<h1 class="pageTitle">HIS20780 History of Science</h1>
<h2>Academic Year 2019/2020</h2>

This module provides a broad outline of the history of science, from ancient times to the present, and incorporates a number of fields of study that we today consider to be scientific. It traces a line from the earliest conceptions of the universe to the evolving views of mankind's relationship with his world, through the Scientific Revolution to current and emerging scientific theories that challenge our very notions of reality itself. The course addresses the question of what counts as science, and
whether this has changed over time. What, for example, would the idea of science or scientific endeavour have meant to the earliest geographers, zoologists or mathematicians? What is a scientific revolution? How does the history of science confirm or challenge our ideas of historical narratives?

The module covers the history of several areas of science, including: Natural Philosophy, Astronomy, Botany, Zoology, Medicine, Anatomy & Dissection, Physiology, Animal Science & Veterinary Medicine, Alchemy, Chemistry, Biology, Physics, Atomic Theory & Quantum Mechanics, Geology, Evolution, Genetics, Environmental Science, Climatology, Philosophy of Science

Curricular information is subject to change

What will I learn?

Learning Outcomes:
On completion of this module students should be able to:
- Assess the role of scientific practice in the development of society from ancient times to the present.
- Examine the validity of traditional narratives of the history of science and the Scientific Revolution, and identify important milestones and events.
- Demonstrate understanding of the historiography of the history of science.

Indicative Module Content:
Lecture 1. Views of the Cosmos I: Babylon to the Ptolemaic Universe, c.3000 BCE-150 CE: Introduction: What is the History of Science? The Cradles of Civilisation and the emergence of mathematics; Babylonian star catalogues and the origins of western astronomy; ancient concepts of the universe; Pythagorean and Aristotelian models in ancient Greece; Ptolemy's geocentric model and the sphere.
Lecture 2. The Life Sciences: Ancient Greece to the Roman Empire, c.350 BCE-c.500 CE: Early medicine and natural science in Asia and Europe; Animal husbandry and care; Aristotle's biology; teleology and zoology in the Hellenistic period; natural history in the Roman empire, from Lucretius to Galen; Isidore of Seville.
Lecture 3. Science in the Islamic Golden Age, 786-1258 CE: Science in the Umayyad and Abbasid caliphates; medieval Islamic contributions to mathematics; transmission of knowledge to Europe; astronomy and cosmology in medieval Islam; Zakariya al-Qazwini and the Marvels of Creatures and Strange Things Existing; Islamic cartography.
Lecture 4. Scientific Endeavour in Europe in the Middle Ages, c.900-1453 CE: Science in Europe in the middle ages; Greek and Arabic influences; science and the medieval university; scientific and technological innovation in the 12th century; rediscovering the classics; medical and veterinary texts.
Lecture 5. Science in a New World, 1492-1700 CE: The Portuguese discoveries and the dawn of astronomical navigation; understanding a new continent; natural history in 16th-century Spanish America; empirical practices in the service of the Spanish Empire; natural science and medicine in Portuguese and Dutch Brazil; the Columbian Exchange; did Portugal and Spain contribute to the Scientific Revolution?
Lecture 6. Scientific Revolution I: The Renaissance to Descartes, c1450-1650: the printing press and its impact on scientific work; sensory experience and the rejection of the Classics; medicine and veterinary practices in early modern Europe; Paracelsus and chemical medicine; the anatomy and physiology of Vesalius and Harvey; new methodologies: Francis Bacon and the Scientific Method; the work and legacy of René Descartes
Lecture 7. Views of the Cosmos II: Scientific Revolution II from Copernicus to Newton, 1543-1687: 16th-century concepts of the universe; Copernicus and the heliocentric universe; the Copernican Revolution: Tycho Brahe, Johannes Kepler and Galileo Galilei; Robert Boyle and experimentalism; Isaac Newton and the Principia Mathematica.
Lecture 8. Enlightenment and Empire, c.1700-1815: The influence of scientific societies and academies in England and France; the evolution of natural philosophy; science as a tool of social reform; dissemination and the popularisation of science; literacy and popular science in print; science and imperial stimulus; the Chemical Revolution; scientific innovation and the Industrial Revolution.

Lecture 9. Uncovering the Ancient Earth: the Origins of Geology, the Darwinian Revolution, and Biology in the Modern Age c.1750-1953: debates on the age of the Earth; natural history in the 19th century; Jean-Baptiste Lamarck and 19th-century evolutionary theory; Alfred Russel Wallace and Charles Darwin s theory of natural selection; On the Origin of Species; the aftermath of Darwin; science and war in the 20th century; Mendel and the emergence of genetics; DNA and the double helix.
Lecture 10. The Atom, the Cat and the Bomb Atomic theory and Quantum Mechanics, c.1827-1960: Brownian motion: antecedents; John Dalton and the dawn of modern atomic theory; the discovery of the electron; Marie Curie and radioactivity; Ernest Rutherford and the Geiger Marsden experiment; Niels Bohr, Werner Heisenberg and the Copenhagen interpretation; Schrödinger s cat; nuclear fission and the Manhattan project; Richard Feynman and the emergence of QED.
Lecture 11. Views of the Cosmos III: From the Big Bang to the Holographic Universe, c.1929 to the present: Edwin Hubble and the expanding universe; Fred Hoyle s helium problem; Steady State vs. the Big Bang; the afterglow of creation; Paul Dirac and antimatter; quantum foam, the multiverse and the many-worlds interpretation; the holographic principle.
Lecture 12. Ecology, Environment and Climate Change, 1800 to the present: What is Environmental History? 18th-century precursors to environmentalism; Thomas Robert Malthus and the social theory of population dynamics; Alexander von Humboldt: botanical geography, Naturgemälde and climate change; Empire, industry and nature in the 19th century; Environmentalism in the 19th and 20th centuries; Climatology, 19th century to the present.

How will I learn?

Student Effort Hours:

Student Effort Type	**Hours**
Lectures	11
Seminar (or Webinar)	11
Specified Learning Activities	45
Autonomous Student Learning	45
Total	**112**

Am I eligible to take this module?

Requirements, Exclusions and Recommendations

Not applicable to this module.

Module Requisites and Incompatibles

Not applicable to this module.

How will I be assessed?

Assessment Strategy

Description	Timing	Open Book Exam	Component Scale	Must Pass Component	% of Final Grade
Essay: 1,000 word essay	Varies over the Trimester	n/a	Graded	No	40
Assignment: 2,000 word essay	Coursework (End of Trimester)	n/a	Graded	No	60

Carry forward of passed components
No

What happens if I fail?

Remediation Type	Remediation Timing
Repeat	Within Two Trimesters

Assessment feedback

Feedback Strategy/Strategies
* Feedback individually to students, post-assessment

How will my Feedback be Delivered?
Feedback on the mid-term Essay Plan Assignment is given in writing on the returned hard-copy. Feedback on the end-of-semester Essay Assignment is given by appointment in one-to-one meetings.

Reading List

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<h1 class="printOnly"><img src="https://www.ucd.ie/t4cms/ucdcollegesandschools_logo.png"> UCD Course Search
History of Science (HIS20780) </h1><h3 class="printOnly">Academic Year 2019/2020</h3> The information contained in this document is, to the best of our knowledge, true and accurate at the time of publication, and is solely for informational purposes. University College Dublin accepts no liability for any loss or damage howsoever arising as a result of use or reliance on this information.
<h4 class="noPrint">History of Science (HIS20780)</h4>
<dl>
<dt>Subject:</dt>
<dd>History</dd>
<dt>College:</dt>
<dd>Arts & Humanities</dd>
<dt>School:</dt>
<dd>History</dd>
<dt>Level:</dt>
<dd>2 (Intermediate)</dd>
<dt>Credits:</dt>
<dd>5.0</dd>

<dt>Trimester:</dt>
<dd>Autumn and Spring (separate)</dd>
<dt>Module Coordinator:</dt>
<dd>Professor Robert Gerwarth</dd>
<dt>Mode of Delivery:</dt>
<dd>Face-to-Face</dd>
<dt>Internship Module:</dt><dd>No</dd>

<dt>How will I be graded?</dt>
<dd>Letter grades </dd>

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