

# HPSC0009 Revealing Science

## Course Syllabus

2018-19 session | Dr Carina Fearnley [c.fearnley@ucl.ac.uk](mailto:c.fearnley@ucl.ac.uk) & Dr Chiara Ambrosio [c.ambrosio@ucl.ac.uk](mailto:c.ambrosio@ucl.ac.uk)

This module provides an engaging introduction to the history, philosophy, and social studies of science, including key concepts in science and technology studies, public engagement with science, and science policy. Using contemporary science and technology, the focus of this module is to encourage students to develop 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. Students attend one lecture and one seminar per week.

### Basic course information

Moodle Web site:	<a href="https://moodle.ucl.ac.uk/course/view.php?id=8990">https://moodle.ucl.ac.uk/course/view.php?id=8990</a>
Assessment:	Three pieces of coursework: 10% - Individual annotated bibliography (oral presentation of 5 minutes) 60% - Individual essay (2,500 words) 30% - Group engagement piece (1,500 words)
Timetable:	<a href="http://www.ucl.ac.uk/sts/hpsc">www.ucl.ac.uk/sts/hpsc</a>
Prerequisites:	No prerequisites
Required texts:	See reading list below and online reading list via Moodle
Course tutor(s):	Course convenors: Dr Carina Fearnley and Dr Chiara Ambrosio Teaching assistants: Francisco Salinas Lemus and Haira Gandolfi
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Web:	<a href="http://www.ucl.ac.uk/sts/staff/fearnley">www.ucl.ac.uk/sts/staff/fearnley</a> and <a href="http://www.ucl.ac.uk/sts/people/dr-chiara-ambrosio">www.ucl.ac.uk/sts/people/dr-chiara-ambrosio</a>
Office location:	22 Gordon Square, Room 1.2a
Fearnley office hours:	Monday 13:00 - 15:00
Ambrosio office hours:	Tuesday 13:00 - 15.00

## Schedule

UCL Week	Lecture Date	Lecture Topic	Tutorial Date	Tutorial: skills and activities
6	1/10/18	What is this thing called Science? (CF)	1&2/10/18	<i>Overview of module &amp; tutorials</i> <i>Presentation of the essay questions</i> <i>Chalmers and resources</i> <i>Homework: finding resources and references</i>
7	8/10/18	Science for Fame and Glory (CF)	8&9/10/18	<i>Discussion of reading</i> <i>Referencing and critical thinking</i> <i>Homework: critique of a paper</i>
8	15/10/18	What makes a scientist? (CA)	15&16/10/18	<i>Discussion of reading</i> <i>Critical thinking</i> <i>Homework: annotated bibliography</i>
9	22/10/18	Brain boxes (CF)	22&23/10/18	<i>Presentations of annotated Bibliography assignment</i> <i>Homework: Essay writing</i>
9	22&23/10/18	<b>Bibliography assignment deadline</b>		
10	29/10/18	The War on Science (CA)	29&30/10/18	<i>Discussion of reading</i> <i>Writing an essay</i>
11	5-9/11/18	<b>Reading Week – no lectures</b>		
12	12/11/18	A Tale of two Volcanoes (CF)	12&13/11/18	<i>Disaster simulation</i> <i>Homework: public engagement and blogs</i>
13	19/11/18	Toward a More Diverse Science? (CA)	19&20/11/18	<i>Discussion of reading</i> <i>What makes writing engaging?</i> <i>Blog assignment details</i> <i>Homework: form groups</i>
14	26/11/18	The Good, the Bad, and the Ugly (CF)	26&27/12/18	<i>Discussion of reading</i> <i>Q&amp;A session for essay</i> <i>Writing the blog</i>
14	28/11/18	<b>Essay assignment deadline</b>		

15	3/12/18	Picturing Science (CA)	3&4/12/18	<i>Discussion of reading Group work on blogs Homework: Watch one of the following Sci-Fi films: Blade Runner (1982/), District 9 (2009) or The Martian (2015)</i>
16	10/12/18	Back to the Future (CF)	10&11/12/18	<i>Sci-Fi discussion Blog peer review process</i>
16	14/12/18	<b>Group engagement assignment deadline</b>		

## Assessments

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	Description	Deadline	Word limit
10% of total mark	Individual annotated bibliography	22&23/10/18 During tutorial	Oral presentation of 5 minutes
60%	Individual essay	17:00 28/11/18	2,500 Words
30%	Group engagement piece	17:00 14/12/18	1,500 Words

## Coursework

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### Assessment 1: Individual annotated bibliography (10%)

In your groups, decide on one of the current topics of scientific debate listed and then construct an annotated bibliography. The bibliography should be comprised of relevant, scholarly sources that will help you to research your topic. Your bibliography will be presented during the tutorials using a PowerPoint style presentation, enabling feedback on your choice of references and analysis. Please note that your selected topic will also be the focus of assessments 2 and 3 - so choose wisely! This work will be assessed individually but you can work within your group to share resources around the topic. You will need to use Parenthetical referencing (also known as Harvard referencing) but using the American Psychological Association or APA style. The 10% weighting will be awarded to all students that present in the tutorials providing an opportunity to presentations skill development.

### Assessment 2: individual essay (60%)

Write a scholarly essay, of no more than 2,500 words, based on the topic chosen for assessment 1. Here, the objective is to write a sustained, focused, and critical examination of your chosen topic. Note that purely descriptive accounts of scientific practices will not be considered sufficient here. Instead, you should detail and analyse some aspect of science, using relevant literature to develop a critical account of the social, political, or ethical aspects of your scientific case study.

### **Assessment 3: group engagement blog (30%)**

Using the research that you have conducted for assessments 1 and 2, work in your groups to produce a public engagement piece in the form of a blog article. This should consist of suitable text of no more than 1,500 words, with images and links where relevant. Note that this assignment involves writing a blog on a publicly accessible blog site using a template, therefore no web-programming expertise is required.

As part of the blog you should consider the question “what does this story reveal about science?” This blog will require you to translate your scholarly work from assessments 1 and 2 into something that can engage a non-expert audience. Each group is invited to have the opportunity to review and comment on the blogs created by their classmates', and for those comments to be integrated and addressed in the final submitted blog that will be assessed based on: i) the content, ii) edits made following the peer group comments, and iii) comments made on other blog sites and, responses to comments made.

#### **Criteria for assessment**

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

## **Aims & Objectives**

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### **Aims**

This course charts the evolution of scientific studies by providing an historical, philosophical, and sociological context to the production of scientific knowledge, which enables students to critically engage with the social applications of science. Students will explore a range of key real-world problems to unpack how science is conducted, practiced and integrated into societies around the globe. The students are introduced to key theoretical models that provide an understanding of the process of making scientific knowledge. Students will apply lessons learnt about contemporary scientific debates by exploring the challenges of operating in a complex, 'post-normal' state.

### **Learning Outcomes**

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

1. Understand and apply fundamental concepts in the History Philosophy of Science (HPS) field, and Science and Technology Studies (STS), sufficient to prepare for further studies
2. Analyse relevant case studies through the application of fundamental concepts in HPS and STS
3. Evaluate the development, use and role of science in a number of different sectors, from policy, to the public, to business and education
4. Critically engage with and debate key developments in science and technology studies
5. Conduct independent research and integrate a wide range of data sources
6. Conduct an effective written piece of public engagement

## Reading List

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### *Background readings*

General background texts for this module include (all available as ebooks except Erickson):

- [Science, culture and society: understanding science in the twenty-first century](#) - Erickson, Mark 2005
- [An introduction to science and technology studies](#) - Sismondo, Sergio 2010
- [Making sense of science: understanding the social study of science](#) - Yearley, Steven 2005
- [The golem: what you should know about science](#) - Collins, H. M., Pinch, T. J. c1998
- [Introducing Philosophy of Science: A Graphic Guide](#) - Sardar, Z., and Van Loon, B 1, 2011

**Please see Moodle for the full UCL Library online reading list.**

### *Essential and other readings*

This section provides additional details of the materials addressed each week. All essential readings will be listed on and available via Moodle and the UCL Library Reading List, unless specified. Further details on readings for the module and assessments will be posted on Moodle. You are encouraged to start your own research to find readings and sources that relate to the module materials, and to take a general interest in key scientific debates, controversies, and breakthroughs throughout the module. Here are some useful sources to start with:

<https://www.newscientist.com>  
<http://www.nature.com>  
<http://www.theguardian.com/science>  
<http://www.huffingtonpost.com/science/>  
<https://royalsociety.org>  
<https://www.ucl.ac.uk/news/ucl-in-the-media>

Also do not forget specific journalists' blogs (such as Ben Goldacre on <http://www.badscience.net>), Twitter feeds of relevant institutions and scientific figures in the public domain (such as Jim Al-Khalili and UCL's own Hannah Fry), and relevant TV and Radio programmes.

### **Week One: What is this thing called Science?**

In the first week we will be looking at competing definitions of 'science'. What are the successes, and failures, and why it is important to understand who does science, how, why, and where it is done. We will be discussing the relationships between scientific inquiry and societies, and the importance of effective integration of scientific knowledge into social practices. An introduction to the module will be provided to highlight some of the themes we will develop during the module.

### *Essential Reading*

Chalmers, A. (1999) *What is this thing called science?* 3<sup>rd</sup> edition. Open University Press [please see chapter 1].

### **Week Two: Science for Fame and Glory**

In this lecture, we will examine the role both of key scientific institutions and individuals in the development of scientific knowledge. We will be investigating the influence of powerful groups and individuals on both how 'science' perceived by both the scientific communities and the general public. Key arguments addressed in this lecture include how the social power of elite groups can influence the values, ethics, funding, and fame of science and scientists, both men *and* women.

#### *Essential Reading*

Erickson, M. (2005). *Science, culture and society: understanding science in the 21st century*. Polity Press [please see chapter 8].

### **Week Three: What makes a scientist?**

In this lecture we will explore and evaluate the history of the philosophy of scientific knowledge and science and chart the evolution of scientific 'beliefs', and the emergences of key concepts and competing paradigms. The key questions to consider in this lecture are: How do we justify the authority of the knowledge produced by scientists? Is scientific knowledge objective? Does science "progress", and if so what does "progress" mean?

#### *Essential Reading*

Collins, H., & Pinch, T. (c1998). *The Golem: What You Should Know About Science*. Cambridge University Press [please see chapter 5].

### **Week Four: Brain Boxes**

Using the brain and 'brain boxes', such as Alan Turing, as a key case studies, we will explore the role of technology in scientific advancements and how technology has shaped our lives, as well as asking how technology can help understand and manage complex and chaotic issues in contemporary societies.

#### *Essential Reading*

Cowan, R. S. (1985). How the refrigerator got its hum. In MacKenzie, D and Wajcman, J (eds) *The social shaping of technology: how the refrigerator got its hum*. Open University Press, pp. 202–218. Available via the UCL reading list service at [http://ls-tlss.ucl.ac.uk/course-materials/HPSC1010\\_63330.pdf](http://ls-tlss.ucl.ac.uk/course-materials/HPSC1010_63330.pdf)

### **Week Five: The War on Science**

How did Einstein feel about his physics being used to develop the nuclear bomb? This session focuses on how war has influenced science, how science has influenced war, and the war on science. A number of case studies will be used to highlight differing perspectives on ethics and the role of large organisations in various races for success.

#### *Essential Reading*

Agar, J. (2012) *Science in the Twentieth Century and Beyond*. Polity Press [please see chapter 14]

## **READING WEEK**

### **Week Six: A Tale of Two Volcanoes**

Using two volcanoes that erupted 100 years apart we will explore the challenges of uncertainty and risk in science, and the importance of communication, differing stakeholder perceptions, and the need and challenges of moving beyond 'normal' science. What will you do when lives are at stake – find out in a simulation of a volcanic eruption.

#### *Essential Reading*

Ravetz, J. (1999). What is Post-Normal Science, *Futures*, Vol.31(7), pp.647-653

### **Week Seven: Toward a More Diverse Science?**

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 voices and 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.

If you want 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.

### **Week Eight: The good, the bad, and the ugly**

Using a number of case studies, we will explore scientific representation, and misrepresentation in the media. Sensationalism and 'Bad Science' can be highly damaging so how is science communicated to the public? We will consider questions such as how are scientific findings published, do you understand your stats, and who is marketing science?

#### *Essential Reading*

Gregory, J. and Miller, S. (1998). *Science in Public*. Basic books [please see chapter 5].

### **Week Nine: 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 legitimisation of scientific knowledge.

#### *Essential Reading*

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

### **Week Ten: Back to the Future**

This final session will investigate the cultures of science and science fiction. Using different media from literature such as *Frankenstein*, to radio, TV and film, we will explore the evolving agendas in scientific framing and the manner in which science and fiction can be mutually constituted. Finally, we will consider what tomorrow's world might be.

#### *Essential Reading*

Erickson, M. (2005). *Science, culture and society: understanding science in the twenty-first century*. Polity Press [please see Chapter 7]

*Please watch a suitable science fiction film in preparation.*

### **Important policy information**

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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](http://www.ucl.ac.uk/sts/handbook)

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