Ideas that have their origin in what we call the “scientific revolution” have radically altered the ways in which we view every aspect of our existence, from the ways we look at the world we live in and the other organisms that inhabit this planet, to how we view ourselves and our place in the cosmos. Indeed, the new tools and perspectives of scientific enquiry have forced us to almost constantly have to reassess what it means to be human. Such is the power that science has given us, not only over the external natural world, but over ourselves, it is unsurprising that many people feel a deep sense of ambivalence about science, its achievements, and its practitioners.
Assessment

READ THIS!!
Note: All written work be submitted to www.turnitin.com. You must ALSO submit a hard copy AS WELL in the first class period that follows the due date. Work that is not received in both formats will be deemed not submitted. You should – as with all your work – ensure you keep a copy yourself.

Deadlines:
You must submit your essays to www.turnitin.com by midnight of the due date. These deadlines are non-negotiable, and www.turnitin.com will not accept late submissions.
Late assignments will be graded F: 0%.

➤ Take-Home Reading Write-Ups: (5x10%) = 50%
You should complete at least five of these. The aim of these short writing assignments is twofold. First, they aim to test your understanding of the readings, lectures and discussions for the week and to this end will ask questions that allow you to show that you have a grasp of the author’s intentions. You will also be asked to comment upon what you found interesting about the reading. Secondly, they are intended to help you to improve your academic writing. Thus all assignments should obey accepted academic standards (i.e.: be fully referenced, include a full bibliography, be well written and well structured).

Your paper should be no more than three and no fewer than two double spaced pages in length. Please use a legible font (I suggest Times New Roman), and all work should be submitted in 12 pitch. You will be asked to answer a number of set questions, you should aim to write one full and coherent paragraph on each, giving citations as relevant, to support the points you make.
These will be due on the first class of the following week.

Your best 5 will count towards your final total. Please note, there is no opportunity for late or retrospective submissions.

➤ Mid-Term and Final Essay examination (2x25%) = 50%
You will write one mid-term and one final essay of six (6) pages (double-spaced, 12pt pitch). You will be given a list of specific questions from which to choose one. In writing your essay you will be expected to show a thorough and detailed knowledge of the relevant readings, lectures, and discussion from this course. Please refer to the grading standards sheet at the back of the syllabus and consult with your instructor for further information.

[midterm essay: set on March 9th, due on March 23rd, Final Essay will be set in the last class, and will be due on 14 May.]

NOTE: Attendance in this course is mandatory. If you miss more than three class sessions without a documented medical excuse you will be penalised by 3% for each subsequent missed class period.
Course Formalities and Expectations

Attendance and Participation:
Attendance in class is mandatory. If you have good cause to miss class, it is imperative that you discuss this with your instructor BEFOREHAND. **NOTE:** Attendance in this course is mandatory. If you miss more than three class sessions without a documented medical excuse you will be penalised by 3% for each subsequent missed class period.

OU policies on reasonable accommodation, and codes of behaviour:

Reasonable Accommodation Policy
Any student in this course who has a documented disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

Codes and Policies of Behaviour
Each student should acquaint his or her self with the University's codes, policies, and procedures involving academic misconduct, grievances, sexual and ethnic harassment, and discrimination based on physical handicap.

Academic Integrity and Plagiarism:
Plagiarism is the unacknowledged appropriation of someone else’s words, ideas, or work, which is then represented as your own. **Plagiarism will not be tolerated and carries significant and serious penalties. At a minimum you will receive 0% for the assignment, and your name put on record. It is possible that you might receive 0% for the course, and in extreme cases may be suspended or even expelled from the University.** You are therefore strongly recommended to educate yourself regarding what plagiarism is and how to avoid it. Your instructor and/or teaching assistants will be happy to advise you on this matter if you are in any doubt.

**NB:** Be aware that ignorance of what constitutes plagiarism will not be accepted as an excuse for it. If at any time you are unsure of how to cite material, your instructor or writing centre staff will be happy to advise you.
**CLASS SCHEDULE**

Please Note: All readings should be completed before the week’s classes.

**Week One:**  
**Tuesday 19th January:** What is science? What is the history of science and why is it important?

Some questions to think about:  
(i) What is “science”  
(ii) How does “scientific knowledge” differ from other forms of cultural knowledge?  
(iii) Is scientific knowledge true and/or objective?  
(iv) What does it mean to say that science has a history?  
(v) What is the relationship between science and technology?  
(vi) What is the relationship between science, technology, and society?

**Thursday 21st January:** *Science, Technology, and Society in the 17th Century.*  
Reading:  
No set reading for this class.

**Week Two:**  
**Tuesday 26th January:** Reading:  

**Thursday 28th January:** Galileo’s discoveries, “patronage”, politics and 1615.  
Reading:  
No set reading for this class.

**Week Three:**  
**Tuesday 2nd February:**  
*Galileo, Science and Religion and the Trial of 1633.*  
Reading:  

**Thursday 4th February:** *The Re-Trial of Galileo* and the Legacy of the “Galileo Affair”.  
Reading:  
No set reading for this class.

*Writing Assignment 1:*  
(i) Briefly summarise Galileo’s main argument in his letter to Christina.  
(ii) What was the primary issue at stake in Galileo’s problems with the Roman Church?  
(iii) What does Galileo say in his Letter to Christina about the relationship between science and religion?  
(iv) What is “patronage”, and why was it significant in seventeenth century science?  
(v) Comment on what you found most interesting or important about this reading.
**Week Four:**
**Tuesday 9th February:** Francis Bacon: The Man and the Method.

**Thursday 11th February:** Isaac Newton: His science and his philosophy of science.
Reading: Isaac Newton, extracts from *The Principia*.

*Writing Assignment 2:*
(i) What do you think were Bacon’s intentions in writing this document?
(ii) What are the “idols” that Bacon discusses?
(iii) Describe briefly the main aspects of Bacon’s conception of Induction.
(iv) What does Newton say about hypotheses?
(v) What are the differences between Bacon and Newton’s ideas on inductive reasoning?
(v) Comment on what you found most interesting or important about these readings.

**Week Five:**
**Tuesday 16th February:** Robert Boyle and the sociology of factual science.
[Chapter Two, “Seeing and believing”, extracts]

**Thursday 18th February:** Natural Theology and the “argument from design”
Reading: William Paley, *Natural Theology*, (1802), [excerpt.]

**Week Six:**
**Tuesday 23rd February:** Science, Technology, and the Politics of Industry: The discovery of scarcity and its solution.

**Thursday 25th February:** Geology: Time, Change and Extinctions. The History of Natural History.
Reading: Georges Cuvier. *Theory of the Earth* (1813) [extract].
Charles Lyell. *Principles of Geology*, (1830) [extract].

*Writing Assignment 3:*
(i) What is Shapin and Schaffer’s main argument in *Leviathan*?
(ii) What is ‘Natural Theology’, and is it science? Why/Why not?
(iii) What was the central argument of Malthus’ 1798 *Essay on Population*?
(iv) Adam Smith makes a number of assumptions about human nature. Describe one.
(v) Define the following: ‘uniformitarianism’, ‘catastrophism’, ‘actualism’
(vi) What have you found most interesting about one of these readings?
Week Seven:
Tuesday 2nd March: *William Whewell’s Philosophy of Science*
Reading:
William Whewell, *The Philosophy of the Inductive Sciences* [1840], [extract].

Thursday 4th March: ‘1859 and all that’: Charles Darwin and *On the Origin of Species* (1859)
Reading:

Week Eight:
[MID-TERM ESSAY SET TODAY]
Tuesday 9th March: *Natural Selection.*
Reading:

Thursday 11th March: No class today. Dr. Hale is away.

Week Nine:

😊 😊 😊 Spring Break 😊 😊 😊
March 13th – 21st

Week Ten:
Tuesday 23rd March: *Religious Responses to Evolution, in England: Charles Kingsley*
Reading:
Charles Kingsley, *The Water Babies* (1863) [extracts].

Thursday 25th March: *Religious Responses to Evolution: and America: Asa Gray*
Reading:
Charles Darwin Correspondence with Asa Gray
Charles Darwin *Autobiography* [excerpt]
Charles Darwin *Variation of Animals and Plants*. [excerpt]

*Writing Assignment 4:*
(i) What does Whewell mean by “the concilience of inductions?”
(ii) In what way did Whewell influence Darwin’s writing of *Origin of Species*.
(iii) Describe the mechanism of natural selection that Darwin proposed in *Origin*.
(iv) How did Kingsley reconcile Darwinian evolution with his Anglican faith?
(v) What was Darwin’s point in his famous “stone house” analogy?
(vi) Which of these readings have you found most interesting, and why?

Week Eleven:
Reading:
Thursday 1st April:  *The Mechanistic Conception of Life*  
Reading:  
Jacques Loeb, “The Mechanistic Conception of Life.” [extract].

**Week Twelve:**  
Tuesday 6th April:  *Eugenics Old and New.*  
Reading:  
Harry Laughlin, “Eugenical Sterilisation in America.” (1926)  
Troy Duster, *The Backdoor to Eugenics.*

Thursday 8th April:  *Life, Liberty and the Limits of Human Dignity?*  
Reading:  

**Week Thirteen:**  
Tuesday 13th April:  *Enhancing Evolution*  
Reading:  

Thursday 15th April:  *Big Science: Science Technology and War*  
Reading:  

*Writing Assignment 5:*
(i) What analogies does Harry Laughlin draw to already existing legislation in his argument that eugenic sterilisation is not unconstitutional?  
(ii) What does Duster mean by “the backdoor to eugenics”?  
(iii) What is Leon Kass’ main argument against human cloning?  
(iv) What is John Harris’ main argument in favour of the moral acceptability of genetically enhancing humans?  
(v) According to Rhodes, what does Michael Polanyi say about the nature of scientific practice in this period?  
(vi) Comment on what you found most interesting about these readings.

**Week Fourteen:**  
Tuesday 20th April:  *“Do Artefacts Have Politics?”*  
Reading:  
Thursday 22\textsuperscript{nd} April: \textit{Silent Spring and the President’s Advisory Committee on Pesticides, 1963.}

Reading:
Rachel Carson, \textit{Silent Spring}. 1962. [extracts]
“The Silence, Miss Carson” Review of \textit{Silent Spring} by Dr. William J. Darby.
“The Impending Emergence of Ecological Thought”, Review of \textit{Silent Spring} by LaMont C. Cole, Ecological Society of America.

Week Fifteen:
Tuesday 27\textsuperscript{th} April: \textit{The Death of Nature. A feminist critique of the scientific method.}

Reading:

Thursday 29\textsuperscript{th} April: \textit{The Origins of Our Environmental Crisis}

Reading:

Week Sixteen:
Tuesday 4\textsuperscript{th} May: \textit{Environmentalism and the (re) discovery of scarcity.}

Reading:
For Hardin’s article and further information see the Garrett Hardin Society website at: http://www.garretthardinsociety.org

Thursday 6\textsuperscript{th} May: \textit{The History of the Science of Global Warming}
*[NB: Final essay exam will be set today]*

Reading:
Spencer Weart. \textit{The Discovery of Global Warming}. 2003. [extract].

*Writing Assignment 6:*
(i) What does Winner mean when he says that “artefacts have politics”?
(ii) What were the main criticisms made against Rachel Carson’s \textit{Silent Spring}?
(iii) What does Carolyn Merchant argue in her book \textit{The Death of Nature}?
(iv) According to Lynn White, what are the origins of what he calls the environmental crisis?
(v) What is “the tragedy of the commons”?
(vi) What does Spencer Weart’s chapter tell us about the nature of scientific enquiry?

Thursday 14\textsuperscript{th} May: *(Final Essay due)*.
Please submit to turnitin.com and deliver a hard copy to PHSC Rm. 625 before 4:30pm.
Tips on Effective Essay Writing

Since writing an effective essay is not a straightforward task, and improving your essay technique is one of the most important skills you will learn during any class, here are some initial suggestions:

First write some general notes on what you already know about the subject of your essay, outlining the most striking points (be careful to keep a record of the page numbers and full citation details of the sources you use – you will need them). Think why these points are so important, and what they entail for the particular methodological or ethical approach with which you are concerned. Then turn to the notes taken during class and to the set readings themselves, as well as any further background readings you may have identified through bibliographic surveys. Continually re-examine your list of striking features and the organisational structure you have imposed upon them, and think how these materials might help you to articulate your analysis more clearly. When you are ready, sketch an outline of your argument, and then write your first draft. Make sure that to the best of your knowledge there are no logical gaps in your argument. If you can identify some, go back to the literature to see if you can close them. This second look at the literature (and your reading notes) is important. Once you have constructed a hypothesis, you will be able to test it against the arguments of the various authors, and to find those who support your case, and those who are your opponents. (note: having your own hypothesis is the point at which the essay truly becomes your own contribution to the debate – having your own thesis is when you can expect to reach the higher grade levels in terms of assessment). You are then ready to proceed to the second phase.

Writing multiple drafts is a good way to produce a good essay, especially if you can gain some distance from early drafts, for example, by having someone else read them. (note: this is not something that can be done the evening before the essay is due). This is how professional academics work, and so you should try to do so too. You are encouraged to exchange your essays with one another and discuss your work with your colleagues as the course progresses. You should be aware that essays written the night before they are due invariably read like they were written the night before they were due, and as a result often appear ill-considered, disorganised, and incoherent. You should aim to manage your time to allow for at least two drafts and revisions. This will pay significant dividends in terms of the quality of your submitted work, and correspondingly, with the grade you can expect.

What makes a good essay

Introduction and argument: A good essay does not simply summarise the argument of the text(s) under examination. It also involves you constructing a coherent narrative about how those texts relate to a broader argument of your own. So, a good essay might start off with a short introduction to the particular element of the topic that you discuss. This might be followed with a similarly brief account of what you intend to say and how you intend to convince the reader of your argument, which brings us to the importance of clear organisation.

Argument and organisation: A good essay should not simply be a list of points about the subject under examination, all arranged in a haphazard manner. It should instead take the reader step by step through the argument so that they will end up seeing the logical progression of your narrative, even if they might not agree with your conclusions. This means that after a good introduction, each subsequent paragraph should introduce one particular idea about the episode and finish with a statement that prepares the reader for the next paragraph and its particular idea. These paragraphs should be arranged in a logical sequence that
takes the reader from the introduction to the conclusion, which means, of course, that the paragraphs should not contradict each other. A good organisation of these steps then depends critically on a very clear understanding of your essays’ aims and objectives. A clear understanding of your readers’ likely assumptions is equally important to avoid their misunderstanding any part of your argument. Think of it as a chess game, and so always try to put yourself in your readers’ shoes! Do not annoy them unnecessarily by forcing them to ask ‘where is this essay going?’

**Evidence:** A good essay should not only be a logical argument, but it should have the aim of convincing your reader of your point of view. To this end each point of the argument should be backed by evidence from the literature you have consulted, as is appropriate to the specific point being made. Importantly, direct quotes or paraphrases of the text or other literature should be carefully referenced, in footnotes and in a full bibliography of all works cited.

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**Preferred reference style**

**Article:** First name(s), Last name(s), “Title,” *Journal Title*, Volume, (Year), Page-Page, on p. XXXX or pp. XXXX-XXXX (if you are quoting or referring to specific passages).

**Book:** First name(s) and last name(s), *Title*, (Place of publication: Publisher, Year), Page (p. XXXX) or pages (pp. XXXX-XXXX).

**Essay in an edited collection:** First name and last name, “Title”, in First name(s) and last name(s) (ed. or eds.), *Title*, (Place of publication: Publisher, Year), Page-Page, on p. XXXX or pp. XXXX-XXXX (if you are quoting or referring to specific passages).

**Web site:** http://www. (Full site address): First name(s) and last name(s), “Title”, Date accessed.

Importantly, use these styles for the first reference the sources, and then use an abbreviated form, such as: Last name, ‘Title’, on p. XXXX or pp. XXXX-XXXX.

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Accurate referencing is not simply a matter of avoiding any accusation of plagiarism, but also of leaving open the possibility for your readers to explore the point you make in greater detail than is appropriate to the argument of your essay. It is perhaps needless to say, but you must always take care that your quotations or references support your point, and this may sometimes mean that you will have to explain how this is the case.

**Style:** A good essay should also be written well, attentive to syntax, grammar and spelling. This is not because your reader is pedantic, but because good syntax and grammar helps clarify your argument. For example, if you compare the passive statement ‘it was said that…’ with the active statement ‘so-and-so said that…’, in the second statement you are providing the reader with much more, possibly important information about ‘so-and-so’, and you will not beg questions about who exactly ‘said that…’. Also, when you write in one sentence that ‘so-and-so said’, and ‘so-and-so says’ in the next, your readers might wonder about chronology and the order of causes and effects. Wanting good spelling may seem even more
pedantic, but why risk aggravating your reader when you can use the spell-checker? Lastly, always have a
good dictionary at hand, because different words for the same concept often convey different meanings,
some of which may not fit well with the point you are making. (You should be aware however, that
common dictionary definitions of terms may lack the nuances of how we might interpret these terms from
a historical or analytical perspective (for instance a dictionary is unlikely to give adequate definitions of
“science” or “technology” for example). You might also consult subject specific dictionaries (A
Dictionary of Biology, for example). If you are in doubt about how an author is using a word, you should
feel free to ask.

You are encouraged to review each other’s work in progress, and to provide comments to the author on the
effectiveness of their argument. You should be aware that this is an important part of learning how to
write, (and to be a generous member of an academic community) and remember that a thorough review of
someone else’s essay probably benefits you more than the author, as you discover how others go about
their task and thus what might be the limitations of your own compositions.

The writing and the peer review of your essays in such a painstaking fashion will enable you to further
develop your research skills. You will improve the effectiveness of your handling of primary and of
secondary materials and thus your understanding of the historical significance of the development of
environmental thought. Moreover, you should find that the exercise helps you advance your ability to
analyse material and express an argument in a persuasive and informed manner.

And finally, a note on:
References:
Do you have enough of them? Each significant point you make should have a reference – either to the
source you have used as evidence to support your own argument, or to the source that shows where
another author has made the point under discussion. As a rough guide: if you are not making three
significant points in a page, you might want to. Thus three footnotes on a page would seem a fair
estimate.

References should be accurate and adequate: You should provide the authors name, the title, the date and
place of publication and the page number. See comments above for further explanation of referencing.

Wikipedia?:
While Wikipedia is often a good source of general information, it is not acknowledged to be a reliable or
scholarly source of information. Wiki often gives you references – chase them up and do your own
research!

Website research:
Online research is increasingly the first port of call for scholars; however, you should be aware that there
is a lot available on line that is of a poor quality, and a lot that is certainly not reliable in terms of
academic standards. Your subject librarians will be able to guide you in your search, and also give you
guidance as to how to cite various online sources. In general you should cite the title of the document, its
author, (assuming one is acknowledged), the full web address, and the date accessed. If you are
submitting your assignment electronically, you might also insert your reference as a link. In general,
though, if you are unsure as to the quality of the site you are looking at, cross-reference your information
with a source you know to be reputable.
## GRADING PRACTICES AND STANDARDS

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<td>87-89</td>
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**90% to 100% (A)**

“A” grade work is *exceptional*, showing strong evidence of original thinking and good organisation. The student will have shown a capacity to analyse and synthesize information, as well as a superior grasp of the subject matter in hand and an ability to make sound critical evaluations based upon an extensive knowledge base. Work of this standard should be well argued, well documented, and well written.

**80% to 89% (B- to B+)**

Work of this grade is *competent*, showing evidence of a reasonable-to-solid grasp of the subject matter. It should also show evidence of critical and analytical thinking. The work should also indicate a familiarity with the literature. It should be clearly written, accurate and coherent, including major points from the course material and an appreciation of their importance.

**70% to 79% (C- to C+)**

Work of this grade is of *adequate* performance, showing a fair understanding of the subject matter and an ability to develop solutions to simple problems in the material. It may include some errors and slight misconceptions, but should be indicative of a reasonable engagement with the course material. An acceptable although uninspired piece of work, it should not contain serious errors, but may lack style and vigour in its articulation.

**60% to 69% (D- to D+)**

Work of this grade is *adequate, but poor*. Poorly articulated and lacking in a coherent argument it may also lack sufficient documentation. Although it may provide some relevant information, it omits many important points and contains a number of substantial errors or misconceptions.

**00% to 59% (F) Inadequate.**

Work of this standard is *inadequate*, showing little or no understanding of the subject matter. Exhibiting little evidence of critical and analytic skills, this work contains only a limited or irrelevant use of the literature. Poorly articulated it is likely to lack coherence and be difficult to comprehend. Work of this grade is not of degree standard.