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THE UNIVERSITY OF NEW SOUTH WALES

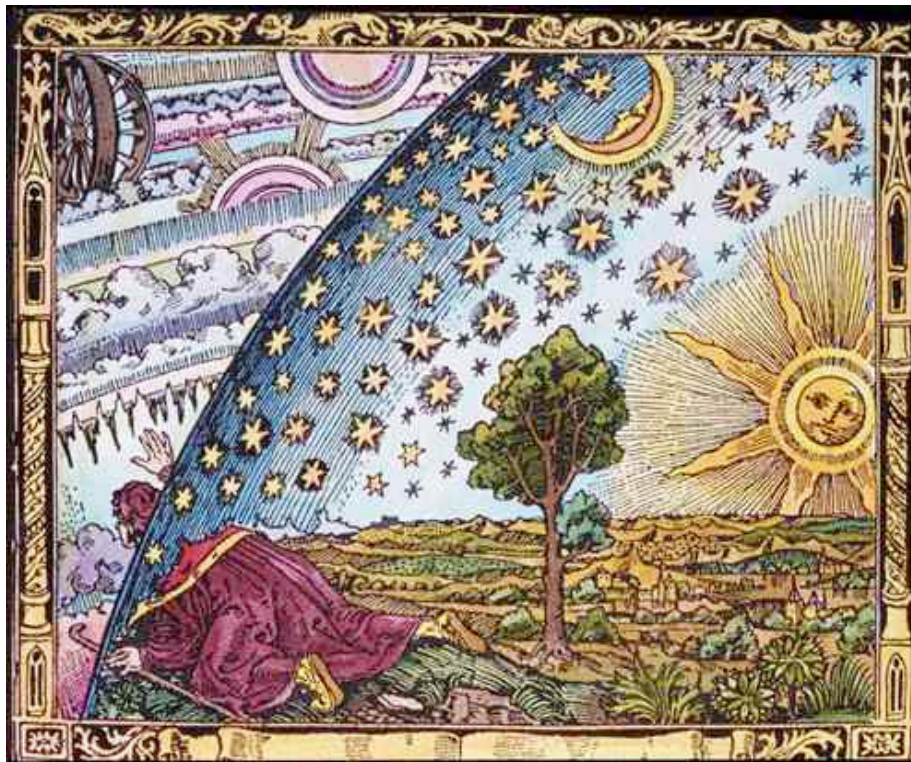
**Arts and
Social Sciences**

SCHOOL OF HUMANITIES & LANGUAGES

ARTS1301

(and SCIF1131, Lecture component)

Cosmos and Culture: Science in History



SESSION 2, 2013

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COURSE STAFF

Convener/Lecturer/Tutor Details:

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COURSE DETAILS

Units of Credit: 6 Course description: This subject examines the history of science (including medicine) from antiquity to the 21st century. It places special emphasis on the role of contextual factors —philosophical, social, political, cultural and technological — in the development and changing character of science over time. The central theme of the course is that all world-views, or accounts of the cosmos, are products of particular cultures, so that we should not expect the science of the past to look like, or be aiming at, our present science. Understanding the history of science in context enables recognition of the distinctive styles of natural science in the past, which (like all history) gives us access to alien ways of seeing, and being in, the world. It also enriches our understanding of the distinctive character of contemporary science. Topics include: Greek and Hellenistic natural philosophy; Medieval natural philosophy, magic and science; Renaissance natural science; the Copernican Revolution; mechanical philosophy and the ‘Scientific Revolution’; Newtonianism and Enlightenment science; natural history and the order of nature; Romantic science and the Counter-Enlightenment; the Darwinian Revolution; laboratory medicine; science and industrial research; the twentieth-century physics revolutions and their impact on philosophy of science; science-based industry and the creation of ‘Big Science’; the Cold War and the physics of life; science and globalization.

COURSE AIMS

As a Level 1 course, Cosmos and Culture aims to provide an introduction to the history of science, and the history and philosophy of science (HPS), as fields of knowledge, while also offering an overview of Western science (including medicine) from antiquity to the present age useful to any major. It complements both history and science Level 1 subjects, and provides a solid grounding for upper level courses. Everyone is affected by science and technology in their private and working lives, and issues concerning the impact of technological and scientific change on society arise every day in technological, medical and environmental controversies. In examining the social and human dimensions of scientific and technological change, this course aims to provide perspective on such issues and to foster citizenship through skills that transcend the traditional Arts/Science ‘two cultures’ divide.

STUDENT LEARNING OUTCOMES

1. Understanding of key periods in the history of science, and changes in the character of science over time as related to general cultural, economic and intellectual change
2. Understanding and experience of how the interdisciplinary fields of History of Science and of History and Philosophy of Science are practiced, especially practice in historiography
3. The capacity to analyse and think critically about the broad cultural, political and social contexts shaping scientific change
4. The skills to communicate effectively on issues of science in historical context
5. The capacity to apply the historiographical skills acquired to new historical materials and fields
6. Understanding of the factors underlying historical change in a way that contributes to a student's ability to appreciate and respect diversity, and to respond creatively to change

LEARNING AND TEACHING RATIONALE

The course aims to engage students in learning through critical analysis and discussion. Contextualised learning strategies allow students to draw and reflect on their own learning experiences, and contribute to classes in an inclusive way. In particular, engaged practice of history and philosophy of science by students is encouraged by presenting models of such practice and inviting students, provided with primary evidence supporting these scholarship models, to modify or critique them. The teaching activities in this course involve lectures and tutorials. They are designed to support student learning outcomes through a climate of mutual inquiry that challenges and stimulates students, and links them to research and scholarship. Students will have the opportunity to reflect on and explore received views, to challenge current beliefs, and to develop new practices and understandings.

TEACHING STRATEGIES

The lectures provide disciplinary knowledge and key concepts, and also model critical analysis and discussion for the students. The online provision of lecture slides and audio recordings allows students to review issues and concepts at a pace that suits their learning capacities. Dialogue and debate are encouraged in the tutorials. Readings for tutorials and the associated questions challenge and develop students' comprehension and interpretive skills, and provide a basis for group work and discussion. The tutorial topics reinforce and extend lecture themes and concepts, and encourage students to apply their knowledge and understanding in a strategic way to material that tests their analytical and critical skills. Tutorial discussions and tasks allow students to reflect on their learning and improve on their performance.

COURSE SCHEDULE

Lecture Times & Locations:

TUESDAY	12-1pm	CLB 8
WEDNESDAY	11- 12	CLB 8

Although automatic recordings of the lectures will be available, you are expected to attend lectures.

Tutorial Times & Locations (Arts sections):

WEDNESDAY	13:00 - 14:00	Mathews	123 [A Coronas]
WEDNESDAY	14:00 - 15:00	Mathews	123 [N Rasmussen]

Lecture & Tutorial Preparation

Although you are expected to read the whole of the course text (*Science a 4000 Year History*, by Patricia Fara) over the semester, key chapters to read in preparation for each week's lectures are given in the schedule below. It is a breezy and entertaining book and it is also drawn upon in the tute discussions and essays. The main tute readings are downloadable from Moodle (under Resources). Consult the Tutorial Guide (also on Moodle) for more details on each week's tutes and tute assessments.

Lecture & Tutorial Program [Lecturer Initials]:

Tue 30 Jul	Introduction: 'Science' and Civilization [NR/AC]
Wed 31 Jul	Heroes, Progress and the Historiography of Science [AC]
Lecture Reading	Fara: I: Chaps 2-3
Tue 6 Aug	Ancient Natural Philosophy and Medicine [AC]
Wed 7 Aug	Aristotle's World [NR]
Lecture Reading	Fara: I: Chaps 4-6
Tutorial 1	Historiography of Science
Tute Reading	Henry
Tue 13 Aug	The Medieval Cosmos [AC]
Wed 14 Aug	The Renaissance & the Natural World [NR]
Lecture Reading	Fara: II: Chaps 6, 7; III: Chap. 1
Tutorial 2	Science and Life in Antiquity
Tute Reading	Aristotle; Galen; Nordenskiold
Tue 20 Aug	The Copernican Revolution [AC]
Wed 21 Aug	Art, Anatomy & Authority in Renaissance Learning [NR]
Lecture Reading	Fara: III: Chaps. 2-4
Tutorial 3	Medieval Science and Renaissance Humanism
Tute Reading	Oresme; Kuhn (Tute 3 selection)
Tue 27 Aug	The Reformation & the Heavens [AC]
Wed 28 Aug	Reason, Experience, and the Mechanical World Picture [AC]
Lecture Reading	Fara: III: Chaps. 5-7
Tutorial 4	Renaissance Anatomy and Medicine
Tute Reading	Vesalius; Park
Tue 3 Sept	CLASS TEST 1
Wed 4 Sept	Fact, Theory, and the Social Mechanism of Truth [NR]
Lecture Reading	Fara: IV: Chap. 1
Tutorial 5	Copernicus, Galileo and the Church
Tute Reading	Copernicus; Galileo
Tue 10 Sept	Enlightenment and Technical Progress [AC]
Wed 11 Sept	Enlightenment and the Life Sciences [NR]
Lecture Reading	Fara: IV: Chaps. 2, 4, 5
Tutorial 6	Newtonian Cosmology
Tute Reading	Newton; Kant

Tue 17 Sept	Moral Progress, Revolution, and the Human Sciences [AC]
Wed 18 Sept	The Counter-Enlightenment & Life As We Know It [NR]
Lecture Reading	Fara: IV: Chaps. 6, 7 and V: Chap. 3
Tutorial 7	Life Science in the Enlightenment
Tute Reading	Haller; Gould
Tue 24 Sept	Chemical and Industrial Research [AC]
Wed 25 Sept	Welcome to Darwin's World [NR]
Lecture Reading	Fara: V: Chaps. 1, 4, 5 and 6
Tutorial 8	Natural History, Natural Forces
Tute Reading	Goethe; Jardine

UNSW MIDSEMESTER RECESS

Tue 8 Oct	Revolutions in Physics & Philosophy [AC]
Wed 9 Oct	Medical Science and Industry [NR]
Lecture Reading	Fara: V: Chap 7, VI: Chaps. 2, 3, 6, 7
Tutorial 9	Darwin and Evolution
Tute Reading	Darwin; Drouin
Tue 15 Oct	The State, the War, and Big Science [NR]
Wed 16 Oct	Cold War and the Physics of Life [NR]
Lecture Reading	Fara: VII: Chaps. 1, 2, 4, 5
Tutorial 10	Bernard and Scientific Method
Tute Reading	Bernard; Wasserstein
Tue 22 Oct	Conclusion: Science's Limits and Futures [AC]
Wed 23 Oct	CLASS TEST 2
Lecture Reading	Fara: VII: Chaps. 6, 7
Tutorial 11	Scientific Change and Revolutions in Science
Tute Reading	Kuhn (Tute 11 selection)

COURSE EVALUATION AND DEVELOPMENT

Student evaluative feedback on this course is welcomed and is gathered periodically, using among other means UNSW's Course and Teaching Evaluation and Improvement (CATEI) process. Student feedback is taken seriously, and continual improvements have been made to the course based in part on such feedback.

READINGS AND REFERENCES

Course Texts

These are essential reading for the course, and are required for the tutorial program.

- *Tutorial* readings posted on course web site.
- Patricia Fara, *Science: A Four Thousand Year History* (Oxford, 2009). This can be purchased from the UNSW Bookshop and is available through Library Reserve. This text is also used for some tutorial topics.

Suggested references

There are a number of sources recommended specifically for each tute assignment, listed at the end of the Tutorial Guide. Several of these are generally useful in the course and therefore have been placed on Reserve/High Use in the Library. It is best that you consult these general sources as a first step beyond the course text.

General Sources on High Use/Reserve (or web)

- W. Applebaum [ed.], *The Encyclopedia of the Scientific Revolution*
G. Christianson, *This Wild Abyss: The Story of the Men Who Made Modern Astronomy*
W. Coleman, *Biology in the Nineteenth Century*
B. Easlea, *Witch-Hunting, Magic and the New Philosophy*
J. Farley, *Gametes & Spores: Ideas About Sexual Reproduction, 1750-1914*
A. J. Goodfield & S. Toulmin, *The Fabric of the Heavens*
J. Henry, *The Scientific Revolution and the Origins of Modern Science*
T.S. Kuhn, *The Copernican Revolution*
D. Lindberg, *The Beginnings of Western Science*
S.F. Mason, *A History of the Sciences: Main Currents of Scientific Thought*
R. Porter ed. *The Cambridge History of Science, Vol 4: The Eighteenth Century*
R. Olby et al [eds.] *The Companion to the History of Modern Science*
J. Pickstone, *Ways of Knowing: A New History of Science, Technology and Medicine*
E. S. Russell, *Form and Function: A Contribution to the History of Animal Morphology*
K. Thomas, *Man and the Natural World: Changing Attitudes in England 1500-1800*
- J. Schuster, *The Scientific Revolution* [web based textbook http://descartes-agonistes.com/index.php?option=com_docman&task=cat_view&gid=38&Itemid=53]

Journals

Moving beyond the recommended general sources above, there are many excellent journals containing the latest work in history of science, an enormous and active field of scholarship. Many can be searched at once by topic, through the History of Science, Technology and Medicine database available through the Library's SIRIUS link.

Websites

The simplest thing to do is search 'history philosophy science' along with whatever topic keywords you are researching. As always with web-based research, you must be doubly cautious about the reliability of information, especially when you are unable to say exactly who wrote the web page in question, when, and based on what sources. Particularly useful sites include:

- <http://www.intute.ac.uk/artsandhumanities/hps/>
<http://www.imss.fi.it/~tsettle/index.html>

Students seeking resources can also obtain assistance from the UNSW Library. One starting point for assistance is:

- info.library.unsw.edu.au/web/services/services.html

ASSESSMENT

The course assessment is both formative (intended to assist students to identify weaknesses in their understanding, so that they may improve in their understanding and enhance their learning) and summative (intended to pass judgment on the quality of a student's learning in terms of grades and marks). These forms of assessment align with the learning outcomes for the course regarding the acquisition of knowledge about the history and philosophy of science, training in the skills and techniques employed in the discipline of HPS, the development of students' communication skills, and the development of students' critical skills (especially in evaluating and constructing arguments). They are also aligned with UNSW's Graduate Attributes as interpreted for the BA program (see <http://www.arts.unsw.edu.au/programs/bachelor-of-arts-2.html>)

The assessment components for students registered in ARTS1301 are:

(i)	Class test 1	30%
(ii)	Class test 2	20%
(iii)	Initial tute writing assignment	10%
(iv)	Second tute writing assignment	30%
(v)	Tutorial participation (p/f quizzes)	10%

*Students registered in **SCIF1131** take the same class tests (with different weighting) and participate in the same tutorial exercises but have distinct tutorial assessments.*

Assessment task	Length	Weight	Learning outcomes assessed	Graduate attributes assessed	Due date
Initial writing assignment	500 words	10%	1, 2, 3, 4	1, 2, 3, 5, 9	Mon 19 August
Second writing assignment	1,500 words	30%	1, 2, 3, 4, 5, 6	1, 2, 3, 4, 5, 8, 9	1 week after the chosen tutorial topic (see below)
Class test 1	50 minutes	30%	1, 2, 3, 4, 6	1, 2, 3, 4, 5, 9	Tuesday 3 Sep (in lecture hour)
Class test 2	35 minutes	20%	1, 2, 3, 4, 6	1, 2, 3, 4, 5, 9	Wed 23 Oct (in lecture hour)
Tutorial participation		10%	1, 3, 4, 5, 6	1, 3, 5, 6, 7, 8, 9, 10, 12	Weeks 2-12

(i) and (ii) Class tests 1 and 2: The two tests are directed at the content of the lectures, and administered during lecture times. They are summative assessments. In order to assist in your preparation for the tests, a revision guide will be available a week before each test. Test questions will require short written answers (about a paragraph each). Test dates are on the lecture schedule. Test results will be posted on Moodle. Test papers will not be returned to students. Note that the first test is worth 30% and the second test 20% of the overall marks.

(iii) Initial tute writing assignment (500 words): The initial writing assignment is a formative assessment. It assesses conceptual understanding of course material, capacity for critical and analytical thinking, and communication skills. Assignments are returned within two weeks with written feedback. In cases of poor performance, students should speak to their tutor. Students will have an opportunity to respond to/use feedback in the second writing assignment.

This assignment is integrated with the tutorial program (see below and also Tutorial 1 in the tutorial program for further details). Please take careful note of the tutorial reading and background material, as well as the tutorial discussions of the set questions, before you proceed to the writing assignment. The assignment will be discussed in Tutorial 1.

The initial writing assignment task is to write 500 words in response to the set topic for this assignment in Tutorial 1.

Papers will be returned to students with grades. [Please note UNSW's grade system: HD (High Distinction 85-100; Outstanding Performance); DN (Distinction 75-84; Superior Performance); CR (Credit 65-74; Good Performance); PS (Pass 50-64; Acceptable Performance); FL (Fail 0-49; Inadequate Performance).] For instructions regarding written work, including referencing and bibliographic details, please consult the HPS Essay Booklet (on the School of Humanities website). The papers must be submitted with an Essay Cover Sheet (to be downloaded from the School website, or available from the School office).

NB: Papers must be fully referenced. You are free to use sources *additional* to the set readings for Tutorial 1, but it is not required for this assignment (though it *is* for the second writing assignment).

Due Date: Thu 11 August.

(iv) Second tute writing assignment (1,500 words): The second writing assignment is a formative and summative assessment. It assesses active understanding of concepts, course material, capacity for critical and analytical thinking, communication skills. A key way in which it assesses active understanding is by asking you to support an argument about a text's meaning with evidence drawn from that text, and this is its main formative goal. Assignments are returned within two weeks with written feedback (in this case the feedback is primarily of use for upper level arts courses).

Like the initial writing assignment, this assignment is also integrated with the tutorial program; only in this case students are free to choose which set writing topic they wish to write about — from Tutorial 4 to Tutorial 11 (see the Tutorial Program for the set writing topic assigned to each of those Tutorials). This restriction on topics will allow you to benefit from feedback on your initial writing assignment.

For this assignment, you should begin researching for your paper *before* the chosen tutorial (that is, it is not only preparation for writing your paper, but also preparation for the tutorial itself). You will then have one week in which to submit your paper. Please take note of the tutorial discussions of the set questions as part of your preparation for the assignment as these are important for addressing the essay question. You can raise questions yourself in the tutorials -- helpful if you have done a good deal of prior work.

NB: Papers must be fully referenced, and students *must* use sources *additional* to those already included in the tutorial program (that is, use the set tutorial readings *plus* other sources).

Due Date: Papers for this assignment are due 7 days after the student's tutorial session on the chosen topic. [While it is possible to leave it to the last set tutorial topic of the Session (that is, Tutorial 11), it is advisable to choose one earlier than that.]

(v) Tutorial participation:

Tutorials are a compulsory part of this course (you are required by UNSW policy to attend a minimum of 80% of classes) and you should prepare for each one carefully. Tutorial participation is a formative practice. If you are unable to attend a tutorial because of illness, or some other pressing reason, please let your tutor know. Tutorials centre on group discussion of set readings and questions. Each tutorial class will be split into four groups, and each group is responsible for one quiz question each week. Each week one member of each group will report the outcome of their group discussion to the class, responsibility for reporting rotating in each group. Each student will be expected to submit two writing assignments during the semester (detailed above), which draw on tute discussion. See the Tutorial Guide for this subject, available through Moodle. Further details will be provided in the tutorials.

Assignment Submission

- The cut off time for all assignment submissions in the School is **4pm** of the stated due date.
- 2 assignment copies must be submitted for every assessment task - 1 paper copy and 1 electronic copy.
- All hard/paper copy assessments should be posted into the Assignment Drop Boxes outside the front counter of the School of Humanities and Languages on level 2, Morven Brown Building by 4pm on the due date.
- A completed cover sheet must be securely attached to assignments. The School is not responsible for any missing pages from poorly bound or stapled assignments.
- In addition, a soft copy must be sent through **Turnitin** via **Moodle** by 4pm on the due date

Important Note

- Electronic copies may not be marked or viewed. Only hard copies submitted in the drop boxes will be marked/assessed.
- The electronic copy will be used as evidence of assignment submission during appeal and dispute cases, as well as for originality checking. Students have no recourse if a soft copy is not submitted and a hard copy is lost. Students should keep the electronic record of their sent assignment.

Assignment Collection

Assignments should be collected from your lecturer/tutor in tute sessions and must be collected by the owner/author of the assignment. A Stamped Self Addressed Envelope must be provided on submission if students wish their assignment posted back to their home address.

Assignment Extensions

A student may apply to the Lecturer/Tutor for an extension to the submission date of an assignment. Requests for extension must normally be made via MyUNSW before the submission due date, and must demonstrate exceptional circumstances, which warrant the

granting of an extension. If medical grounds preclude submission of assignment or an extension request by due date, contact should be made with subject coordinator as soon as possible. A medical certificate will be required for late submission and must be appropriate for the extension period.

To apply for an extension please log into myUNSW and go to My Student Profile tab > My Student Services channel > Online Services > Special Consideration

Late Submission of Assignments

Assignments submitted after the due or extended date will incur a 20% penalty of the maximum marks available for that assignment. Assignments received more than 7 calendar days after the due or extended date will not be given a mark unless an official Special Consideration application has been filed and actioned to the contrary.

ATTENDANCE

To successfully complete this unit of study you are required to attend minimum 80% of tutes and lectures (other than lectures accessed electronically). If this requirement is not met you may fail the unit. The Lecturer/Tutor will keep attendance records.

ACADEMIC HONESTY AND PLAGIARISM

UNSW's policy on plagiarism and other misconduct will be enforced, sometimes with serious consequences. Students seeking information on plagiarism should visit the following web site: <http://www.lc.unsw.edu.au/plagiarism/index.html>

OCCUPATIONAL HEALTH AND SAFETY

UNSW's Occupational Health and Safety (OHS) Policy requires each person to work safely and responsibly, in order to avoid personal injury and to protect the safety of others.

Any OHS concerns should be raised with your immediate supervisor, the School's OHS representative, or the Head of School. The OHS guidelines are available at: http://www.ohs.unsw.edu.au/ohs_policies/index.html

STUDENT EQUITY AND DIVERSITY

Students who have a disability that requires some adjustment in their learning and teaching environment are encouraged to discuss their study needs with the course convener prior to, or at the commencement of the course, or with the Student Equity Officers (Disability) in the Student Equity and Diversity Unit (9385 4734). Information for students with disabilities is available at: www.studentequity.unsw.edu.au

Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional examination and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made. Information on designing courses

and course outlines that take into account the needs of students with disabilities can be found at:

www.secretariat.unsw.edu.au/acboardcom/minutes/coe/disabilityguidelines.pdf

GRIEVANCES

All students should be treated fairly in the course of their studies at UNSW. Students who feel they have not been dealt with fairly should first attempt to resolve any issues with their tutor or the course convener/s. If such an approach fails to resolve the matter, the School of Humanities and Languages has an academic member of staff who acts as a Grievance Officer for the School. This staff member is identified on the notice board and/or web page of the School of Humanities and Languages. Further information about UNSW grievance procedures is available at: <https://my.unsw.edu.au/student/atoz/Complaints.html>

OTHER STUDENT INFORMATION

myUNSW is the single online access point for UNSW services and information, integrating online services for commencing & current students and UNSW staff. It is a valuable resource for further information not listed in this course outline. To visit myUNSW please visit either of the below links:

<https://my.unsw.edu.au/student/atoz/ABC.html>

<https://my.unsw.edu.au>