

HPSC 3007 Topics in the History of the Physical Sciences Course Syllabus

2012-13 session | Dr. Chiara Ambrosio | c.ambrosio@ucl.ac.uk



Course Information

In this course students undertake original research projects on the history of electricity, which they inherit from students who took the course in previous years. Through this inheritance mechanism, results of original research can accumulate from year to year. All students in the course work on related projects, so that the class, and the group of students that take this course over the years, form a real community of researchers.

The students' projects will be incorporated in a monograph entitled "Electrocultures: Electricity Wild and Domesticated 1800-1970".

Basic course information

Course website:	http://www.ucl.ac.uk/sts/study/hpsc/3007
Moodle Web site:	search 'HPSC3007'
Assessment:	One long essay (50%); a research folder (25%); a final examination in May (25%)
Timetable:	www.ucl.ac.uk/sts/hpsc
Prerequisites:	no pre-requisites
Required texts:	no required texts'
Course tutor:	Chiara Ambrosio
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Office location:	22 Gordon Square, Room 1.2
Office hours:	Thursdays 11-1

Course overview

This course continues, and hopefully will bring to completion, an ambitious didactic experiment originally developed by Prof. Hasok Chang. In it, students undertake original research projects, which they inherit from students who took the course in previous years. Through this inheritance mechanism, results of original research can accumulate from year to year. All students in the course work on related projects, so that the class, and the group of students that take this course over the years, form a real community of researchers.

The first run of this course (2000/01 to 2004/05) was an ambitious educational experiment, which succeeded beyond expectations and resulted in the publication of a research monograph: Hasok Chang and Catherine Jackson, eds., *An Element of Controversy: The Life of Chlorine in Science, Medicine, Technology and War* (British Society for the History of Science, 2007). This was an extraordinary achievement: a scholarly book containing original research, all carried out by undergraduates.

The current run of the course, which started in 2007, is “Electrocultures: Electricity Wild and Domesticated”. There is much to be gained from doing a series of interconnected studies that deal with various aspects of one material object or substance; each study will enrich others, often prompting unexpected insights for them. When we have collected and coordinated enough of these studies, we will have a “biography” of that object, which has been a rather popular concept in recent works of popular science and history of science. Aside from giving interesting synopses of the history of humanity’s dealings with particular objects, these “object biographies” reveal many general themes about the processes by which scientific knowledge is developed and applied. Object biography was the framework for our previous study on chlorine, and we will use it again here.

Electricity has been at the forefront of scientific and technological progress, especially in the last two centuries. It has fascinated observers of nature from ancient times, though in the early days its known manifestations were very limited: static electricity generated by friction, and shocks received from it; lightning; “galvanism” in animal physiology. In the 19th century, a rapid succession of discoveries and inventions, including Volta’s battery, Oersted’s and Faraday’s work on electromagnetism, and Hertz’s generation of electromagnetic waves, led to the establishment of a highly developed science of electricity (and magnetism). Technological applications of electricity in the late 19th and early 20th centuries have been astonishing in their impact and sheer variety: the dynamo, the telegraph, radio and television, electric lights, electric heating, the phonograph, and so on, not to mention a whole set of industrial processes and somewhat bizarre applications such as electro-convulsive therapy for mental illnesses and the electric chair for executions. The 20th century might be considered the century of the electron. The discovery of this little particle, which serves as the carrier of electricity in most familiar situations, has ushered in whole new areas of investigation and application, including quantum mechanics and electronics. Many of these scientific and technological applications have also captured the popular and literary imagination.

It is here that our methodological angle on the various “cultures of electricity” comes useful and gives our collective project coherence and sharpness. After all, studying STS is first and

foremost a way of placing science in a broader social and cultural context, and the history of electricity is no exception. Other than the emphasis on the many ways in which electricity has been domesticated (or has not surrendered to our attempts to domesticate it!), there are few restrictions on how the individual projects are pursued. Each project deals with historical material, but its frame of analysis can be philosophical, sociological, political or economic.

Assessments

Summary

	Description	Deadline	Word limit
Assignment 1	Preliminary report	11.59 pm Mon 13 November	1.500/2000 words
Assignment 2	Draft 1 (optional)	11.59pm Mon 17 December	
Assignment 3	Essay 1 and Essay 2 (long essay and research folder)	11.59 pm Mon 7 January 2013	Each equivalent to 3000 words
Exam		Term 3 Date TBC	NA

At the end of the course, you will be required to submit an extended essay that contains a summary of the most important findings from your study. You will also be asked to submit all useful materials generated by your research (this constitutes the "second essay"), in a form that will allow another researcher to use them. You should submit both an electronic and a printed version of the essay and research records. In the middle of the term you will also be asked to submit a preliminary report of roughly 2,000 words, which will not be assessed in itself, but will be used in determining the content of the exam. You must complete all assessed elements in order to complete the course.

Given the peculiar nature of the course, these will not be ordinary essays and exam. I will be giving you continual advice on the preparation of the assessed material, but the following are some basic parameters.

Essay 1 (50% of the total mark): This is the final product of your work. It will be assessed on the basis of its scholarly merit (originality, systematic synthesis of material, quantity and accuracy of information given, understanding of technical points when relevant, methodological sophistication, and effective engagement with previous work). Since the project is now at a relatively advanced stage, essays will be marked on the "value added" with respect to previous work.

Essay 2 (25%): This "essay" consists of research records, including: a full annotated bibliography recording all the sources you have located and your action on them; a record of library and database searches; all reading notes; any useful photocopies you made; and the record of your own thoughts (including drawings, calculations, etc.). You can think of this collection of work as the "raw material" that went into the production of the extended essay.

It will be assessed by three chief criteria (again considering "value added"). The first is content: how much useful information and ideas you were able to gather and record. The second is effort: often in real research, genuine effort may not produce much useful outcome; for the purpose of assessment in this course, you will be rewarded for all such "wasted" effort, too, as long as they can be demonstrated. The third is presentation: the main concern here is that the information should be organised and presented in a way that is most convenient and useful for the next person who will be taking up the project.

Exam (25%): The exam has two parts. Part 1 tests "general knowledge" of the material covered in the course. Here you will be tested on the content of all of the preliminary reports submitted by the group, as well as any introductory material that I present at the beginning. It is therefore crucial that you work in close collaboration with the rest of your group in preparing for this piece of assessment. Part 2 of the exam is an essay on what you have learned in the process of doing your research, aside from the content of your essays. You may touch on any issues you consider important, but most welcome will be reflections on the following: historiography; the use of primary and secondary sources; the interaction between different STS disciplines; the connections and contrasts between science, medicine and technology; techniques of gathering and processing information; the process of defining, sustaining, and refining a research question.

At the end of the academic year I will ask you whether you are willing to have your work incorporated into collective publications. If you do not give your permission, your work will simply be kept for a limited period of time like all other assessed work. Where permission is given, all students who have worked on a specific project over the years will be made co-authors in any publications that result from the work.

More on the philosophy behind this course

(For a more extended discussion, see the Epilogue to *An Element of Controversy* and the paper "Building on the Directed Community Model: Projects and Prospects" by Ambrosio and Jackson, available on moodle.)

Mode of working

Each of you will craft a well-defined individual project, and work on it independently for the most part. At the same time, the whole class will form a research community. My role is that of the overall director and coordinator of the whole collection of projects. This will include (but will not be limited to):

- helping you craft the topics and questions for individual projects;
- providing background information and initial suggestions of sources to examine;
- providing training in research methods and skills;
- serving as a central point where all progress is reported and synthesised; facilitating mutual interactions;
- suggesting points for improvement and further investigation.

Very soon in the process you are likely to know far more about the topic than I do. This will be

a sign that your work is heading in the right direction – however, at that point you will have to prove that you are capable of independent inquiry into your topic, just like a proper researcher. This does not mean that I will stop following your progress – on the contrary, it will be my responsibility to keep the pace with your work and suggest points for further improvement.

In the few initial sessions, I will make a brief introduction to the subject and coordinate people's choices of individual projects. Once each student has chosen a project, we will spend part of the whole-group sessions hearing a brief report on the most significant things that each one of you has learned since the previous session. The remaining part of the session will be devoted to mini-lectures to refresh your research skills. We will occasionally have guest-speakers and short visits to museums and displays that will be aimed at broadening your horizons and help you think about your topic in a broader context.

In addition to the whole-group sessions, we will also arrange individual or small-group meetings to discuss the progress of individual projects closely and focus on specific issues arising from individual projects. Outside the formal meetings, I will be available to meet each one of you during my office hours and discuss further details. I will also read and comment on notes or short drafts. In addition, you are strongly encouraged to meet with each other to exchange information and discuss areas of overlap in your projects.

Criteria for assessment

The departmental marking guidelines for individual items of assessment can be found in the STS Student Handbook.

Aims of the course

1. To produce knowledge. The most fundamental premise of this course is that undergraduate students are capable of creating knowledge, not merely absorbing it. In fact you do create knowledge routinely, in writing your dissertations or any serious essays; however, most likely the fruits of your labour will end up scattered and hidden in piles of papers, studied by your tutors for assessment but never to be looked at again. In this course I orchestrate your efforts so that they can be pulled together into a recognizable product. Passive learning of existing knowledge is not our main goal here (though pushing the boundaries of knowledge does of course require first finding out where those boundaries lie.)

2. To learn, by doing, how to produce knowledge. The process of doing active research will also serve the purpose of training you for similar future work. The skills you will acquire include: searching for relevant materials; understanding primary sources; collaborating with others who are pursuing related projects; using other people's previous works (secondary sources) to help your enquiry; preserving and presenting the results of

your work so that others (including yourself at a later time) can build on them effectively.

Sources and resources

In order to be successful in professional research, you must be resourceful. Identifying your sources is an important, difficult and time-consuming part of the work. And it will almost never be the case that all the materials you need for a given project will be found in one place. Fortunately, you are working in London, where we have an almost unrivalled concentration of libraries, archives, and experts. It is up to you to take advantage of this situation.

Once you have a basic idea of the area you want to investigate and you have done some initial exploratory reading, the next obvious step is to locate the main primary and secondary sources relevant to your topic. This process of locating sources will have to continue all the way through the project, but it makes sense to start with a fairly sizeable list of sources. In each case I will attempt to provide you with some starting points. One of the best ways to proceed is to follow promising references given in the initial readings; this will start a "chain reaction" in which you will continue to find more and more sources. However, you also need to do more systematic searches and you will receive more advice on this in the lectures on research methods.

Libraries, archives and museums

Once you have identified the materials you need to look at, the next challenge is to find them! Dealing with the scarcity and inaccessibility of sources is an important part of doing research. The UCL Library system holds a lot of material, but it will almost certainly not have everything you need. Fortunately, we are close to many other excellent libraries, each with some peculiar strengths.

Some of you will want to use the British Library. As long as you have good reasons for requesting access, you will be able to obtain a reader's pass. Many other useful libraries in London are open to you, with varying degrees of access. These include the Wellcome Library for the History of Medicine, the Science Museum Library, the Royal Society Library, and the various libraries of the University of London (including Senate House, LSE, and King's).

Some projects will require archival work. There will be practical constraints on organising archival trips, but of possible use and within easy enough reach are the archives of UCL, the Institute of Electrical Engineers, Imperial College, the Royal Society, the Royal Institution, Cambridge University, and the various medical colleges and societies in London. The MOSI (Museum of Science and Industry) Archives in Liverpool have expressed a keen interest in our course and are willing to help us access their collections. More information is available here: <http://www.mosi.org.uk/collections/about-the-collections.aspx> . In general, museums are excellent resources for some of the projects in our course, and we have good links with some leading curators at the Science Museum and elsewhere who can help you.

Other UCL tutors, and experts outside UCL

As you will be doing genuine research in this course, you will soon be learning things that I don't know. It also means that when you need help I may not be able to give much. In such cases I will attempt to put you in touch with better experts on the particular topics;

these experts may be other tutors in the STS department, or other UCL departments, or possibly even outside UCL, London, or Britain. And you should also not be shy about locating and contacting such experts on your own.

Reading list

General and Preliminary Bibliography

On the History of Electricity

- Arabatzis, Theodore. *Representing Electrons : a Biographical Approach to Theoretical Entities*. Chicago and London: University of Chicago Press, 2006.
- Bertucci, Paola, and Giuliano Pancaldi, eds. *Electric Bodies: Episodes in the History of Medical Electricity*. Bologna: Universita di Bologna, 2001.
- Buchwald, Jed. *The Creation of Scientific Effects*. Chicago and London: University of Chicago Press, 1996.
- Cantor, Geoffrey. *Faraday: Scientist and Sandamanian. A Study of Science and Religion in the Nineteenth Century*. Basingstoke: Macmillan, 1991.
- Darrigol, Olivier. *Electrodynamics from Ampère to Einstein*. Oxford: Oxford University Press, 2003.
- Dibner, Bern. *Ten Founding Fathers of the Electrical Science*. Norwalk, Conn.: Burndy Library, 1954.
- Edgerton, David. *The Shock of the Old. Technology and Global History since 1900*. London: Profile, 2006.
- Fara, Patricia. *An Entertainment for Angels: Electricity in the Enlightenment*. Cambridge: Icon, 2002.
- Gooday, Graeme. *The Morals of Measurement : Accuracy, Irony, and Trust in Late Victorian Electrical Practice*. Cambridge: Cambridge University Press, 2002
- Gooding, David and James, Frank. *Faraday Rediscovered*. London: Macmillan, 1985.
- Gooding, David, Pinch, Trevor and Schaffer, Simon. *The Uses of Experiment: Studies in the Natural Sciences*. Cambridge: Cambridge University Press, 1989.
- Gooding, David and Tweeney, Ryan (eds). *Michael Faraday's Chemical Notes, Hints, Suggestions and Objects of Pursuit of 1822*. London: Peregrinus, 1991.
- Gooding, David. Scientific Discovery as Creative Exploration: Faraday's Experiments, *Creativity Research Journal*, 9 (1995) no. 2-3: 189-205.
- Hofmann, James R. *André-Marie Ampère: Enlightenment and Electrodynamics*. New York: Cambridge University Press, 1995.
- Hong, Sungook. "Controversy over Voltaic Contact Phenomena", *Archive for History of Exact Sciences* 47 (1994): 233-289.
- Hughes, Thomas. *Networks of Power : Electrification in Western Society, 1880-1930*. Baltimore and London: John Hopkins University Press, 1993.
- James, Frank, Cantor, Geoffrey and Gooding, David. *Faraday*. Basingstoke: Macmillan, 1991.

- Lardner, Dionysius. *Handbook of Natural Philosophy: Electricity, Magnetism, and Acoustics*. London: Lockwood & Co. (1874).
- Melhado, Evan. Jacob Berzelius : the emergence of his chemical system. Stockholm: Almqvist and Wicksell, 1981.
- Mottelay, Paul Fleury. *Bibliographical History of Electricity and Magnetism, Chronologically Arranged*. London: Charles Griffin and Company Ltd, 1922.
- *Nuova Voltiana: Studies on Volta and His Times* (journal), edited by Fabio Bevilacqua and Lucio Frenonese.
- Ostwald, Wilhelm. *Electrochemistry: History and Theory*, transl. from German by N. P. Date. New Delhi: Amerind Publishing Co. Ltd., 1980.
- Pera, Marcello. *The Ambiguous Frog: the Galvani-Volta Controversy on Animal Electricity*. Princeton University Press, 1992.
- Smith, Crosbie, and M. Norton Wise. *Energy and Empire : a Biographical Study of Lord Kelvin*. Cambridge: Cambridge University Press.
- Schaffer, Simon. "Rayleigh and the Establishment of Electric Standards", *European Journal of Physics*, 15 (1994): 277-285. .
- Stock, John T., and Mary Virginia Orna, eds. *Electrochemistry, Past and Present*. American Chemical Society, 1989.
- Whittaker, Edmund. *A History of Aether and Electricity*. (2 vols.) New York: Philosophical Library, 1951-3.

Methodological Sources on Innovation, Invention and Discovery

- Aris, Rutherford, H. Ted Davis, and Roger H. Stuewer, eds. *Springs of Scientific Creativity: Essays on Founders of Modern Science*. Minneapolis: University of Minnesota Press, 1983.
- Kuhn, Thomas S. *The Structure of Scientific Revolutions*, 2nd ed. Chicago: University of Chicago Press, 1970.
- Kuhn, Thomas S. *The Essential Tension*. Chicago: University of Chicago Press, 1977.
- Rogers, Everett M. *Diffusion of Innovations*, 5th ed. New York and London: Free Press, 2003.

General Histories of Physics, Chemistry and Technology

- Brock, W. H. *The Fontana History of Chemistry*. London: Fontana Press, 1992.
- Cajori, Florian. *A History of Physics in its Elementary Branches : Including the Evolution of Physical Laboratories*. New York: Macmillan, 1929 (2nd ed.)
- Cushing, James T. *Philosophical Concepts in Physics: The Historical Relation Between Philosophy and Scientific Theories*. Cambridge: Cambridge University Press, 1998.
- Golinski, Jan. *Science as Public Culture: Chemistry and Enlightenment in Britain, 1760-1820*. Cambridge: Cambridge University Press, 1992.
- Haber, L. F. *Chemical Industry During the 19th Century*. Oxford: Oxford University Press, 1958.
- Haber, L. F. *The Chemical Industry 1900-1930: International Growth and Technological Change*. Oxford: Clarendon Press, 2008.
- Hankins, Thomas L. *Science and the Enlightenment*. Cambridge: Cambridge University Press, 1985.

- Heilbron, John. *Elements of Early Modern Physics* Berkeley, London: University of California Press, 1981.
- Heilbron, John. *Weighing Imponderables and Other Quantitative Science around 1800*, published as a supplement to *Historical Studies in the Physical and Biological Sciences*, 24:1 (1993).
- Holton, Gerald, and Stephen G. Brush. *Physics, the Human Adventure: From Copernicus to Einstein and Beyond*. New Brunswick, N.J.: Rutgers University Press, 2001.
- Ihde, Aaron J. *The Development of Modern Chemistry*. New York: Dover, 1984 (originally published in 1964).
- Kragh, Helge. *Quantum Generations: A History of Physics in the Twentieth Century*. Princeton: Princeton University Press, 1999.
- Levere, Trevor H. *Transforming Matter: A History of Chemistry from Alchemy to the Buckyball*. Baltimore and London: Johns Hopkins, 2001.
- Nye, Mary Jo. *Before Big Science: The Pursuit of Modern Chemistry and Physics, 1800-1940*. Cambridge, Mass.: Harvard University Press, 1996.
- Partington, J. R. *A History of Chemistry*, 4 vols (London: Macmillan, 1961-70; Volume 1, published last, is incomplete). See also its abridged version, *A Short History of Chemistry*, 3rd ed. (New York: Harper, 1957; originally published in 1937).
- Pledge, H. T. *Science since 1500*. London: HMSO, 1939.
- Russell, Colin A. *Science and Social Change 1700-1900*. London: Macmillan, 1983.
- Singer, Charles, E. J. Holmyard, A. R. Hall, and Trevor I. Williams. *A History of Technology*. New York and London: Oxford University Press, 1957.
- Taylor, F. Sherwood. *Science Past and Present*, 2nd ed. London: Heinemann, 1949.
- Toulmin, Stephen, and June Goodfield. *The Architecture of Matter*. Harmondsworth: Penguin, 1965.
- Wolf, A. *A History of Science, Technology, and Philosophy in the 18th Century*, 2nd ed. London: Macmillan, 1952.

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- Bynum, W. F., and Roy Porter, eds., *Companion Encyclopedia of the History of Medicine*. London: Routledge, 1993.
- Gillispie, Charles Coulston, editor-in-chief. *Dictionary of Scientific Biography*. New York: Charles Scribner's Sons, 1970-.
- Heilbron, J. L., ed. *The Oxford Companion to the History of Modern Science*. Oxford: Oxford University Press, 2003.
- Olby, R. C., G. N. Cantor, J. R. R. Christie, and M. J. S. Hodge, eds. *Companion to the History of Modern Science*. London and New York: Routledge, 1990.
- Rogers, Eric M. *Physics for the Inquiring Mind*. Princeton: Princeton University Press, 1960.

Edited Collections of Primary Materials

- Conant, James Bryant, ed. *Harvard Case Histories in Experimental Science*, 2 vols. Cambridge, Mass.: Harvard University Press, 1957.
- Crosland, M. P., ed. *The Science of Matter: A Historical Survey*. Harmondsworth: Penguin

Books, 1971.

- Hurd, D. L., and J. J. Kipling, eds. *The Origins and Growth of Physical Science*, 2 vols. Harmondsworth: Penguin Books, 1964. (Based on G. Schwartz and P.W. Bishop, eds., *Moments of Discovery*, published in 1958.)
- Leicester, Henry M., and Herbert S. Klickstein, eds. *A Source Book in Chemistry 1400-1900*. New York: McGraw-Hill, 1952.
- Magie, William Francis, ed. *A Source Book in Physics*. New York: McGraw-Hill, 1953.

Exemplars: "Biographies" of Objects

- Ball, Philip. *H₂O: A Biography of Water*. London: Weidenfeld & Nicolson, 1999.
- Chang, Hasok, and Catherine Jackson, eds., *An Element of Controversy: The Life of Chlorine in Science, Medicine, Technology and War*. British Society for the History of Science, 2007.
- Daston, Lorraine, ed. *Biographies of Scientific Objects*. Chicago: University of Chicago Press, 2000.
- Emsley, John. *The Shocking History of Phosphorus: A Biography of the Devil's Element*. London: Macmillan, 2000.
- Kurlansky, Mark. *Cod: A Biography of the Fish That Changed the World*. New York: Penguin Books, 1998.
- Multhauf, Robert P. *Neptune's Gift: A History of Common Salt*. Baltimore and London: John Hopkins University Press, 1978.

Important policy information

Below are listed some important points of policy. Further details of all these policies can be found in the STS Student Handbook www.ucl.ac.uk/sts/handbook

Late submission of coursework

Penalties for late coursework submission are as follows:

- loss of 5 marks for work submitted less than 24 hours late
- loss of 15 marks for work submitted between 1 and 7 days late
- loss of all marks (i.e. work is graded 0) if submitted more than 7 days late

These rules are statutory and non-negotiable.

Coursework word limits

Penalties for over-length coursework are as follows:

- Assessed work should not be more than 10% longer than the prescribed word count. Assessed work with a stated word count above this maximum cannot be accepted for submission, but will be immediately returned to the student with instructions to reduce the word length. The work may then be resubmitted, except insofar as penalties for late submission may apply.
- If submitted work is subsequently found to have an inaccurately stated word count, and to exceed the upper word limit by at least 10% and by less than 20%, the mark will be reduced by ten percentage marks, subject to a minimum mark of a minimum pass assuming that the work merited a pass.
- For work which exceeds the upper word limit by 20% or more, a mark of zero will be recorded.
- Footnotes and endnotes **do** count as part of the word limit
- Bibliography, tables, pictures and graphs **do not** count as part of the word limit.

Extensions

If unforeseeable circumstances prevent the completion of a piece of coursework, students may request an extension to the set deadline. Please consult the STS Student Handbook for further guidance on acceptable grounds for requesting an extension. Extensions must be negotiated in advance with the course tutor. Students to whom STS is parent department may also request an extension from their Personal Tutor. No extension is considered official without written approval.

The request for extension form can be found at: www.ucl.ac.uk/sts/study

Plagiarism

The *UCL Student Handbook* defines plagiarism as “the presentation of another person’s thoughts or words or artefacts or software as though they were [your] own”. Students are expected to know the College and Department policies in detail and to avoid even the appearance of inappropriate behaviour. In the first demonstrated instance of plagiarism or other irregularities in this course, students normally will receive a 0 F for the course and will be referred to the department and College officials for further action. All course work is subject to scrutiny against past papers and other materials for irregularities. Electronic and other checks

will be conducted; see the *STS student handbook* for additional information.

Attendance

Regular attendance is mandatory.

Requirements to complete modules

Students are required to be 'complete' in all modules. Normally all assignments must be attempted in order for students to be considered complete. This is different from 'passing' a module which requires a minimum overall module mark of 40%.

Assessment and additional examiners

Assessed materials are marked by the course tutors. These provisional marks will be distributed to students at the first opportunity. To ensure fairness, materials subsequently are scrutinised by a second examiner within the Department, and a consensus is reached on these separate assessments. All assessed materials and the consensus marks are made available for scrutiny by an examiner external to UCL. Marks are considered final only after the Board of Examiners for Science and Technology Studies has approved them in their annual meeting near the close of Term three.

Disputed marks

Students must endeavour to discuss any grievances over marks informally with the course tutor in the first instance. If informal discussion fails to resolve the matter satisfactorily and there appears to be genuine and substantive grounds for appeal, the student should submit a written explanation of their grievance to the chair of the board of examiners. A final formal written appeal can be made to the College Registrar.

Mechanisms for student feedback

Students have a variety of means for commenting on the module and module tutor. These include written module evaluations at the end of term, regular lecture assessments offered by the module tutor, and in-session opportunities. Students are welcome to bring comments and criticisms to the module tutor in the first instance, by anonymous note if necessary, then to their personal tutor or the STS undergraduate tutor. The department schedules regular meetings of the Undergraduate Student Staff Consultative Committee to which all students are invited.
