

## Teaching Materials: A Journey through STS and Innovation Studies

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### Abstract

A series of teaching materials to accompany the *Engagement* “A Journey through STS and Innovation Studies” published as part of the STS and Innovation thematic collection.

### Keywords

innovation studies; UK universities; STS method; Schumpeterian economics, radical science movement

### Teaching Innovation Studies at the University of East London in the 1990s

What follows is a small selection of teaching materials I used when teaching innovation studies and STS to first year students at the University of East London (UEL). The course was called “Innovation, Technology & Culture”. It was compulsory for all of the students following the “New Technology” degrees. Included on the following pages are the aims and objectives, lecture and seminar schedules, examples of seminars, lectures and assessment. Along the way, I point to some of the material features of teaching pre-Internet. More context for this material can be found in my article “A Journey through STS and Innovation Studies”.

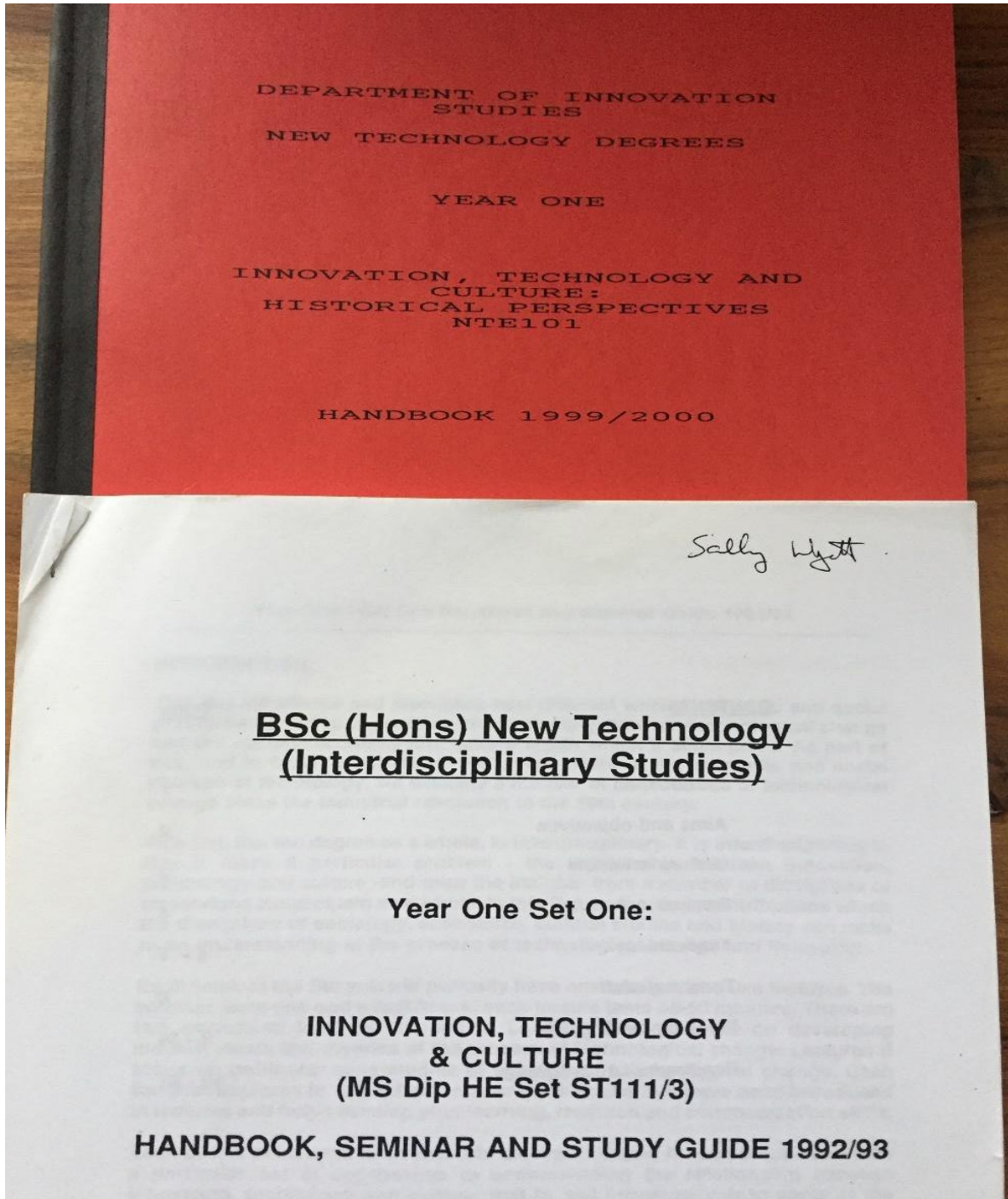
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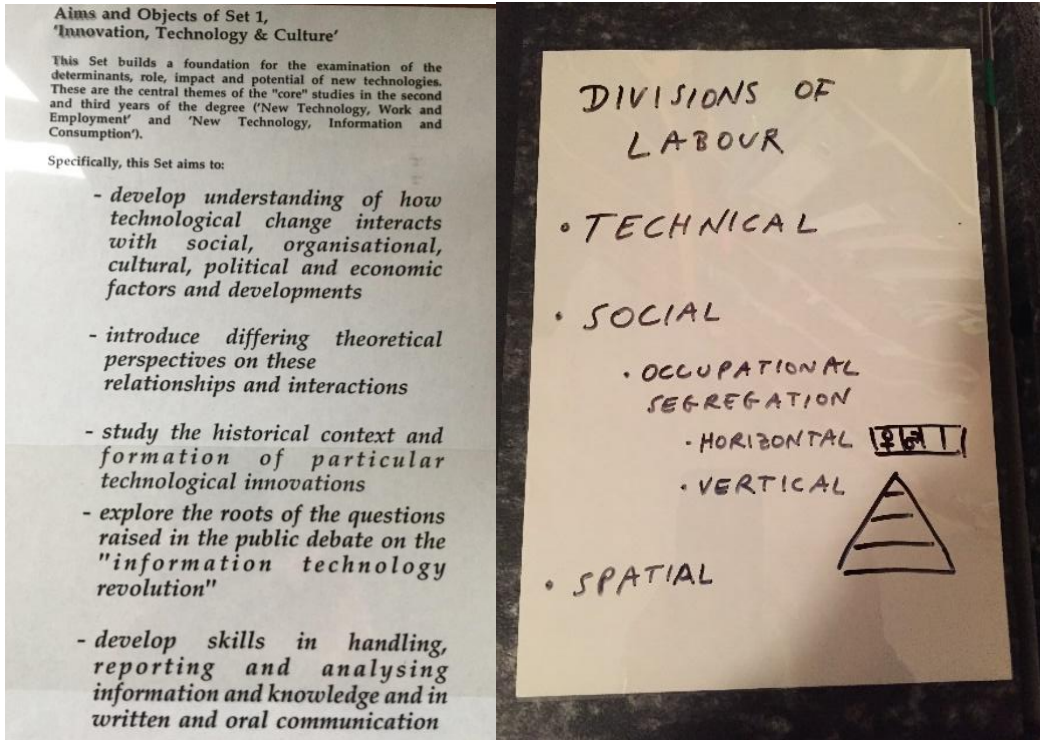
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## Course Handbook Covers



**Figure 1.** These are the covers for the same course, one from 1992/93 and the other from 1999/2000. By the turn of the millennium we had coloured paper and binding. But we didn't have a logo on the course material. Perpetual branding of university materials really took off in the 21st century. The course was called "Innovation, Technology & Culture", and was compulsory for all first year students.

## Aims and Object[ive]s



**Figure 2a and 2b.** Interesting typo on the first line of this overhead sheet. In the 1990s, pre-PowerPoint, we used these sheets. Being able to print them was already a major innovation. In the early '90s, I was still writing them by hand, as illustrated by this sheet from a lecture about labour process theory.

Lecture and Seminar Schedules

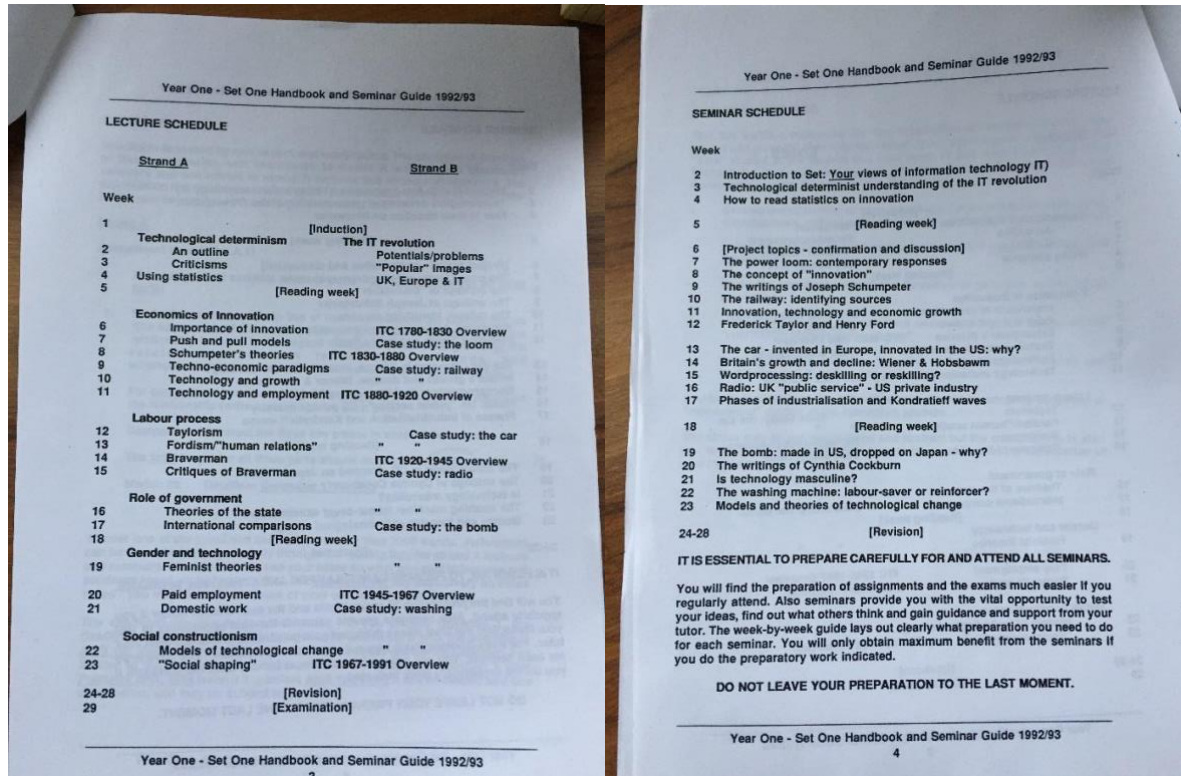


Figure 3a and 3b. Those were the days – a course that lasted for 24 weeks, with time to develop arguments and make connections. Students had two one-hour lectures every week, one more theoretical and one about a case study relevant for the theories we were exploring that week. For example, when introducing students to the concept of ‘techno-economic paradigm’, we also spent time on the history of the railway (see next page). Seminars, in smaller groups, lasted for one and a half hours, and addressed both theoretical and empirical themes.

### What we Did in Week 9: Schumpeter

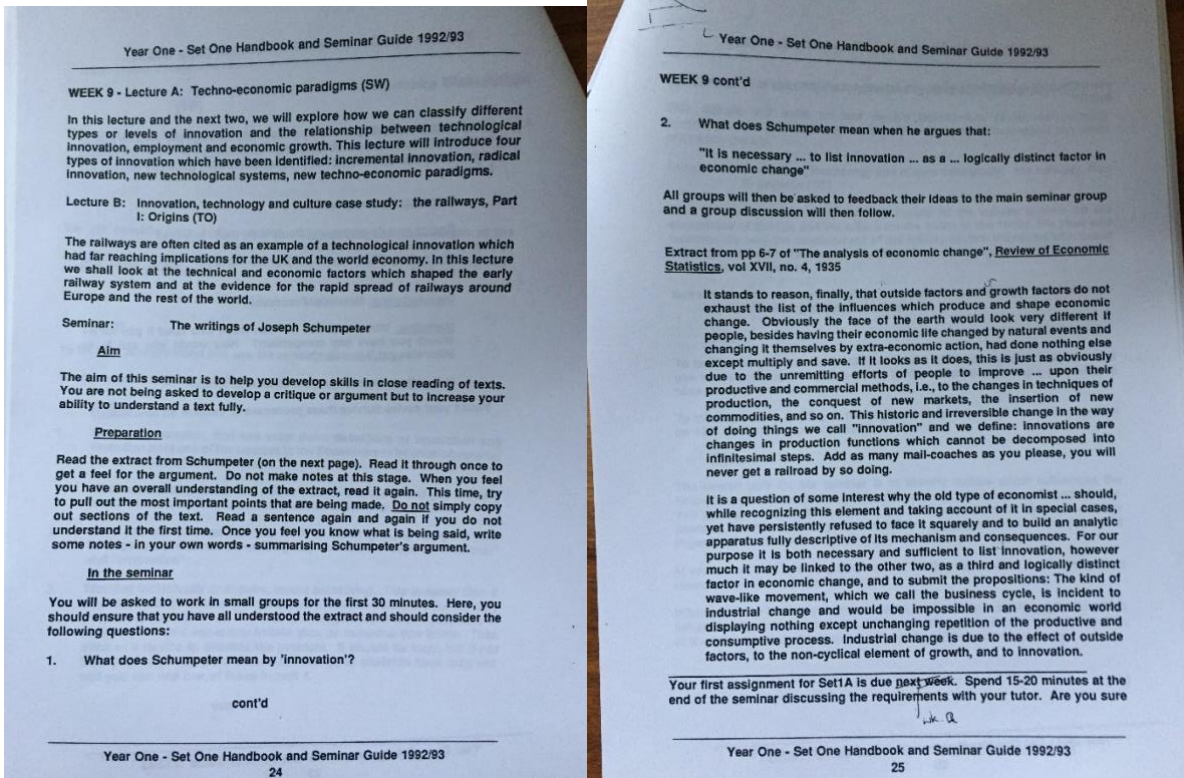


Figure 4a and 4b. In retrospect, I find it quite ambitious that we expected students to read major texts from the field in week 9 of their first year. Often, first-year students only encounter highly processed material, in the form of textbooks. Looking at the paragraph about 'Preparation', it was clear that we paid attention to developing the skills of close reading, and that works best with primary sources.

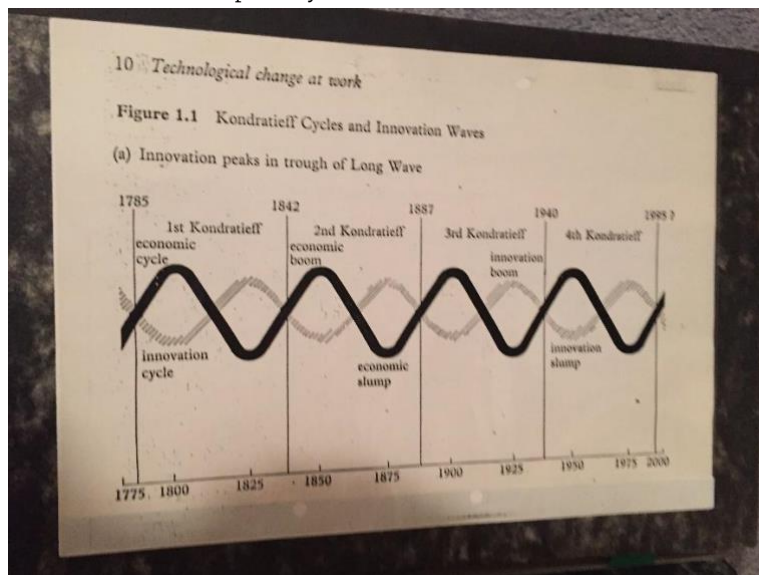
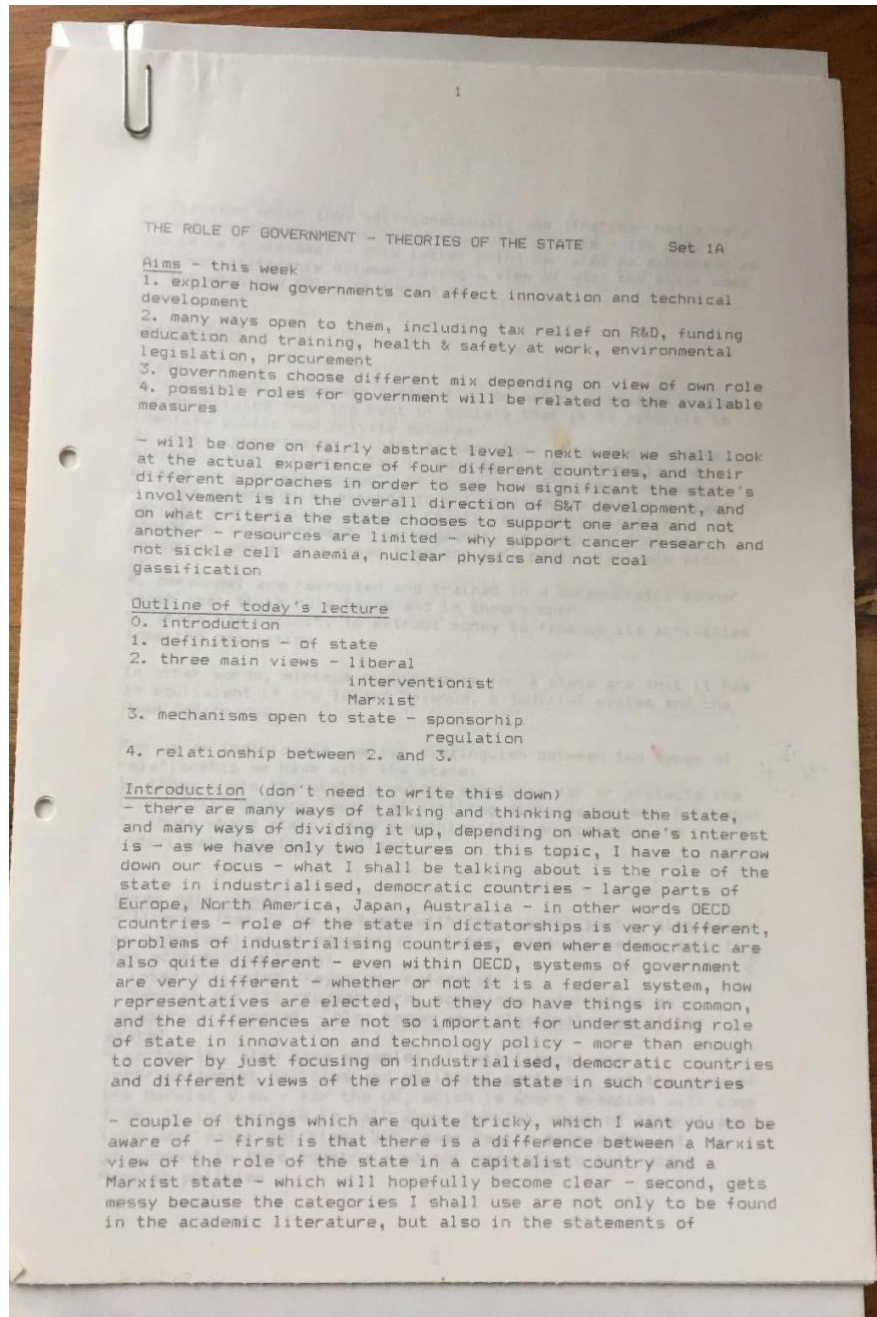


Figure 4c. Untitled.

## Lecture Notes from Week 16: The Role of Government



**Figure 5.** These lecture notes were prepared on a home computer, probably WordPerfect, the dominant word processing software from the mid-1980s until the late 1990s (and still used today by the legal profession). If you look closely, you can see it was printed using a dot matrix printer (still in use for high-volume printing needs in some sectors).

I love my clarification of the difference between 'a Marxist view of the role of the state in a capitalist country' and 'a Marxist state'. The former emphasises the role of the state as an agent to support the interests of

capital (as described by Karl Marx and Friedrich Engles in *The Communist Manifesto*, 1848), whereas the latter is a system of government based on Marxist principles.

## Assessment

Year One - Set One Handbook and Seminar Guide 1992/93

**ASSESSMENT**

This Set is assessed by coursework and examination. The coursework consists of four assignments, with two related to strand A lectures and associated seminars and two related to strand B lectures and associated seminars. The examination is a three hour unseen paper (considerable time will be spent later in the year helping you prepare for the examination).

**Strand A**

**Assignment 1 (code 1.1.A.1)**

This assignment consists of three parts - you must complete all three parts:

1. Find articles or chapters in two of the references on the reading list on "the economics of innovation" (see pp 30-33) which discuss either the relationship between technological change and economic growth or the relationship between technological change and employment/unemployment (use titles, contents pages and indexes)
2. For each of your two sources, identify three key points which it makes on the relationship (write a paragraph on each point)
3. Compare and contrast the three key points in each of the sources

The total length for all three parts should not exceed 1000 words. X

Marks: 25    **Deadline: December 17th, 1992**

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Year One - Set One Handbook and Seminar Guide 1992/93

**1. A general reading list**

H Barnett *Innovation: The Basis for Cultural Change* McGraw-Hill, 1953

W Brown & R Rothwell (eds) *Entrepreneurship and Technology*, Longman, 1986

N Clark *The Political Economy of Science and Technology* Basil Blackwell, Oxford, 1985

R Coombs et al *Economics and Technological Change* MacMillan, London, 1987 (a book primarily aimed at third year undergraduates but some of the material is covered in a very clear form, see esp pp 9-14 regarding the importance of innovation)

C Cooper & J Clark *Employment, Economics and Technology* Wheatsheaf, Hassoeks, 1982 (BK/MH 331.125)

B Elliott (ed) *Technology, Innovation and Change* Centre of Canadian Studies (University of Edinburgh), 1986

G Dosi et al *The Economics of Technical Change and International Trade* Harvester/Wheatsheaf, 1990 [MH]

C Freeman *The Economics of Industrial Innovation* (2nd edition) Frances Pinter, London, 1982

L Georghiou et al *Post-Innovation Performance: Technological Development and Competition* MacMillan, 1986

P Hall (ed) *Technology, Innovation and Economic Policy* Philip Allan, 1986

E von Hippel *The Sources of Innovation* Oxford UP

R Langdon & R Rothwell (eds) *Design and Innovation: Policy and Management* Frances Pinter, 1985

J Langrish *Innovation Policy and Needs Analysis* 1982 (BK 303.483)

——— *Innovation: Strategies for Survival* 1984 (BK 303.483)

J Langrish et al *Wealth from Knowledge* (MH 607.241)

cont'd...

**Figure 6.** This is one of the assignments related to the theoretical part of the course. Students are referred to the reading list, of which the first page is reproduced here. The numbers after some of the references refer to the library (MH – Maryland House where we were based, or BK another part of the campus). The reading list was four pages long.

## Assessment

Year One - Set One Handbook and Seminar Guide 1992/93

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**Strand B**

**Assignment 1 (code 1.1.B.1)**

Summarise (identify the key themes), in your own words, and in not more than 1000 words,

either E Hobsbawm *Industry and Empire* Penguin, chapter 3 "The Industrial Revolution 1780-1840"

or D Landes *The Unbound Prometheus* Cambridge University Press, chapter 2 "The Industrial Revolution in Britain" (first twenty pages only)

Marks: 25    Deadline: **November 5, 1992**

**Assignment 2 (code 1.1.B.2)**

Prepare an annotated bibliography, a list of key dates, and detailed structure for a report on the determinants and impacts of one pre-World War Two innovation.

- (1) Between six and eight relevant sources with a paragraph on each describing the main relevant contents. One or two of the sources must be non-academic, i.e. a novel, film, visit to a museum, etc.
- (2) A clear plan or outline showing what would be the main section and sub-section headings in your report.

(Further details on this assignment can be found in the seminar material for week 6. Note carefully you are not required for this assignment to produce the final report)

You may not choose one of the case studies already covered in the Set 1B lectures. In other words, you may not prepare your assignment on the loom, railway, car or radio.

Marks: 45    Deadline: **February 4, 1993**

**For all coursework assignments, get into the practice of wordprocessing and using the spell-checking facility to correct errors. All essays should end with a bibliography - a list of the books and articles which you have read for that piece of work. The guidebook 'How to study and write essays' that was given to you during induction week will help you to present the bibliography in the correct format.**

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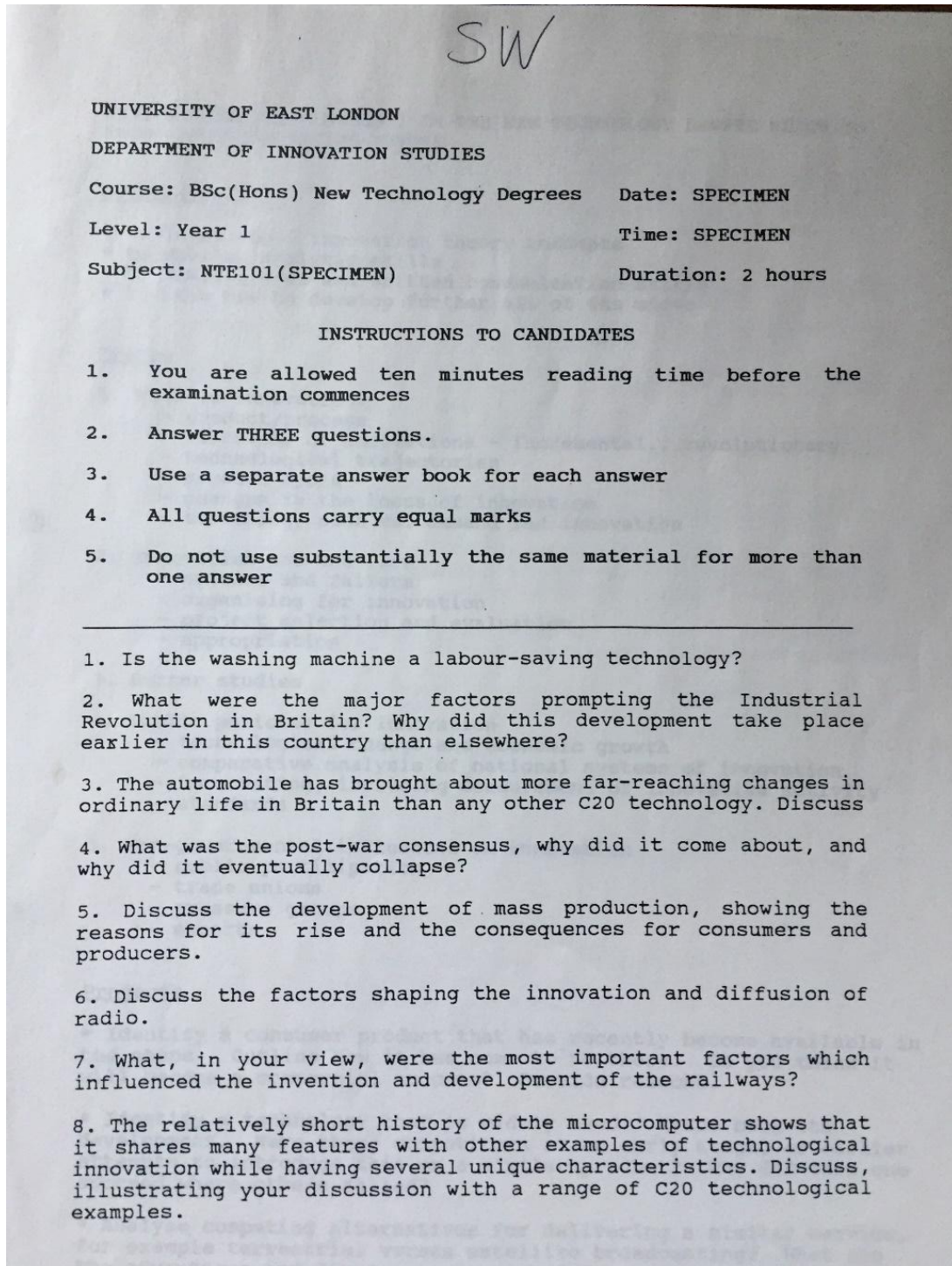
Year One - Set One Handbook and Seminar Guide 1992/93

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**Figure 7.** These two assignments relate to the case studies. Again, I'm struck by our ambition in asking students to read Eric Hobsbawm and/or David Landes. I also like how we expected them to incorporate non-academic sources in the second assignment. We wanted to sensitise students to the idea that science, technology and their representations could be found everywhere, including popular and high culture.



## Assessment



**Figure 8.** This is an example, given to students in advance, to help them prepare for the final exam. The exam was done in closed conditions, and the students wrote by hand, with a separate book for each of their three answers. Carrying these to and from the exam location, and to and from home in order to grade them was heavy work.

## What students should know about innovation theory by their third and final year

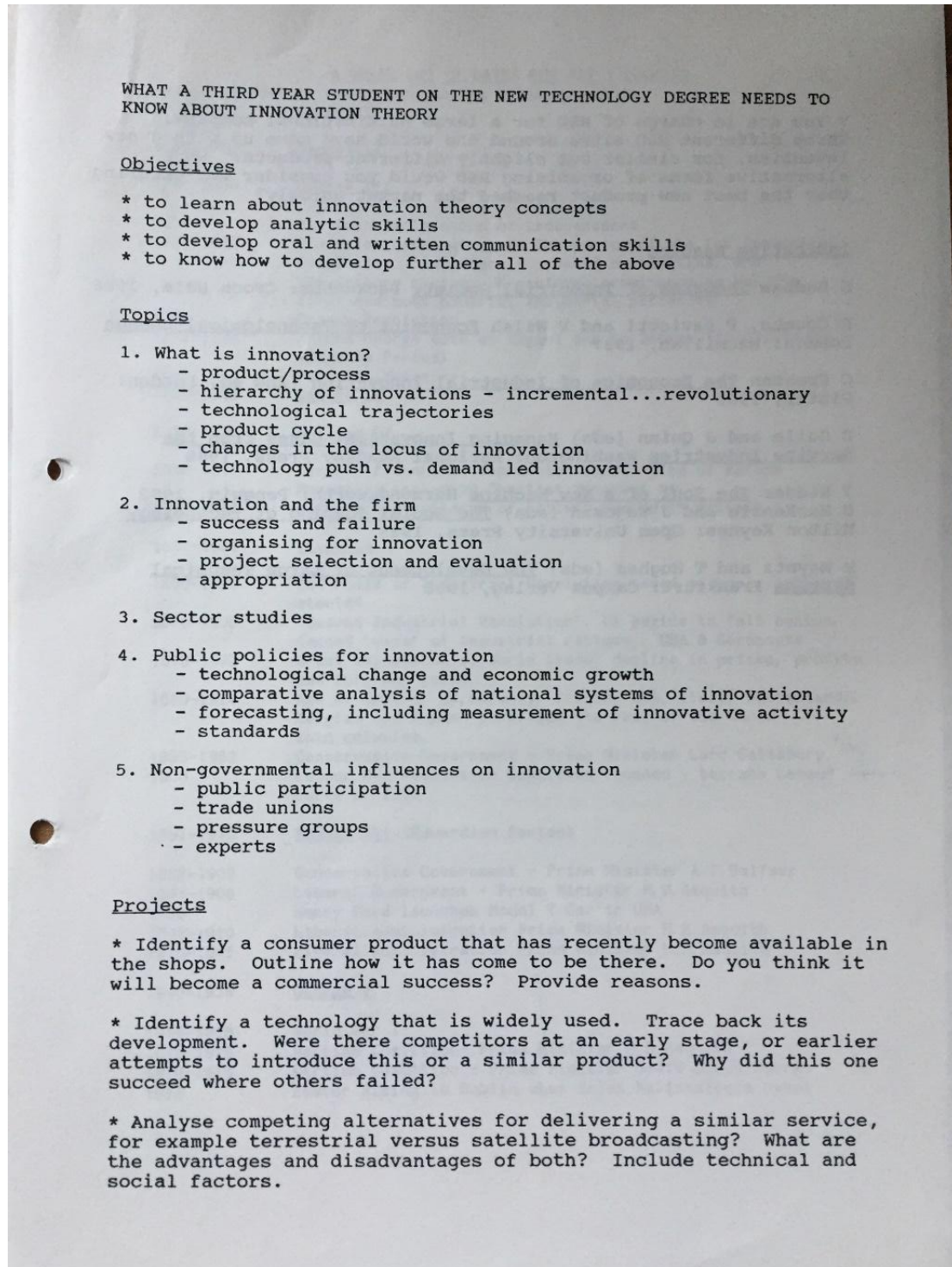


Figure 9. Outline.

### The Materiality of Teaching

In some of the previous pages, we've seen examples of dot matrix printing, overhead sheets, out-of-academic-use software, how to bind paper. Here are a few more examples – 3.5 inch disks, tape recording, slides (of paintings by John Constable and William Turner, a sort-of before and after of industrialisation). There was also chalk, and chalk dust. Outdated fashion tip: never wear black when lecturing with chalk.



Figure 10. 3.5" disks.

## Readable Version of Lecture Notes

### THE ROLE OF GOVERNMENT – THEORIES OF THE STATE Set 1A

#### Aims – this week

1. explore how governments can affect innovation and technical development
2. many ways open to them, including tax relief on R&D [research and development], funding education and training, health and safety at work, environmental legislation, procurement
3. governments choose different mix depending on view of own role
4. possible roles for government will be related to the available measures

– will be done on fairly abstract level – next week we shall look at the actual experience of four different countries, and their different approaches in order to see how significant the state's involvement is in the overall direction of S&T [science and technology] development, and on what criteria the state chooses to support one area and not another – resources are limited – why support cancer research and not sickle cell anaemia, nuclear physics and not coal gasification

#### Outline of today's lecture

0. introduction
1. definitions – of state
2. three main views – liberal, interventionist, Marxist
3. mechanisms open to state – sponsorship, regulation
4. relationship between 2. and 3.

#### Introduction (don't need to write this down)

- there are many ways of talking and thinking about the state, and many ways of dividing it up, depending on what one's interest is – as we have only two lectures on this topic, I have to narrow down our focus – what I shall be talking about is the role of the state in industrialised, democratic countries – large parts of Europe, North America, Japan, Australia – in other words OECD [Organisation of Economic Cooperation and Development] countries – role of the state in dictatorships is very different, problems of industrialising countries, even where democratic are also quite different – even within OECD, systems of government are very different – whether or not it is a federal system, how representatives are elected, but they do have things in common, and the differences are not so important for understanding role of state in innovation and technology policy – more than enough to cover by just focusing on industrialised, democratic countries and different views of the role of the state in such countries
- couple of things which are quite tricky, which I want you to be aware of – first is that there is a difference between a Marxist view of the role of the state in a capitalist country and a Marxist state

– which will hopefully become clear – second, gets messy because the categories I shall use are not only to be found in the academic literature, but also in the statements of [continued on next page, not reproduced here]

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### **Acknowledgements**

I learned a great deal about teaching during my years at UEL. The material in the following pages was in part produced by me, but much was produced by others before I joined UEL. The original course was designed by David Albury, Tony Hargreaves and Alvaro de Miranda. I had the pleasure of working with all of them on this course, as well as with Flis Henwood and Gavin Poynter. I am grateful to them all.

### **Author Biography**

Sally Wyatt is professor of digital cultures in the Maastricht University Science, Technology and Society Studies research programme.

