

Knowing and Making the World: the History of Science from the Ancients to the Moderns

(formerly known as 'Introduction to the History of Science')

HSTC 1200 / HSTC 2200 / SCIE 2000 / BIOL 3503 / HIST 2074

2014-2015

Course Syllabus

Instructors: Ian Stewart ian.stewart@ukings.ca tel: 422 1271 x 134
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Offices: Stewart: King's Gymnasium, (beside the King's Library) Room 204
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Office hours: Stewart: FALL TERM ONLY Tuesday, 10-11:30 am (or by appointment)
Mitchell: WINTER TERM ONLY Wednesday, 3:30-4:30 (or by appointment)

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Course format: Lecture & Tutorial

Lecture times: Mon. and Wed. 2:35-3:25 pm, Alumni Hall, King's Academic Building

Tutorial times: Wed. 3:35-4:25; Fri. 2:35-3:25 (various locations @ King's)

Course Overview

This class is a broad introductory survey of the central developments in the history of science. It examines the most important figures and theories from ancient Greece to our contemporary world, with a big emphasis on engaging with them *in their own words* (in translation where necessary, of course). In each period of history, the study of the natural world was central to the human pursuit of knowledge and culture. Students in the humanities will therefore find that this class not only helps clarify the nature of science, but also sheds light on the broader historical contexts of each period. Students in the sciences will discover the many ways their own studies are threads in the fabric of science's long history. In uncovering the sources and character of each of these transformations in the theory and practice of science, the class will challenge students to address their own assumptions about the nature and place of science in society, past and present.

Evaluation:

<u>First Term</u>			<u>Second Term</u>		
<u>Assignment</u>	<u>Worth</u>	<u>Due</u>	<u>Assignment</u>	<u>Worth</u>	<u>Due</u>
Test I:	7%	Week of Sept 29	Test III:	8%	Jan. 28, 30
Short Paper I:	10%	Mon., Oct 27	Short Paper II:	10%	March 2
Test II:	8%	Week of Nov. 10	Test IV:	7%	March 25-27
End-of-term exam:	20%	(Exam Period)	Final Exam	20%	(Exam Period)
Participation	5%		Participation	5%	

Grading Scheme

During this course assignments will be graded using the %-system (out of 100), which will be converted to a letter grade/GPA for your final grade at the end of the year. The following table outlines the conversion scheme, as established by the Dalhousie Senate, we follow:

<u>Range of % grade /100</u>	<u>Letter Grade</u>	<u>Grade Point</u>
90 +	A+	4.3
85–89	A	4.0
80–84	A–	3.7
77–79	B+	3.3
73–76	B	3.0
70–72	B–	2.7
65–69	C+	2.3
60–64	C	2.0
55–59	C–	1.7
50–54	D	1.0
< 50	F	0.0

Course format: Readings, Lectures, Tutorials

Readings: This course places a heavy emphasis on engaging with primary texts, that is, reading authors in their own words (albeit translated, where needed). This is often hard work, but usually a far more rewarding way to learn than reading modern ‘digests’, descriptions or textbook summaries. You are responsible for *all* the readings assigned in the reading/lecture schedule.

Reading and Lectures: If you don’t do the readings, you will get very much less out of lectures, which are intended to provide historical and interpretative background to the primary texts, and to set them in the context of the course as a whole.

Tutorials: Attendance at tutorials is mandatory. A participation grade will be assigned for each term (5%), based partly on attendance and partly on your contribution to tutorial discussion. Tutorials serve as the third hour each week of course instruction. Tutorials are your chance to review and ask questions concerning your readings or lectures of the week. Given the nature of the material in this course, and the pace with which it is covered, they are indispensable aids to your comprehension, and to your performance in tests, essays and exams.

Tests and exams

Tests and exams will be based on *all* readings and *everything* covered in lectures. Be sure to keep up week by week, as things will pile up if you don't. Tests will be held during regular tutorial time and will be geared toward the discussions taking place in each tutorial group; YET ANOTHER good reason to attend tutorial regularly.

Short papers

The short papers will be short and sweet (well-written, tightly argued, and in essay style). We will provide precise questions, from which you will choose 1 (one) as the basis of your short paper. If you are inexperienced in, or otherwise have difficulties writing well, your tutors are there to help you. Fear not!

Keeping academic term

Examination dates cannot be changed to accommodate travel plans. It is the obligation of each student to ensure that his or her travel arrangements do not conflict with either the tests or the end-of-term examinations. The keeping of academic term is the responsibility of every student.

NOTE: DO NOT make (nor let others make for you) travel arrangements prior to verifying that they do not conflict with evaluation dates of the course.

Extensions/accommodations will **not** be granted if you fail to do this.

Required Texts

- (1) Course Reader (a retext of selected readings)
- (2) David Lindberg, *The Beginnings of Western Science*, 2nd edition, (Chicago, University of Chicago Press, 2007)
- (3) Joseph Carroll, ed. *Darwin: On the Origin of Species*. (Peterborough: Broadview Press, 2003)
- (4) Watson, James, *The Double Helix: Text, Commentary, Reviews* (New York: W.W. Norton, 1980)

All texts are available at the King's Bookstore (one floor beneath the Alumni Lecture Hall, King's New Academic Building). Note that they are **not** available in the Dalhousie Bookstore.

Statement on Accommodations Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic under the human rights legislation. Students who require academic accommodation for either classroom participation or the writing of tests and exams should make their request to the Advising and Access Services Center (AASC) prior to or at the outset of the regular academic year. Please visit www.dal.ca/access for more information and to obtain the Request for Accommodation form.

A note taker may be required as part of a student's accommodation. There is an honorarium of \$75/course/term (with some exceptions). If you are interested, please contact AASC at 494-2836 for more information or send an email to notetaking@dal.ca

Please note that your classroom may contain specialized accessible furniture and equipment. It is important that these items remain in the classroom, untouched, so that students who require their usage will be able to fully participate in the class.

Lastly...some UNDESIREABLE stuff

Late papers and missed tests:

Late papers will lose 5% from their assignment grade per day, including weekends, to a maximum of 7 days. After 7 days the assignment will receive a ZERO. Essays must be submitted to Sharon Brown in the HSTC office, third floor, King's New Academic Building by 4:00pm on the day they are due. Essays submitted after the office closes will be considered as having been submitted on the next working day. Extensions and rescheduling of tests will be possible in the case of real exigencies (medical, family crises, religious holidays, etc), but must be requested from either course instructor (i.e., they will not be granted by your tutor) BEFORE the due date. Appropriate supporting documentation will be required for extensions to be granted.

Citation: All sources you used in writing assignments must be cited. Standard citation techniques can be found in any writing handbook, e.g., *The Chicago Manual of Style* or online at: <http://owl.english.purdue.edu/> . We don't much care which system you pick, so long as you are consistent. For web pages, you cite the specific URL (e.g., www.ukings.ns.ca). You *must* also keep a printout of the web page in case we need to see it.

Plagiarism: Penalties are harsh. Don't do it. For the definition of what constitutes plagiarism, please see the Dalhousie Calendar. A fuller explanation of plagiarism can be found in the 'Statement on Plagiarism' (below) that you are **required to read**. This is because all written work submitted for this course must include a signed "Certification of Authenticity" at the time of submission, placed on a separate page following the bibliography. It must be of the following format:

I certify that I have read the Statements on Plagiarism and Self-Plagiarism for this course, agree to abide by them and herewith confirm that this essay is wholly my own new and original work except where I directly quote from or allude to other sources, in which cases these sources are acknowledged through the use of full bibliographic citations and in no cases are the words of other writers placed in my essay verbatim without a clear indication that they constitute direct quotations.

Signature: _____

Submissions of work lacking this Certification will not be accepted. If you are unsure about any aspect of plagiarism, then see one of us ***before*** you hand in written work.

STATEMENT ON PLAGIARISM

Plagiarism

Plagiarism is a serious academic offence. King's College and Dalhousie University are serious about enforcing anti-plagiarism rules. Not only does plagiarism involve the inequitable use of another person's intellectual work, but it is not fair to the vast majority of fellow students who abide by the rules. Furthermore, plagiarists are themselves robbed of a good education and will be disadvantaged (by being ill-prepared) if they pursue graduate studies or any employment that involves original research and writing. It will also be difficult for an instructor to write a letter of reference or recommendation for a student who has been caught plagiarising and who has a notation indicating an academic penalties on his or her transcript.

All assignments must be *the sole work* of the student whose name is given on the assignment title page. Collaborative *writing* is not allowed either for take-home assignments or research essays. All quotations and significant theses taken from any source (print or Internet) must be fully referenced and presented as quotations with shorter quotations placed in quotation marks and longer quotations double indented. All sources cited, alluded to or in any way used in the production of your paper must be listed at the end of your paper in a separate bibliography. When alluding to (rather than directly quoting) the words of another author, that author's thoughts must be expressed in your own words and must also be cited. Placing the words of another author in your text without a clear indication (through the use of quotation marks or indentation in the case of longer quotations) is the most common form of plagiarism and must be avoided. Students are also not permitted to re-submit their own essays from other King's and Dalhousie courses without prior permission from the instructor (see "Self-plagiarism" below).

Every assignment and research paper in this course will be checked for plagiarism. The University has various means whereby it can identify plagiarism. The penalties for plagiarism can range from receiving a zero grade on the assignment and failing the course to expulsion from the University and even, in some circumstances, the revocation of a degree. In all cases where the Senate Discipline Committee has concluded that plagiarism has been committed, a citation noting that an academic offence has been committed may be added to the student's transcript (for a minimum of one year and often for two years). Such a notation on your transcript will delay entrance into graduate school or teachers' college and can also affect your ability to obtain a job. A failing grade is irreversible and will remain as an enduring legacy on your transcript. These are not merely hypothetical penalties; plagiarism cases are regularly identified at King's and Dalhousie and students *are* regularly penalised. It's simply not worth it. *Don't do it.*

Students should be aware that no sympathy will be shown by the Senate Discipline Committee towards those who claim that they did not know what plagiarism is, that they did not realise the penalties could be so harsh or that their plagiarised paper is merely an example of "sloppy citation techniques". Students should also understand that it is not the job of the instructor or the Senate Discipline Committee to assess motivation.

A confirmed case of plagiarism will be penalised regardless of motivation or putative sincerity. If any doubt remains as to what constitutes plagiarism, check with the instructor. All students are in any case advised to review the “Student Resources” section of Dalhousie’s plagiarism site (<http://plagiarism.dal.ca>) for further clarification about what constitutes plagiarism, guidance on time management and a list of possible penalties for infractions. However, students in this course are asked to ensure that their papers conform to the citation style for this course. Students are also encouraged to consult the statements on Intellectual Honesty in the current King’s and Dalhousie calendars.

Self-plagiarism

Resubmitting work you have already submitted for a mark in another course at King’s and Dalhousie is a different form of plagiarism known as self-plagiarism. Essays and other assignments that are self-plagiarised will at a bare minimum receive a zero grade. In certain circumstances it is possible to submit a paper on a theme similar to one treated in another paper for another course. However, the new work must be substantially different and in any case *prior permission must be sought* from the new instructor.

Certification of authorship page

On a separate page following the bibliography students are to print, sign and attach the following statement:

I certify that I have read the Statements on Plagiarism and Self-Plagiarism for this course, agree to abide by them and herewith confirm that this essay is wholly my own new and original work except where I directly quote from or allude to other sources, in which cases these sources are acknowledged through the use of full bibliographic citations and in no cases are the words of other writers placed in my essay verbatim without a clear indication that they constitute direct quotations.

Papers without this statement will not be accepted.

Research Records

Students are encouraged to keep a record of their research for their essays, as this will sometimes be required as evidence in cases of suspected plagiarism. Papers that utilise sources that are not in the Novanet system and that a student cannot show how he or she had access to them will raise suspicions. If Internet sources are used, students should retain print-outs of web articles cited or alluded to in assignments and papers. Students are reminded, however, that papers that rely heavily or exclusively on web sources generally receive lower grades than papers that employ a wider range of sources, including traditional ones. You will also need to be able to account for all your sources and be able to show that you obtained them at King’s, Dalhousie and/or through Novanet/Inter-Library Loans or present copies of any books that you own personally.

Reading & Lecture Schedule

FALL TERM

Monday, September 8

Course Introduction

Section A:	Ancient Foundations
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Wednesday, September 10

The (really) Ancient Greeks: early questions

Reading: Lindberg, ch. 2, pp. 21-34

Monday, September 15

Plato's World

Reading: Plato, selection from *Timaeus* [Reader]; Lindberg, ch. 2 (cont'd), pp. 34-44

Wednesday, September 17

The mathematical way of knowing

Reading: Lindberg, ch. 5; Euclid, selected propositions from *Elements*, [Reader]

Monday, September 22

Ancient Greek Medicine

Reading: Hippocrates, *Sacred Disease* [Reader]; Lindberg, ch. 6, pp. 111-19.

Wednesday, September 24

Aristotle's World

Reading: Aristotle, selection from *On the heavens* [Reader]; Lindberg, ch. 3

Monday, September 29

Why? According to Aristotle

Reading: Aristotle, selection from *Physics* [Reader]

Wednesday, October 1

Aristotle challenged: Epicurean atomism

Reading: Epicurus, selection from *Letter to Herodotus* [Reader]; Lindberg, ch. 4

TEST I: (held in regular Wednesday/Friday Tutorial)

Monday October 6

The Body according to Galen: Hellenistic medicine

Reading: Lindberg, ch. 6, pp. 119-131; Galen, selection from book Six of *On the usefulness of the parts* [Reader]

Wednesday, October 8

The anatomy of vision: Galen on the eye

Reading: Galen, selection from book Six of *On the usefulness of the parts* [Reader]

Reading: selection from Francis Bacon, *Instauratio Magna* [Reader]

Monday, November 24 **A new philosophy of nature II: René Descartes**
Reading: selections from Descartes' *Principles of Philosophy*; selection from *Treatise on light* [Reader]

Wednesday, November 26 **The new experimental science: Isaac Newton**
Reading: Newton's 'Letter to Oldenburg, February 6, 1672' [Reader]

Monday, December 1 **The new physics: Newton (cont'd)**
Reading: selection from Newton's *Principia* [Reader]

WINTER TERM

Section A: The Rise of Scientific Modernity

Monday, January 5 **Enlightenment Science**
Reading: Jean d'Alembert, "Preliminary Discourse to the Encyclopedia of Diderot", (selections, course reader)

Wednesday, January 7 **The New French Chemistry**
Lavoisier, *New French Chemistry* (selections, course reader)

Monday, January 12 **A Problem of Atomic Proportions**
Reading: Dalton, *A New System of Chemical Philosophy* (selection, course reader)

Wednesday, January 14 **The Rise of the Machines**
Start reading: Hermann von Helmholtz, "On the Conservation of Force" (course reader)

Monday, Jan 19 **Romanticism, Colour and Archetypes**
Reading: Goethe, *Theory of Colours* (selection, course reader), "Experiment as Mediator between Object and Subject" (selection, course reader), "The Metamorphosis of Plants" (selection, course reader), "Doubt and Resignation" (course reader)

Section B: The Discovery of History: Origins
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Wednesday, January 21 **Being There: Picturing the Globe**
Reading: von Humboldt, *Cosmos* (selections, course reader)

Monday, January 26 **Natural Theology: God's Watch**
Reading: Paley, *Natural Theology* (in Carroll, *The Origin of Species*, pp. 565-573), Malthus, *Principles of Population* (in Carroll, pp. 595-604)

Test III (In your regular Wednesday or Friday tutorial of January 28-January 30)

Wednesday, January 28 **Deep Time – Nature goes Historical**
Reading: Lamarck, *Zoological Philosophy* (in Carroll, pp. 573-579); Lyell, *Principles of Geology* (in Carroll, pp. 605-609)

Monday, February 2 **The Origins of Species**
Start Reading: Darwin, *On the Origin of Species* (in Carroll)

Wednesday, February 4 **The Origin of Species II.**
Finish Reading: Darwin, *On the Origin of Species* (in Carroll). Concentrate on “Recapitulation and Conclusion, pp. 379-398)

Monday, February 9 **The Descent of Man**
Reading: Darwin, *The Descent of Man* (in Carroll. Read as much as possible. “General Summary and Conclusion”, pp. 549-561)

Wednesday, February 11 **Sociobiology and Eugenics**
Reading: Sanger, “Birth Control and Racial Betterment”; Woodhull, “Rapid Multiplication of the Unfit” (selections, course reader); Kropotkin, “Mutual Aid” (selections, course reader)

February 16-20. **Study Break (no classes or tutorials)**

Monday, February 23 **“As though an honourable contest were in hand”**
Reading: Wallace, *A Defence of Modern Spiritualism* (selections, course reader)

Wednesday, February 25 **“Passing through the long and ghastly kitchen”**
Reading: Anna Kingsford, *The Uselessness of Vivisection* (selections, course reader); Claude Bernard, *Introduction to the Study of Experimental Medicine* (selections, course reader)

Monday, March 2nd **Telegraphy, Telepathy, and the Media**
Reading: Stead, *Telegraphy Without Wires*, *The Miracle of the Marconi Waves*, and *The Next Wonder of the World* (selections, course reader)

Monday March 2: SHORT PAPER II DUE (4pm, HOST office)

Wednesday, March 4th **The Double Helix**
Reading: Watson, *The Double Helix*

Monday, March 9th **The Double Helix**
Reading: Watson, *The Double Helix* (focusing on pp. 95-133)

Section C: The Destruction of the Old Order
