It is widely recognised that science has transformed our understanding of nature and our ability to control the world around us. But considered as a professional activity, science and technology are relatively recent products of Western European culture. During the first term, this course will look at the developments in European culture between the 12th and 18th centuries that brought about a dramatic change in the way people understood the structure of the heavens, the nature of the physical world and the relationship between religion and science. In the second term the course will focus on the emergence of the scientific disciplines and the role of the industrial revolution, imperialism, and war in the institutionalisation of science and technology in the 19th and 20th centuries. The course concludes by looking at the recent trend towards the commercialisation of science and impact of science on society. Careful attention will be paid throughout to the changing status of scientific knowledge within Western society and its interaction with technology and industry. The historical background will be provided by the lectures and readings. Extensive memorisation of names and dates is not a part of the course.

Aims

The course is designed to provide an overview of the development of the natural sciences from the medieval period to the late-20th century. Special attention will be paid to the relationship between science and technology in the period after 1800. The course develops essential transferable skills. These include written and oral communication skills, and experience in the synthesis and analysis of a range of information sources, which makes students who have taken this course more attractive to prospective employers.

Objectives

By taking the course students will become able to:

- identify and explain the peculiar nature of the scientific enterprise in different countries at key points in European history;
- give informed and critical comment on historical writing (both scholarly and popular) about the development of the sciences;
- present judgements on historical material as a formal essay;
• describe how our knowledge of the natural world had changed over the past eight centuries;

• identify and describe the historical forces that have caused the above changes and brought into being the scientific institutions in which we now work.

• understand how the present role of science in society emerged from the historical past and is shaped by current social and political values

**Course structure**

The course consists of 20 lectures and 10 tutorials. Lectures will be given each week on Mondays at 12.00 commencing on 8 October. Tutorials will be held fortnightly at which you will be able to discuss the issues raised in the lectures in more depth. The tutorials will be held at a time and place to be announced in the lectures.

**Reading**

Each week an introductory reading will be assigned in connection with the lecture. The amount of reading has been kept to a practical minimum (for the benefit of overworked scientists and engineers) on the understanding that what is set must be read. You will find it helpful to do the reading before the lecture.

**Essays and assessment**

Essays. You will be expected to write two essays of about 2000 words each. These are intended to provide an opportunity for you to explore in greater depth an aspect in the history of science and technology that you find especially interesting. Preparing and writing these essays will develop important skills in the critical assessment of texts and the effective written communication of your own ideas. These skills will certainly be useful in your subsequent career. Topics for these essays, together with notes concerning the form they should take, are given below. These topics will also be discussed further in tutorials.

The first essay must be handed in to the Humanities Department Reception Desk, Humanities Department, Level 3, Sherfield Building, by 14.00 on 7 January 2008. The second essay must be handed in by 14.00 on 28 April 2008. Credit will be deducted for late submissions unless an extension is granted in advance.

All requests for an extension MUST be arranged through the Humanities administration, and NOT directly between lecturer and student.

The only valid reasons for requesting an extension to a coursework deadline are illness or a serious personal problem. Workload pressures, including examinations in the student’s home department, are not judged to be a valid reason. Students needing to request an extension should download the ‘Coursework Extension Request Form’ from the Humanities website. They should complete and sign the form and return it to Christian Jacobi, Humanities Administrator, or by e-mail to humanities@imperial.ac.uk, along with any supporting documentation such as a medical certificate. The Humanities Department administration will, if necessary, liaise with the home department to ascertain the seriousness of the circumstances. Apart from in very exceptional circumstances, the maximum extension period will be two weeks. Students submitting late assignments without arranging an extension will be subject to a mark penalty of 5% per day, including weekends.
You should hand your essay in at the Humanities Reception Desk, Humanities Department, Level 3, Sherfield Building. The essay will not be accepted without a Humanities Department cover sheet (included in the Humanities Student Handbook or available from the Humanities Office). This provides evidence that you have handed in your essay on time and includes a declaration that it is your own work.

Assessment. Assessment of the course will depend upon (a) the quality of the two essays; and (b) performance in a two-hour written examination on the course as a whole. Regular attendance and participation in tutorials is essential if you are to do well in the course. In the final allocation of marks, the weighting will be as follows: first essay 30%, second essay 40%, examination 30%.

Students with queries can contact Dr Navarro by email: j.navarro@imperial.ac.uk
Schedule 2007–2008

AUTUMN TERM 2007 (Start: 8 October)

1. Introduction: history, science and technology

2. The earth and heavens in the medieval university

3. Reforming the heavens: Copernicus and astronomy

4. Astronomical revolution: the new Copernicanism

5. Uniting heaven and earth: Galileo’s new science of motion

6. Magic and the Mechanical Philosophy

7. Experiment at the Royal Society

8. Physico-mathematics and the Newtonian universe

9. Mathematics and the exact sciences in the Enlightenment

10. Classifying and measuring: the advent of a revolution in chemistry

SPRING TERM 2008 (Start: 7 January)


12. Work, energy and the Industrial Revolution.
13. The age of the earth


15. Electromagnetism and Empire

16. The laboratory revolution

17. Managing numbers: calculating technologies in Victorian England

18. Big science and the military: the Manhattan Project

19. Life as a scientific commodity: the advent of DNA.

20. REVISION LECTURE
Exam: 17 March 2008

**Essay topics and readings**

Essays should be approximately 2000 words in length (though this need not be adhered to strictly). The most important thing is that you express yourself clearly and concisely. Make sure (before you begin writing) that you have a clear idea of the topic you intend to address and the route by which you intend to answer the question. A substantial conclusion should be included at the end of your essay in which you summarise the main points of your argument.

The readings given in connection with each essay are the best and most recent in the field. You are strongly advised to use these when preparing your essays rather than choosing books on the topic at random. Note that many of the readings referred to are articles in specialist journals (rather than books). These articles cannot be found by searching for the author; you must first locate the journal (ask at the Science Museum STS desk, Level 3) and then find the volume cited. These issues will be discussed during the library visit.
First essay topics

Choose one of the following topics for your first-term essay.

1. Analyse the arguments that Copernicus used in order to convince his audience of the soundness of his new cosmic system.

Recommended reading

2. “Heliocentrism was accepted because it was true”. Analyse the validity of the previous statement and relate Copernicus' work with that of Tycho Brahe, Kepler and Galileo.

Recommended reading

3. How does Galileo’s condemnation relate to the politics of his time?

Recommended reading

4. One of the basic notions attributed to modern science is that of “experiment”. Critically discuss the ways by which experiments became accepted as a source of knowledge.

Recommended reading
5. "Newton discovered gravitation and his ideas were universally accepted". Critically assess the validity of the previous statement, with a particular emphasis on the reception of Newtonianism in France.

Recommended reading

Second essay topics

Choose one of the following topics for your second essay.

1. Compare the different responses that British and French natural philosophers gave to the Voltaic pile and Oersted’s announcement that a current carrying wire could affect a magnetic needle.

Recommended readings

2. Evaluate the possible influence of industrial Glasgow on William Thomson’s work leading to his formulation of the first and second laws of thermodynamics.

Recommended reading

3. “The development of an all-encompassing theory of electromagnetism in Britain was a consequence of the efforts to lay a transatlantic submarine telegraphic cable”. Critically discuss the validity of the previous statement.

Recommended reading

4. To what extent was Darwin’s evolutionism a consequence of his observations on the Beagle? Analyse the relationship between Darwin’s and Malthus theories.

Recommended reading

5. What was the impact of the atomic bomb on the development of 20th century science?

Recommended reading