HH9207/HH207: Science and technology in historical perspective

Syllabus

Course head: Assistant Professor Hallam Stevens
Academic units: 3 AU
Prerequisites: None
Lecture times: Monday 10.30am-12.30pm
Tutorial times: Monday 2.30pm-3.30pm and 3.30pm-4.30pm

Learning objectives:

• Understand the evolution of major scientific and technological developments and trends in modern history and how these trends have affected human societies and civilizations
• Obtain familiarity with the major historical approaches in explaining scientific and technological evolution
• Critically analyze the interactions between science, technology, and socio-political changes in different historical and cultural contexts

Content:

This course surveys the major scientific and technological developments in various geographical and cultural contexts, including those of Asia, Europe, and the United States. It examines transformations in the study of astronomy, medicine, and natural philosophy, and compares the approaches to knowledge and the cultural values attached to science and technology in different societies. In so doing, it places these developments in their cultural, social, and political contexts. The course also surveys technological innovation since the industrial revolution and how it has increasingly become a powerful force in transforming the human condition.

Assessment:

Class participation: (20%)
Assessment will be based on participation in discussions during tutorial meetings.

Writing assignment: (30%)
Assessment based on a research paper of 3000 words analyzing primary sources. Topics / questions and sources to be provided. Outside research and reading will be required.
Due date: 5pm Friday 25th February, 2012.

Final examination: (50%)
A 3-hour final written examination will be given, covering the content of the entire course, including all the lectures and reading material.
Lectures:

*Week 1: Introduction (January 9th)*

Lecture 1a: Introducing the course: themes and methods (or: Why should we care about the history of science?)
Lecture 1b: Before 1600

*Week 2: The scientific revolution (January 16th)*

Lecture 2a: What was the scientific revolution?
Lecture 2b: Why was there a scientific revolution?

*Week 3: Beyond Europe (January 23rd - Chinese New Year, lecture may be rescheduled or cancelled)*

Lecture 3a: Islamic science
Lecture 3b: China and the myth of the great divide

*Week 4: Natural philosophy and the Enlightenment (January 30th)*

Lecture 4a: The enlightenment: chemistry, mathematics, and reason
Lecture 4b: Romantic science

*Week 5: The industrial revolution (February 6th)*

Lecture 5a: Steam engines, telegraphs, and Victorian science
Lecture 5b: Energy and empire

*Week 6: Natural history (February 13th)*

Lecture 6a: Geology, time, and natural theology
Lecture 6b: Darwin and his impact

*Week 7: The rise of the human sciences (February 20th)*

Lecture 7a: Measuring the human
Lecture 7b: Freud and the sciences of the mind

*Mid-semester break*

*Week 8: Mass production (March 5th)*

Lecture 9a: Technological systems
Lecture 9b: Workers, factories, products
Week 9: A new physics (March 12th)

Lecture 8a: Einstein and relativity
Lecture 8b: From classical to quantum

Week 10: Science and war (March 19th)

Lecture 10a: From chemistry to physics
Lecture 10b: The cold war and the military-industrial complex

Week 11: Information / technology (March 26th)

Lecture 11a: The rise of the computer
Lecture 11b: From the ARPANET to the World Wide Web

Week 12: Asia and 20th century technology (April 2nd)

Lecture 12a: Japan’s postwar miracle
Lecture 12b: Rise of the ‘Asian Tigers’

Week 13: New frontiers of innovation (April 9th)

Lecture 13a: Biotechnology
Lecture 13b: Nanotechnology

Readings:

Week 1: Introduction

• Thomas Kuhn, The structure of scientific revolutions (Chicago, IL: University of Chicago Press) [“Introduction: Role for History” (pp. 1-9) and “The Nature and Necessity of Scientific Revolutions” (pp. 92-110)]

Week 2: The scientific revolution

• Steven Shapin (1996) “What was known?” The scientific revolution (Chicago, IL: University of Chicago Press): 15-64.
• Isaac Newton (1687 [1729]) Principles of natural philosophy [Author’s preface (5pp.) and “Axioms or General Laws of Motion,” (pp. 19-21), available on GoogleBooks]

Week 3: Beyond Europe

• Nathan Sivin, 1982, “Why the scientific revolution did not take place in China – or didn’t it?” Chinese science 5: 45-66.

Week 4: Natural philosophy and the Enlightenment

• Antoine Lavoisier (1798), Elements of chemistry [available at Project Gutenberg, http://www.gutenberg.org/files/30775/30775-h/30775-h.htm , Chapter 3]
• Alexander von Humboldt (1807) “Essai sur la géographie des plantes,” Paris/Tübingen [selections]

Week 5: The industrial revolution

• Frederick Engels (1845). *The condition of the working class in England in 1844* [“Introduction,” pp. 50-65]
• Charles Babbage, *On the economy of machinery and manufactures* [selections]

*Week 6: Natural history*

• Janet Browne, *Charles Darwin: The power of place* [“Stormy waters,” pp. 3-42]
• Charles Darwin (1859) *On the origin of species* [Chapter XIV: Recapitulation and conclusion, pp. 371-396]
• William Kirby (1835). *The habits and instincts of animals with reference to natural theology* [Chapter 1: The history, habits, and instincts of animals, pp. 1-43]

*Week 7: The rise of the human sciences*


*Week 8: Mass production*


*Week 9: The new physics*


**Week 10: Science and war**


**Week 11: Information / technology**


**Week 12: Asia and 20th century technology**


**Week 13: New frontiers of innovation**

