HR903-10 BioScience, Politics & Social Acceptability

22/23

Department
Life Sciences
Level
Taught Postgraduate Level
Module leader
David Chandler
Credit value
10
Module duration
2 weeks
Assessment
100% coursework
Study location
University of Warwick main campus, Coventry

Description

Introductory description

Science and technology have a central place in modern society. Since the end of the second world war, scientific research has led to unparalleled developments in medicine, agriculture, manufacturing, transport, computing, communications, energy production, to name but a few. These changes have driven increases in the standard of living, health and wellbeing of many people. However, at the same time, the expansion of modern, industrialised economies has led to significant pressure being placed on the environment (though climate change, ocean acidification, biodiversity loss, and disruption of biogeochemical cycles). In addition, science and technology are being viewed increasingly as a threat by some sectors of society, particularly where they are considered to impact negatively on the sanctity of life, public health, privacy, democracy and personal freedom. In these cases, controversies arise which lead to public disputes and raises complex ethical questions. There are related issues about how science and technologies can best be regulated and used for common good in a globalised world in which enlightenment values are increasingly being questioned.

Scientists play a critical role in these issues, both in terms of developing new scientific discoveries and technologies in universities, institutes and industry, and also by acting as government policy advisors, regulators, communicators, or working for NGOs and pressure groups. Sometimes,

scientists have conflicting roles as the originators and advocates for new technologies, as well as being the safety and risk assessor for the same technologies. The pressure to publish novel and groundbreaking findings can lead to some scientists publishing work that is incorrect, not repeatable, or interpreted in a particular way to grab headlines. These issues have generated questions about trust in scientists, the reliability of scientific evidence, and its ownership.

Module web page

Module aims

Understanding the relationship between science and general society is an important part of the education of our science graduates, therefore. In this module we explore the societal drivers for a range of ethical issues concerning science and technology, particularly for issues involving bioscience and environmental science. We discuss how an understanding of ethics can be used to gain new insight into controversial science/society issues. We explore how modern science is funded, regulated and communicated. Examples of controversies explored in the course include GM crops, food safety (BSE), over-exploitation of natural environmental resources, and climate change.

This aim of the module is improve participants' understanding of ethical concerns and disputes over science and technology. The philosophy of science will be discussed to describe the process of scientific research, which increases knowledge but also involves uncertainties and limitations of scientific evaluation in terms of hypothesis testing and modelling, and the apparent uncertainty of risk assessment. Science is governed by a compact between society and science but the privileged position of science is under question. New models are sought to increase communication and understanding between science and society (involving individuals, NGO's, commerce and governments).

Outline syllabus

This is an indicative module outline only to give an indication of the sort of topics that may be covered. Actual sessions held may differ.

1. Introduction. Describe and discuss the role of science in modern society, the media and business. Identify the benefits from science and technology as well as the risks to people, society and the environment including from emerging technologies.
2. History of the development of the modern scientific method. Introduction to the philosophy of science. Science as a social enterprise. Criticisms of the scientific method.
3. Funding and management of science in modern society. Investment in R&D in different countries. Basic versus applied science and the linear science policy model.
4. Understanding our relationship with risk, and how modern, technology-driven society presents a wide range of risks and uncertainties for people.
5. Introduction to ethics and bioethics. Exploring ethical issues using case studies. Describe different ethical issues concerning science, society and the environment. Describe different ethical theories used by philosophers. Explain what is meant by an ethical matrix and how it is used.
6. Science, government, and evidence based policy making. Explain what is meant by evidence-based policy making. Debate the need for regulation of science and technologies.

Show how scientific and ethical advice is made available to policy makers. Identify advisory bodies and their roles.

7. Global challenges on the environment. Explain the root causes for different global environmental pressures (climate change, biodiversity loss, threats to food security). Categorize different attitudes to the environment and views on how humanity should proceed in the face of environmental problems. Discuss and identify the possible reasons why governments and individuals have not yet acted sufficiently to prevent dangerous levels of climate change, according to the latest scientific advice.
8. Food safety and the BSE crisis. Describe the UK BSE crisis, what caused it and what were the consequences.
9. GM crops and the globalisation of agriculture. Explain what GM crops are, and describe the perceived costs and benefits of GM crops. Explain and discuss how the debate around GM has been influenced by different actors including GM industry and environmental groups.
10. Science communication 1. Models of science communication, the role of the media, popular science journalism. Describe the different ways in which science is communicated and the actors involved. Be able to summarise a peer review scientific paper for readers of a popular science magazine. Critically analyse scientific papers from peer review journals, develop conclusions and compare them with reports of the papers in the popular press.
11. Science communication Explore the development of the modern scientific publishing industry. Is academic research reliable? The relationship between the general media and specialist scientific publications.

Learning outcomes

By the end of the module, students should be able to:

- Demonstrate understanding of ethical questions concerning science, technology or the environment.
- Be able to identify the participants involved in specific ethical questions and explain their roles / motivations.
- Be able to recognize and explain conflicts of interest between participants.
- Be able to combine normative ethical theories with knowledge of natural science in order to identify insights or potential solutions to ethical questions involving science, technology and the environment.
- Be able to explain the challenges faced by governments and other actors involved in developing and regulating science and technology.
- Understand how science is communicated in different ways, including within the scientific community and to the wider public.

Indicative reading list

Ben Mepham (2008) Bioethics : an introduction for the biosciences. Oxford University Press.

Bioethics for Scientists, edited by John Bryant, Linda Baggott la Velle, and John Searle (2002).

William Coleman, Wyn Grant, and Tim Josling (2004) Agriculture in the new global economy. Edward Elgar.

Paul R. Ehrlich, Anne H. Ehrlich (1998) Betrayal of science and reason : how anti-environmental rhetoric threatens our future. Island Press.

Sakiko Fukuda-Parr (2007) The gene revolution : GM crops and unequal development. Earthscan.

Anthony Giddens (2009) The politics of climate change. Polity Press.

Aynsley Kellow (2007) Science and public policy : the virtuous corruption of virtual environmental science. Edward Elgar.

Samir Okasha (2002) Philosophy of science : a very short introduction. Oxford University Press.

Mark Erickson (2005) Science, culture and society : understanding science in the twenty-first century. Polity.

Subject specific skills

Demonstrate understanding of ethical questions concerning science, technology or the environment.

Identify the participants involved in specific ethical questions concerning the biosciences and explain their roles / motivations.

Combine normative ethical theories with knowledge of natural science in order to identify insights or potential solutions to ethical questions involving science, technology and the environment

Explain the challenges faced by governments and other actors involved in developing and regulating science and technology.

Transferable skills

Recognise and explain conflicts of interest between participants.
Understand how science is communicated in different ways, including within the scientific community and to the wider public.

Study

Study time

Type	Required
Lectures	3 sessions of 1 hour (3%)
Seminars	5 sessions of 1 hour (5%)
Practical classes	17 sessions of 1 hour (17%)
Placement	75 hours (75%)
Total	100 hours

Private study description

No private study requirements defined for this module.

Costs

No further costs have been identified for this module.

Assessment

You do not need to pass all assessment components to pass the module.

Assessment group A5

	Weighting	Study time	Eligible for self-certification
Assessed Seminar Seminar Presentation.	40%	10 hours	No
Essay	60%	15 hours	Yes (extension)

Feedback on assessment

Written feedback on essay and seminar.

Availability

Courses

This module is Core for:

- Year 1 of THRA-D4A1 Postgraduate Taught Environmental Bioscience in a Changing Climate
- Year 1 of THRA-D4A3 Postgraduate Taught Food Security

This module is Optional for:

- Year 1 of TCHA-F1PC Postgraduate Certificate in Transferable Skills in Science
- Year 1 of ULFA-C1A2 Undergraduate Biochemistry (MBio)
- Year 1 of ULFA-C1A1 Undergraduate Biological Sciences (MBio)
- Year 1 of ULFA-C1A3 Undergraduate Biomedical Science (MBio)

This module is Unusual option for:

- Year 1 of TCHA-F1PE Postgraduate Taught Scientific Research and Communication

This module is Option list A for:

- Year 1 of TCHA-F1PD The Warwick Postgraduate Award in Transferable Skills in Science