HPSC0037

Thinking about Technology

Course Syllabus

2022-23 session | Jon Agar | jonathan.agar@ucl.ac.uk

Course Information

An introduction to ways of thinking about technology, from historical, sociological and philosophical perspectives. The course starts with lectures and seminars on fundamental questions: what is technology? Is technology socially shaped? Do artefacts have politics? What are the common mistakes in thinking about technology? The course then addresses major khistorical developments (industrialization, growth of technological systems, the spread of information technologies, the influence in the current era of Big Tech giants), as well as key issues (disability) and questions (can machines think? can machines be ethical?), and critical philosophical approaches.

Basic course information

Course website:	See moodle
Moodle Web site:	https://moodle.ucl.ac.uk/course/view.php?id=28055
Assessment:	Essay
Timetable:	www.ucl.ac.uk/sts/hpsc
Prerequisites:	No prerequisites
Required texts:	No required texts
Course tutor(s):	Professor Jon Agar
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Web:	https://www.ucl.ac.uk/sts/people/professor-jon-agar
Office location:	22 Gordon Square, Room 2.4a
Office hours:	TBC

Aims & objectives

Aim. The aim of the module is to provide students with the knowledge of the ways of thinking about technology, philosophical, sociological and historical.

Objectives. By the end of this module students should be able to:

- Apply knowledge of ways of thinking about technology, philosophical, sociological and historical.
- Possess skills for interpreting technology in the modern world

Schedule

UCL Week	Topic	Date	Activity
6	1. What is technology?	4.10	READ: Winner
7	2. Sociology of technology	11.10	READ: MacKenzie and Wajcman READ: Pinch and Bijker
8	3. Common mistakes in thinking about technology	18.10	READ: Edgerton READ: Verrips and Meyer
9	4. Industrial Revolutions in Work and at Home	25.10	READ: Cowan
10	5. Growth of Technological Systems Advice on Essays	1.11	READ: Hughes
11	READING WEEK		
12	6. What's a Computer?	15.11	READ: Abbate
13	7. Big Tech	22.11	READ: David READ: Zuboff
14	8. Disability	29.11	READ: Jain
15	9. Can machines think? Can machines be ethical?	6.12	READ: Turing READ: Suchman and Sharkey
16	10. Critical Philosophy of Technology	13.12	READ: Heidegger
	Submit Essay		Submit essay

Assessments

Summary

	Description	Deadline	Word limit
100%	Essay	10 January	3000* (*for iBSc students – Level 6 - the limit is 4000 words)

Assignments

Essay: Describe and analyse a technology or technological system, drawing on ways of thinking about technology encountered in the course

Approach to essay:

1) Choose your technology or technological system. Often more specific choices make for stronger essays than more general ones. So, for example, the 'Model T Ford automobile' is a better choice than 'cars'. Surprising or unusual choices also often make better essays.
2) Locate sources that will inform you about the technology, for examples sources that help you understand the history, invention, use and implications of the technology. More guidance on what makes for strong sources can be found below.
3) Reflect on which ways of thinking about technology (especially arguments and ideas from class readings) might help in interpreting your technology in context
4) There are some analytical frameworks, from the class readings, that you **must** try and apply. Specifically:

From this source	What you must ask:
MacKenzie and Wajcman	Are there technologically determinist views of your technology. If so, who says them, why, and why are they misleading?
Pinch and Bijker	Using the SCOT analysis, identify relevant social groups, their interests, and how they shape (or not) the technology. Are differently gendered or abled social groups relevant?
Edgerton	How and why are patterns of invention and innovation different from patterns of technology-in-use?
Hughes	Describe the extent to which your technology is part of a system. How well does the development of your technology fit with Hughes' model of the growth of technological systems?

Essays must be submitted via Moodle

Criteria for assessment

The departmental marking guidelines for individual items of assessment can be found in the STS Student Handbook. The general criteria for assessment for STS BSc coursework can be found here: http://www.ucl.ac.uk/sts/study/bsc/documents/criteria_for_assessment_general_.pdf

Specific guidelines

The following is some informal, specific guidelines regarding the essay coursework for HPSC0037. The essay project itself is defined above.

The essay will be marked with reference to three categories (you will see these in the general comments section on Turnitin): structure, content and style. All three are important, but most of the credit will concern content. The following breaks down what I am looking for under each of these headings. Overall, the essay will be graded according to whether it is judged to meet these descriptions of qualities in ways which are excellent (>70%), good (60-69%), satisfactory (50-59%), poor (40-49%) or have failed (0-39%).

Structure

- The essay has a clear (1) **introduction**, (2) main **sections** which are well labelled and organised**,** (3) a **conclusion**.
- The essay has a complete and accurate bibliography.

Content

- A clear account of methodology, in other words which analytical tools, including some from class readings, you will be using, and why. The account of the technological object or system is analysed by drawing on the ways of thinking about technology we have read and discussed in class. If these frameworks are supplemented by others we have not directly discussed in class, then these are described, assessed and applied accurately and convincingly.
- A detailed descriptive and analytical account of the technology you have chosen. The technology is analysed by you showing what insights are generated by applying the analytical tools to the case study. The analysis is persuasive.
- The descriptive parts of the account above are referenced to sources, especially academic scholarship. The essay should reflect them accurately, and should be examined critically. No essay will be overly dependent on a handful of sources.
- Likewise the sources of the analytical frameworks are referenced, and should also be treated critically: what are their strengths and weaknesses? What are the assumptions or the alternatives? Should the way of thinking about technology be modified by what you have found out?

- Does the essay offer some independent critique or insight or does it merely report what is in the literature? This criterion becomes increasingly more important for higher level history essays, and for the 'originality' mentioned in the general criteria.

Style

- We place great emphasis on clarity of argument and expression. Avoid ambiguity, vagueness and the passive voice where possible. Try to keep your line of argument clear. Clarity is one reason to divide the main body of the essay into sections.
- Format (including referencing) is clear and consistent

Further advice on sources

Any source is of potential use so long as you consider them critically and you provide a full and proper reference. However, academic studies of technology are often the strongest sources. To find their work you can:

- Browse the relevant section in the UCL Science Library (3rd floor, amongst the STS books). Other good locations are Senate House library (which is comprehensive), and the Science Museum's Dana Research Library (next to the Science Museum) which has a specialist library on technology you can use – most of the books you would need all in one place.
- Search relevant journals. Good history of technology journals include: *Technology & Culture* and *History and Technology*. Other STS journals that include papers on technology include: *Science, Technology and Human Values* and *Social Studies of Science*.
- The various editions of the *Handbook of Science and Technology Studies* (each edition has a new set of essays from experts from the field) will provide excellent guides to some of the literature.
- But there are plenty of other academic journals from outside STS (eg geography, politics, philosophy, etc) that may have relevant scholarship.
- Try scholar.google.com searches. Use google scholar both to find likely literature on your topic, but also by seeing who cites a central piece, where later literature on the topic can be found
- Visual illustrations can help, but make sure they are a) part of your argument, and not merely decorative, and b) referenced accurately and properly
- Your own observations or visual recordings may well be valuable. These can be referenced by place, date, and your own authorship.

Reading list

Class 1 What is Technology? 4 October 2022

What is technology – tools – artefacts – systems – technical knowledge – know-how – relationship with science – relationship to society, economy, culture

Essential reading: Langdon Winner, 'Do artifacts have politics?', in *The Whale and the Reactor: a Search for Limits in an Age of High Technology*, Chicago, University of Chicago Press, pp.19-39. Also reprinted in MacKenzie and Wajcman (1985)

Optional further reading: Eric Schatzberg, *Technology: Critical History of a Concept*, Chicago: University of Chicago Press, 2018

Class 2 Sociology of Technology 11 October 2022

In what ways do technologies shape society – weak and strong forms of shaping– technological determinism - social shaping of technology - SCOT – sociology of science and sociology of technology – critiques of SCOT

Essential reading: Donald MacKenzie and Judy Wacjman, 'Introductory essay', in Donald MacKenzie and Judy Wacjman, *The Social Shaping of Technology* (Open University Press, 1985), pp2-25. Trevor J. Pinch and Wiebe E. Bijker, 'The social construction of facts and artifacts: Or how the sociology of science and the sociology of technology might benefit each other', in Bijker, Pinch and Hughes (eds.), *The Social Construction of Technological Systems*, Cambridge, MA: MIT Press, 1987, pp.17-50

Optional further reading: (1) Langdon Winner, 'Upon opening the black box and finding it empty: social constructivism and the philosophy of technology', *Science, Technology, & Human Values* (1993) 18, pp. 362-378. http://journals.sagepub.com/doi/pdf/10.1177/016224399301800306 (2) Steve Woolgar, 'The turn to technology in social studies of science', *Science, Technology & Human Values* (1991) 16(1), pp. 20-50 https://doi.org/10.1177/016224399101600102 (This paper is also a critique of Winner's 'Artefacts')

Class 3 Common Mistakes in Thinking about Technology 18 October 2022

Technologies in use - distinguishing technology from innovation – revisiting technological determinism – technology in developed and developing world – importance of old technologies

Essential reading: David Edgerton, 'From innovation to use: ten eclectic theses on the historiography of technology', *History & Technology* (1999) 16, pp.111-136. Jojada Verrips and Birgit Meyer, 'Kwaku's car: the struggles and stories of a Ghanaian long-distance taxi-driver', in Daniel Miller (ed.), Car Cultures, Oxford: Berg, 2001, pp.153-184

Optional further reading: David Edgerton, *The Shock of the Old: Technology and Global History since 1900*, London: Profile, 2006.

Class 4 Industrial Revolution in Work and at Home **25 October 2022**

Adam Smith on the division of labour – industrial revolution – clocks, time and work discipline – Ford and Fordism – artisan skill and deskilling - Gender as a factor in the social shaping of technology – domestic technologies – industrialization of the home

Essential reading: Ruth Schwartz Cowan, *More Work for Mother: the Ironies of Household Technology from the Open Hearth to the Microwave*, New York: Basic Books, 1983, pp. 3-101.

Optional further reading: E.P. Thompson, 'Time, work-discipline and industrial capitalism', *Past and Present* 38 (1967), pp56-97. David Hounshell, *From the American System to Mass Production, 1800-1932: the Development of Manufacturing Technology in the United States*, Baltimore: Johns Hopkins University Press, 1984. Judy Wajcman, *Feminism Confronts Technology*, Cambridge: Polity Press, 1991. Barbara Hahn, *Technology and the Industrial Revolution*, Cambridge: Cambridge University Press, 2020.

Class 5 Growth of Technological Systems **1 November 2022**

Technological systems – Hughes's model of growth of systems – Edison as systems builder Railways – perception of time and space – corporations - infrastructures

Essential reading: Thomas P. Hughes, "The Evolution of Large Technological Systems," in Bijker, Hughes, and Pinch (eds.), *The Social Construction of Large Technological Systems*, Cambridge, MA: MIT Press, pp.51-82

Optional further reading: Wolfgang Schivelbusch, *The Railway Journey: the Industrialization and Perception of Time and Space in the 19th Century*, Leamington Spa: Berg, 1986. Alfred D. Chandler, Jr., *The Visible Hand: the Managerial Revolution in American Business*, Cambridge, MA: Belknap Press, 1977. Brian Larkin, 'The Politics and Poetics of Infrastructure', *Annual Review of Anthropology* (2013), 42, pp. 327-343 https://doi.org/10.1146/annurev-anthro-092412-155522

NOTE: Advice on coursework essays will also be provided in this session

READING WEEK

Class 6 What's a Computer? **15 November 2022**

Long history of information technologies – crises of industrial control – universal machine – stored-program electronic computers – business or military? - miniaturization - networks

Essental reading: Janet Abbate, 'Cold war and white heat: The origins and meanings of packet switching', Chapter 25 in MacKenzie and Wajcman, second edition, *Social Shaping of Technology* https://eecs.wsu.edu/~taylorm/2012_VAST/Abbate.Cold.War.and.White.Heat.Packet.Switching.pdf

Optional further reading: Martin Campbell-Kelly and William Aspray, *Computer: a History of the Information Machine*, New York: Basic Books, 1996 (later editions available, full text via UCL Explore). Paul Edwards, *The Closed World: Computers and the Politics of Discourse in the Cold War*, Cambridge, MA: MIT Press, 1996 http://cognet.mit.edu/book/closed-world

Class 7 Big Tech **22 November 2022**

Big Tech Giants (including Facebook and Google) – social media – attention economy – politics of bubbles - lock-in – surveillance capitalism

Essential reading: Paul David 'Clio and the economics of QWERTY', *American Economic Review* (1985) 75(2), pp.332-337 Shoshana Zuboff, 'Big other: surveillance capitalism and the prospects of an information civilization', *Journal of Information Technology* (2015) 30, pp. 75–89

Optional further reading: John Lanchester, 'The global id', *London Review of Books* (2006) https://www.lrb.co.uk/v28/n02/john-lanchester/the-global-id. Tarleton Gillespie, 'The politics of "platforms"', *New Media & Society* (2010) 12(3), pp. 347–364. Richard Barbrook and Any Cameron, 'The California ideology' (1995/6), various versions, including https://www.tandfonline.com/doi/pdf/10.1080/09505439609526455

Class 8 Disability **29 November 2022**

Functionality in definitions of technology – prosthetics – technology and Deaf culture – technology and cultural diversity/uniformity

Essential reading: Sara S. Jain, 'The Prosthetic Imagination: Enabling and Disabling the Prosthesis Trope', *Science, Technology, & Human Values* (1999) 24, pp. 31-54. https://doi.org/10.1177/016224399902400103

Optional further reading: David E. Nye, 'Chapter 5: Cultural uniformity, or diversity?', in *Technology Matters: Questions to Live with*, Cambridge MA: MIT Press, 2006, pp.67-86. Bess Williamson, 'Electric Moms and Quad Drivers: People with Disabilities Buying, Making, and Using Technology in Postwar America', *American Studies* 52 (2012), pp 5-29 https://www.jstor.org/stable/41809566 Vasilis Galis, 'Enacting disability: how can science and technology studies inform disability studies?', *Disability & Society* (2011) 26, pp. 825-838. https://doi.org/10.1080/09687599.2011.618737. Myriam Winance 'Trying Out the Wheelchair: The Mutual Shaping of People and Devices through Adjustment', *Science, Technology, & Human Values* (2006) 31, pp.52-72. https://journals.sagepub.com/doi/10.1177/0162243905280023

Class 9 Can machines think? Can machines be ethical? **6 December 2022**

Artificial intelligence – Turing – ethics in machines

Essential reading: Alan Turing, 'Computing machinery and intelligence', *Mind* (1950) 59, pp. 433-460. Lucy Suchman and Noel Sharkey, 'Wishful Mnemonics and Autonomous Killing Machines', *AISB Quarterly* (2013), pp. 14-22.

Optional further reading: Julia Angwin, Jeff Larson, Surya Mattu and Lauren Kirchner, 'Machine Bias: there's software used across the country to predict future criminals. And it's biased against blacks', *ProPublica*, May 2016 https://www.propublica.org/article/machine-bias-risk-assessments-in-criminal-sentencing

Class 10 Critical Philosophy of Technology **13 December 2022**

Marx – Heidegger – Ellul - Haraway

Essential reading: Martin Heidegger, 'The question concerning technology', reprinted in Robert C. Scharff and Val Dusek (eds.), *Philosophy of Technology: the Technological Condition*. *An Anthology*, Oxford: Blackwell, 2003, pp. 252-264.

Optional further reading: Extracts from Karl Marx, *Capital*, *A Contribution to the Critique of Political Economy*, Marx and Engels, *The German Ideology*, and Engels, *Dialectics of Nature*, and Marx and Engels, Basic Writings on Politics and Philosophy, in Robert C. Scharff and Val Dusek (eds.), *Philosophy of Technology: the Technological Condition*. An Anthology, Oxford: Blackwell, 2003, pp. 66-79. Donald MacKenzie, 'Marx and the machine', Technology and Culture (1984) 25, pp. 473-502 http://www.jstor.org/stable/3104202. Jacques Ellul, *The Technological Society*, New York: Knopf, 1964. Donna Haraway, 'A manifesto for cyborgs: science, technology, and socialist feminism in the 1980s', *Australian Feminist Studies* (1987) 2(4), pp. 1-42 http://dx.doi.org/10.1080/08164649.1987.9961538 Andrew Feenberg, 'Critical theory of technology: an overview', https://www.sfu.ca/~andrewf/books/critbio.pdf

Course expectations

Students are expected to have read and to have made notes on the readings required for each class. Students are expected to contribute to discussions in class.

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.