: Oxford University Press, 2009 [see especially the chapter titled "Progress", pp. 237-245, available via the Reading list for this module. The book is available in hard copy in the UCL library]

James Secord, *Visions of Science: Books and Readers at the Dawn of the Victorian Age*, Chicago: The University of Chicago Press, 2014 [chapter 4]

Topic 4 – Monday 23 October

What Makes a *Good* Scientist? Ethics Matters!

In this session we explore the ethical challenges arising from scientific research. We will focus on three main ethical theories: utilitarianism, deontology and virtue ethics, and will consider their application to a concrete case study, which will be discussed in detail and connected to various conceptual approaches to ethics.

Essential Readings:

Look up current news on the mission to colonise Mars. Then have a look at the articles below, where people are arguing for and against this mission.

Bharmal, Z. (2018) 'The case against Mars colonisation', *The Guardian*, 28 August. Available at: https://www.theguardian.com/science/blog/2018/aug/28/the-case-against-mars-colonisation (accessed 15 September 2020)

Thompson, D. (2018) 'Is Colonizing Mars the Most Important Project in Human History?', *The Atlantic*, 29 June. Available at: https://www.theatlantic.com/technology/archive/2018/06/could-colonizing-mars-be-the-most-important-project-in-human-history/564041/ (accessed 15 September 2020)

Further Readings:

Stoner, I., 2017. 'Humans Should Not Colonize Mars'. *Journal of the American Philosophical Association*, 3(3), pp.334–353.
Zubrin, R., 2019. 'Why We Earthlings Should Colonize Mars'. *Theology and Science*, 17(3), pp.305–316.
Billings, L., 2019. 'Should Humans Colonize Mars? No'. *Theology and Science*, 17(3), pp.341–346.

General text on ethics:

Tännsjö, T. (2013) *Understanding Ethics*. Edinburgh: Edinburgh University Press.
This text explains utilitarianism, deontology and virtue ethics in great detail. It is entirely available electronically via the UCL library. Use it if you are planning to answer the essay question on ethics!

Topic 5 – Monday 30 October

What Makes a Scientist? The Sociologist's Answer

Demarcating science from non-science is more than just an analytical exercise. When looked at from the perspective of practicing scientists, the issue of demarcation reveals that the reasons why scientists erect boundaries and divisions to separate their activities from other kinds of human enterprises are often ideological. In this session we explore how some key authors in the sociology of science can help us probe the complex relationship between science, power, institutions, and values.

Essential Reading

Thomas Gieryn, "Boundary-Work and the Demarcation of Science from Non-Science: Strains and Interests in Professional Ideologies of Scientists", *American Sociological Review* vol. 48 no. 6, pp. 781-795.

Further readings

Mark Erickson, *Science, Culture and Society: Understanding Science in the 21st Century*. Cambridge, UK; Malden MA.: Polity Press 2016 [chapter 3 and 5]

Thomas Gieryn, "John Tyndall's Double Boundary-Work: Science, Religion, and Mechanics in Victorian England", pp.37-64 in Gieryn, T.F., *Cultural Boundaries of Science: Credibility on the Line*, University of Chicago Press, (Chicago), 1999.

Reading week (6-10 November): No Classes

Part 2: Doing STS in the Real World

Now that you have acquired some basic concepts and methods in STS, we can start exploring how our discipline tackles research and problems in particular applied contexts. The second part of this course is case-based, and provides you with examples of how history, philosophy and social studies of science can serve as analytical tools as well as empirical methodologies to think critically about science in society, and to build a better science and a better future.

Topic 6 – Monday 13 November

How Can We Make Science More Inclusive?

The authority of science has often come at the price of exclusion or subjugation of a number of social groups. Drawing on historical as well as philosophical sources, in this section we explore what science would look like, if it was carried out from the perspective of these underrepresented groups, and if their contributions were taken seriously.

Essential Reading

Londa Schiebinger (2009), "West Indian Abortifacients and the Making of Ignorance", in Robert Proctor and Londa Schiebinger (eds), *Agnotology: The Making and Unmaking of Ignorance*, Stanford: Stanford University Press, pp. 149-162.

Further Readings

Hannah Wills, Sadie Harrison, Erika Jones, Farrah Lawrence-Mackey and Rebecca Martin (eds.) (2023) *Women in the History of Science: A Sourcebook*. London: UCL Press.
Available at: https://www.uclpress.co.uk/products/211143# . Look at the table of contents, the preface, the note on pronouns and the introduction. Listen also to the editors' explaining how they researched and developed the book in one of our STS podcasts: https://profjoecain.net/women-history-science-53-original-sources-stsucl-wearests

Note that the *Women in Science* sourcebook has also an original extract by Maria Sibylla Merian and a commentary by Tamara Caulkins. Read it: you will not regret it!

Tanya Latty (2019), "Hidden Women of History: Maria Sibylla Merian, 17th Century Entomologist and Scientific Adventurer", *The Conversation*, 20 February 2020, available at: https://theconversation.com/hidden-women-of-history-maria-sibylla-merian-17th-century-entomologist-and-scientific-adventurer-112057

For the full story of the Peacock Flower see chapter 3 of Londa Schiebinger, *Plants and Empire: Colonial Bioprospecting in the Atlantic World*, Cambridge: Mass, Harvard University Press.

The key paper on intersectionality discussed in the lecture is Kimberlé Crenshaw, "Demarginalizing the Intersection of Race and Sex: A Black Feminist Critique of Antidiscrimination Doctrine,
Feminist Theory and Antiracist Politics," *University of Chicago Legal Forum*: Vol. 1989: Iss. 1, Article 8.
Available open access at: http://chicagounbound.uchicago.edu/uclf/vol1989/iss1/8

It is a long reading, but it is also a crucial text to understand where intersectionality comes from, and why it really matters in practical contexts.

Topic 7 – Monday 20 November

Picturing Science

Scientific knowledge takes many forms, which often comprise a range of visual tools and devices. This lecture explores the role images and other forms of visualisation play in scientists' arguments, how images and visualisation can serve as evidence for scientific claims, and how they participate more broadly in the legitimation of scientific knowledge.

Essential Reading

Lynch, Michael (2015), "Visualisation in Science and Technology", in *International Encyclopaedia of the Social and Behavioral Sciences* (2nd ed.), ed. James D Wright, Amsterdam: Elsevier.

Further readings

Note: There are a lot of sources on visual culture, and a simple search will allow you to locate a really large literature! A few good texts are:

Annamaria Carusi, Aud Sissel Hoel, Timothy Webmoor and Steve Woolgar, *Visualisation in the Age of Computerisation*. London: Routledge, 2015.

Cateljine Coopmans, Janet Vertesi, Michael Lynch and Steve Woolgar, *Representation in Scientific Practice Revisited*. Cambridge, Mass.: The MIT Press, 2014.

[This is the updated edition of Michael Lynch and Steve Woolgar, *Representation in Scientific Practice*, Cambridge, Mass.: The MIT Press, 1990.

Boris Castel and Sergio Sismondo, *The Art of Science*. Toronto: The University of Toronto Press, 2008.

Topic 8 – Monday 5 December

Policy, Experts and Social Change

Scientific knowledge plays an important role in our society, informing all aspects of life, including policy decisions. While we want our policies to be based on scientific evidence, it is not clear what should be the role of scientist in the process. In this session, we are going to look at some case studies (both historical and contemporary) and examine the role of scientists in the political process.

Sözüdoğru, E. (2020) 'Coronavirus: how values drive decisions in science, not data' *The Conversation*, 26 March. Available at: https://theconversation.com/coronavirus-how-values-drive-decisions-in-science-not-data-134178)

Sözüdoğru, E. (2020) 'Coronavirus: government advisory groups should include a wider range of experts' *The Conversation*, 13 May. Available at: https://theconversation.com/coronavirus-government-advisory-groups-should-include-a-wider-range-of-experts-137734

Broader theoretical reading:
Millstone, E and van Zwanenberg, P (2003) 'BSE: A Paradigm of Policy Failure' in *The Political Quarterly* Vol.74 no. 1, pp 27-37

Topic 9 – Monday 4 December

Assessed Workshops

Prepare a two-minute presentation of the argument you are presenting in your essay, using at least two of the sources you will draw on to support your argument. The class will be divided in groups, and each of you will in turn 1. present their arguments to the group and 2. give one point of feedback to their peers when it is their turn to present.

This is an assessed in-class activity and **you must attend** it or you will be incomplete on the course. If you attend, present, and give feedback to your peers you will get a mark of 100%, which will count 10% toward your final mark on this module.

Topic 9 – Monday 11 December

STS and The Meaning of Life

We got to the end of the road. But this is really only the beginning! In this lecture we will discuss what we have learned throughout this module, and where it will take you next.

And of course, who has time for the meaning of life when there is another coursework deadline looming? So yes – in the lecture we will also discuss the essay. We will also reflect on peer feedback from last week's workshops, and how to be a honest and constructive peer reviewer.

Essential Readings

Pick a lecture you have enjoyed particularly on the course, and come prepared to tell us why you found it inspiring. We will also do some last-minute troubleshooting on your essays.

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.