Course Syllabus

STS 1123: Technology and Society, Section 101: Histories of Computing

Class Number 28558

Tuesdays/Thursdays 10:10 am-11:25 am Rockefeller B15
Instructor: Hansen Hsu
Office Hours: 133 Rockefeller or 172 Rockefeller, Tuesdays/Thursdays 9:00 am - 10:00 am, Thursdays 1-2 pm, or by Appointment
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Course Description

Computers have become ubiquitous parts of our modern lives. This course will ask students to think about what computers meant to different generations, through readings in the history of computing. Competing narratives are told about the invention of computers. By comparing these stories, students will be taught to think critically about the histories they are taught and about the role technology plays in society. Topics will include the role of the military versus business in the development of the mainframe, and the role of the counterculture in the development of the personal computer. Short essay assignments will teach students to write and think like historians.

Learning outcomes:

By the time you have completed this course, you will have learned:

That writing is simply a way of working out your ideas; improving the mechanics and grammar of your writing goes hand in hand with better organizing and expressing your ideas.
To proofread for grammar, punctuation, mechanics.
To use preparatory writing strategies, with drafts, revisions, and peer review–writing is a process.
To write with proper citations in CMS, APA, or MLA style.
To read an article for an author's argument, and be able to summarize it in writing, even if you do not agree with it.
To be able to synthesize, compare, or contrast, the arguments of different authors, in writing.
To be able to construct your own argument in writing using supporting evidence drawn from the readings.
To proofread for structural problems in one's writing, such as problems with the argument/thesis, or with the evidence.
To evaluate the arguments and evidence of your peers' writing, and to learn the weaknesses of your own from their critiques.
To question and evaluate different historical arguments and interpretations.
To think critically about things you read and to not take their authority for granted.

Required Texts:

Campbell-Kelly, Martin, and Aspray, William. *Computer: A History of the Information Machine*. 2nd ed. Boulder, CO: Westview Press, 2004.
Edwards, Paul N. *The Closed World: Computers and the Politics of Discourse in Cold War America*. Cambridge, MA: MIT Press, 1996.

Turner, Fred. *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Chicago: University of Chicago Press, 2006.

Abbate, Janet. *Inventing the Internet*. Cambridge, MA: MIT Press, 1999.

Readings Available on Blackboard:

"Introduction" in Appleby, Joyce, Lynn Avery Hunt, and Margaret C. Jacob. *Telling the Truth about History*. 1-11 New York: Norton, 1994.

"Introduction: Defining 'Computer'" in Ceruzzi, Paul E. *A History of Modern Computing*. 1-12. Cambridge, Mass.: MIT Press, 1998.

Mahoney, Michael S. "The histories of computing(s).." *Interdisciplinary Science Reviews* 30, no. 2 (June 2005): 119-135.

Mahoney, Michael S. "What Makes the History of Software Hard." *Annals of the History of Computing, IEEE* 30, no. 3 (2008): 8-18.

Light, Jennifer S. "When Computers Were Women." *Technology and Culture* 40, no. 3 (July 1999): 455-483.

Ensmenger, Nathan L. "Making Programming Masculine." in *Gender Codes: Women and Men in the Computing Professions*, edited by Thomas Misa. Wiley, 2009.

Chapter 1: "The Advent of Commercial Computing" in Ceruzzi, Paul E. *A History of Modern Computing*. 13-45. Cambridge, Mass.: MIT Press, 1998.

Kline, Ronald. "Technological Determinism." in *International Encyclopedia of the Social & Behavioral Sciences*, edited by Neil J. Smelsa and Paul B. Baltes, 12:495–98. 3rd ed. Amsterdam; New York, 2001.

"Introduction" in Smith, Merritt Roe, and Leo Marx. *Does Technology Drive History? The Dilemma of Technological Determinism*, *ix-xiv*. Cambridge Mass.: MIT Press, 1994.

Winner, Langdon. "Do Artifacts Have Politics?." in *The Social Shaping of Technology: How the Refrigerator Got its Hum*, edited by Donald MacKenzie and Judy Wajcman, 26-38. 1st ed. Milton Keynes; Philadelphia: Open University Press, 1985.

"Introductory Essay" in The Social Shaping of Technology: How the Refrigerator Got its Hum, edited by Donald MacKenzie and Judy Wajcman, 2-25. 1st ed. Milton Keynes; Philadelphia: Open University Press, 1985.

"Introduction" in Bijker, Wiebe, Thomas P. Hughes, and Trevor J. Pinch. *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, 9-15. Cambridge Mass.: MIT Press, 1987.

Pinch, Trevor J., and Wiebe E. Bijker. "The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other." *Social Studies of Science* 14, no. 3 (August 1984): 399-441.

Chapter 2, "I'd Hammer Out Freedom: Technology as Politics and Culture" in Sclove, Richard. *Democracy and Technology*, 10-24. New York: Guilford Press, 1995.

Recommended: A Writing Handbook
Suggested Handbooks:

Hacker, Diana. *A Pocket Style Manual,* 5th ed., Bedford/St. Martin's, 2010.

Hacker, Diana. *A Writer's Reference with Help for Writing in the Disciplines,* 6th ed., Bedford/St. Martin's, 2009.

Lunsford, Andrea. *The Everyday Writer,* Bedford/St. Martin's, 2002.
Raimes, Ann. *Keys for Writers,* 5th ed., Houghton Mifflin, 2008.

Hjortshoj, Keith. *The Transition to College Writing*, 2nd ed. Bedford/St. Martin's, 2009.
Graff, Gerald, and Cathy Birkenstein. *They Say/I Say: The Moves That Matter in Academic Writing*. 2nd ed. W.W. Norton, 2009.

Course Documents and Communication
The course website is located within the Cornell University Blackboard (BB) system (http://blackboard.cornell.edu). Step-by-step how-to instructions for creating your BB account can be found by going to the main BB page (http://blackboard.cornell.edu) and clicking on "For Students" that is found on the right in the Support Information section. Once you set up your BB account, I will register you as a BB user for this course. If you haven't already set up your account within BB, please do so as soon as possible. Blackboard is the venue by which communications and documents for this course are conveyed. Be sure to check the site regularly.

Description of required writing
We will have three different kinds of writing in this course. First, we will have in class, informal writing exercises. These will not be graded but will count towards your participation grade. Second, weekly reading responses will be handed in during the first class meeting each week. These consist of a summary of the previous week's readings, and some personal thoughts and reactions to them. Reading responses should be about one page minimum (doublespaced). A good guideline is to write at least one paragraph summary for every full chapter or article assigned (less for chapter excerpts).

Third, there will be six more formal essay writing assignments throughout the course, increasing in length and difficulty. These make up the majority of the grade. Completing these essays will call on you to draw from the readings in the course, so doing the readings and completing the reading responses will be important preparation for the essay assignments. The longer assignments will take place in stages, allowing for preparatory work, at least one rough draft, peer review, and a final draft. These formal essays will ask students to go beyond summarizing readings to craft and sustain their own an argument or thesis, supported by evidence from the reading assignments.

Requirement for Conferences
Students taking this seminar must meet with me at least twice during the semester to review the student's work and progress. These meetings must be scheduled in advance, either during my office hours or by appointment. Beyond these required conferences, I encourage you to come see me in my office hours for any reason. I am here to help you and provide support.

Policy on Absences and Lateness
Important work will occur in class, so attendance is mandatory, and will be part of your participation grade. Only illnesses or family emergencies will be accepted as legitimate reasons to miss class. If you need to miss class, you must let me know at least 1 hour in advance (e-mail is OK). More than 2 unexcused absences will adversely affect your final grade. Please be on time and prepared so that we can start promptly.

If you do miss class for any reason, you are responsible for finding out what you missed from your peers in the class, including getting copies of materials and assignments.

Guidelines for Submission of Written Work

- All papers must be typed in a word processor, printed out, and handed in physically in class. E-mail submissions will only be allowed under extenuating circumstances.
- Use a standard serif font, 12 point. (Times New Roman, Cambria, Garamond are acceptable.)
- Doublespace, 1 inch margins
- Number your pages
- Staple or paper-clip your pages together
- At the top of the first page, include your name (this is important!), assignment number, date, and essay title.
- Proofread and spellcheck before bringing drafts to class.
- Proper citations (Chicago Style is preferred, but APA or MLA will also be accepted.) See citation style guides at: http://www.library.cornell.edu/services/citing.html

Grading Policy

Class Participation	10%
Reading Responses	15%
Essay 1	5%
Essay 2	5%
Essay 3	10%
Essay 4	15%
Essay 5	20%
Essay 6	20%

Public Domain

All student writing done for the course may be read and shared by all members of the class. Please be aware of this in your writing in case of any privacy concerns. Your work will not be shared outside the classroom without your permission.

University Policies and Regulations

This instructor respects and upholds University policies and regulations pertaining to the observation of religious holidays; assistance available to the physically handicapped, visually and/or hearing impaired student; plagiarism; sexual harassment; and racial or ethnic discrimination. All students are advised to become familiar with the respective University regulations and are encouraged to bring any questions or concerns to the attention of the instructor.

For Students with Disabilities

In compliance with the Cornell University policy and equal access laws, I am available to discuss appropriate academic accommodations that may be required for students with disabilities. Requests for academic accommodations are to be made during the first three weeks of the semester, except in unusual circumstances, so that arrangements can be made. Students are encouraged to register with Student Disability Services to verify their eligibility for appropriate accommodations.

Academic Integrity/Plagiarism
All the work you submit in this course must have been written for this course and not another and must originate with you in form and content with all contributory sources fully and specifically acknowledged. Make yourself familiar with Cornell's Academic Integrity Code. This states:

"Absolute integrity is expected of every Cornell student in all academic undertakings. Integrity entails a firm adherence to a set of values, and the values most essential to an academic community are grounded on the concept of honesty with respect to the intellectual efforts of oneself and others. Academic integrity is expected not only in formal coursework situations, but in all University relationships and interactions connected to the educational process, including the use of University resources. While both students and faculty of Cornell assume the responsibility of maintaining and furthering these values, this document is concerned specifically with the conduct of students.

A Cornell student's submission of work for academic credit indicates that the work is the student's own. All outside assistance should be acknowledged, and the student's academic position truthfully reported at all times. In addition, Cornell students have a right to expect academic integrity from each of their peers."

The complete statement of the Code of Academic Integrity can be found at
http://cuinfo.cornell.edu/Academic/AIC.html
The code, together with a guide to *Acknowledging the Work of Others*, can be downloaded at
http://theuniversityfaculty.cornell.edu/pdfs/AIAckWorkRev90620.pdf
How to use sources correctly (with examples and exercises):
http://plagiarism.arts.cornell.edu/tutorial/index.cfm
Citations styles can be found at:
http://www.library.cornell.edu/services/citing.html

In this course, the normal penalty for a violation of the code is an "F" for the term.

Collaborative work of the following kinds is authorized in this course: peer review and critique of students' essays by one another and, when approved by the instructor in particular cases, collaborative projects by pairs of students.

Calendar

Week 1, August 25-27
Thursday, August 26
Introductions, administration, writing exercises

Week 2, Aug 30-Sept 3
Tuesday, August 31
Topic: What is the history of computing? What do these authors criticize about what has been written about the history of computers?

"Introduction" 1-11 in Appleby, Joyce, Lynn Avery Hunt, and Margaret C. Jacob. *Telling the truth about history*. New York: Norton, 1994.

"Introduction: Defining 'Computer'" in Ceruzzi, Paul E. A History of Modern Computing. 1-12. Cambridge, Mass. MIT Press, 1998.

Mahoney, Michael S. "The histories of computing(s).." *Interdisciplinary Science Reviews* 30, no. 2 (June 2005): 119-135.

Assign Essay 1 (2-3 pages ungraded)
According to Michael Mahoney, why is there not a single "history of computing"? Relate this to the different uses (cited by Mahoney) that computers may have. What does Mahoney think the history of computing is really the history of, and why?
In class: preparatory writing for the essay

Thursday, Sept 2: Technological Determinism

Kline, Ronald. "Technological Determinism." In *International Encyclopedia of the Social & Behavioral Sciences,*, edited by Neil J. Smelsa and Paul B. Baltes, 12:495–98. 3rd ed. Amsterdam, 2001.

Introduction, Smith, Merritt Roe, and Leo Marx. *Does Technology Drive History? The Dilemma of Technological Determinism*, *ix-xiv*. Cambridge Mass.: MIT Press, 1994.

Winner, Langdon. "Do artifacts have politics?." In *The Social Shaping of Technology: How the Refrigerator Got its Hum*, edited by Donald MacKenzie and Judy Wajcman, 26-38. 1st ed. Milton Keynes ; Philadelphia: Open University Press, 1985.

Week 3, Sept 6-10
Tuesday, Sept 7: Against Technological Determinism–Social Construction of Technology
Essay 1 FINAL Due

"Introductory Essay" in The Social Shaping of Technology: How the Refrigerator Got its Hum, edited by Donald MacKenzie and Judy Wajcman, 2-25. 1st ed. Milton Keynes ; Philadelphia: Open University Press, 1985.

Pinch, Trevor J., and Wiebe E. Bijker. "The Social Construction of Facts and Artefacts: Or How the Sociology of Science and the Sociology of Technology Might Benefit Each Other." *Social Studies of Science* 14, no. 3 (August 1984): 399-441.

Chapter 2, "I'd Hammer Out Freedom: Technology as Politics and Culture" in Sclove, Richard. *Democracy and Technology*, 10-24. New York: Guilford Press, 1995.

Assign Essay 2 (2-3 pages): What is "technological determinism"? Find an example of this theory in the history of computing. What are some reasons why the theory is convincing to many people? What are some of the problems with this theory? What do you think about technological determinism?

Thursday, Sept 9: Human Computing and 19th Century Calculation
Readings: Ch 1 "When Computers Were People", pp 1-9, Ch 3 "Babbage's Dream Comes True", pp 45-65 in Campbell-Kelly, Martin, and William Aspray, *Computer: A History of the Information Machine*, New York: Basic Books, 1996.

Week 4, Sept 13-17

Tuesday, Sept 14: Inventing the Computer
Essay 2 FINAL Due

Readings: Ch 4 "Inventing the Computer", pp 69-91 in Campbell-Kelly and Aspray
Pp 20-24 only in Ch 1, "The Advent of Commercial Computing" in Ceruzzi.

Thursday, Sept 16: Gender and Software 1

Mahoney, Michael S. "What Makes the History of Software Hard." *Annals of the History of Computing, IEEE* 30, no. 3 (2008): 8-18.

Light, Jennifer S. "When Computers Were Women." *Technology and Culture* 40, no. 3 (July 1999): 455-483.

Assign Essay 3 proposal/preparatory writing
Essay 3 (3 pages):
Choice Topic 1: Michael Mahoney revised his paper, "The histories of computing(s)" three years later as "What Makes the History of Software Hard?" published in a different journal. Compare these two versions of the paper. In a 3 page essay, explain what changes Mahoney made to the paper, and why did he make them? In your answer, address the differences in the audience and purpose of the two papers. (Note that the first version was published in *Interdisciplinary Science Reviews* while the second was published in *IEEE Annals of the History of Computing*.)

Choice Topic 2:
Using the articles by Light and Ensmenger, explain how and why programming was originally gendered female, and how the gendered meaning of programming changed to male.

Week 5, Sept 20-24

Tuesday, Sept 21 Gender and Software 2

Ensmenger, Nathan L. "Making Programming Masculine." In *Gender Codes: Women and Men in the Computing Professions*, edited by Thomas Misa. Wiley, 2009.

Thursday, Sept 23: Business Computing 1
Readings: Ch 1, pp 14-21, Ch 2 "The Mechanical Office", pp 23-44 in Campbell-Kelly and Aspray
Essay 3 draft Due

Week 6, Sept 27-Oct 1
Tuesday, Sept 38: Business Computing 2
Ch 5 "The Computer Becomes a Business Machine" pp 93-115 in Campbell-Kelly and Aspray

Thursday, Sept 30: Business Computing 3
Ch 1, "The Advent of Commercial Computing" pp 13-20, 24-45 in Ceruzzi.

Week 7, Oct 4-8: The Military and Computing
Tuesday, Oct 5

Ch 2: "Why Build Computers? The Military Role in Computer Research" pp 41-73 in Edwards, Paul N. *The Closed World: Computers and the Politics of Discourse in Cold War America*. Inside Technology. Cambridge, Mass.: MIT Press, 1996.

Essay 3 FINAL Due

Thursday, Oct 7:
Chapter 3 "SAGE" pp 75-111 in Edwards

Essay 4 proposal/preparatory writing

Topic Essay 4 (4 pages): "The ENIAC is the world's first computer." Drawing upon your readings in Campbell-Kelly and Aspray, as well as Ceruzzi, argue to what extent is this an accurate statement or not, and why? In order to do this, you will need to state a definition of what a "computer" is, what criteria are required for a machine to be considered a "computer," and why those criteria are necessary. Use evidence from the readings in Campbell-Kelly and Aspray, and/or Ceruzzi to support your argument.

Week 8, Fall break. Classes meet Oct 13-15

Thursday, Oct 14: Cybernetics and AI, Humans and Machines

Chapter 6 "The Machine in the Middle: Cybernetic Psychology and World War II" pp 175-207 in Edwards

Workshops on Essay 4

Week 9, Oct 18-22

Tuesday, Oct 19: AI

Chapter 8, "Constructing Artificial Intelligence" pp 239-273 in Edwards

Essay 4 FINAL Due

Thursday, Oct 21:

Chapter 9 "New Modes of Computing" pp 185-204 in Campbell-Kelly and Aspray

Essay 5 preparatory writing/proposal

Topic Essay 5 (5-6 pages): Campbell-Kelly and Aspray, and Paul Edwards, offer two competing narratives for why computers were invented, one driven by business needs, and the other by the military. Which account, the business narrative or the military narrative, do you think is more convincing? In other words, do you think that military needs, or business needs, were more important in motivating people to invent computers?

This assignment asks you to explicitly compare and evaluate these two stories against each other. First, summarize the argument given in each book. Second, evaluate each of them along these two criteria:

> To what extent is each narrative accurate or inaccurate?
>
> Which events, people, or machines does each narrative highlight, and which ones does each ignore or gloss over?
>
> Why did the author(s) make these choices?

Third, which of these two narratives do you feel presents a "better" picture of the invention of computers? Use the following criteria to define what you mean by "better":

> Which interpretation did you feel was more persuasive, and why? (What specific pieces of evidence did you find most compelling?)
>
> Which aspects of computers, highlighted by the authors' narrative, do you believe to be more important to the history of computers?

You may also use Ceruzzi's account in his chapter, "The Advent of Commercial Computing" to supplement Campbell-Kelly and Aspray's business narrative if you wish.

Week 10, Oct 25-29

Tuesday, Oct 26: Personal Computing 1

Ceruzzi, Paul. "From scientific instrument to everyday appliance: The emergence of personal computers, 1970–77." *History and Technology: An International Journal* 13, no. 1 (1996): 1.

Thursday, Oct 28: Personal Computing 2

Pfaffenberger, Bryan. "The Social Meaning of the Personal Computer: Or, Why the Personal Computer Revolution Was No Revolution." *Anthropological Quarterly* 61, no. 1 (January 1988): 39-47.

Essay 5 draft 2 due

Week 11, Nov 1-5
Tuesday, Nov 2: The GUI
Bardini, Thierry, and August T. Horvath. "The Social Construction of the Personal Computer User." *The Journal of Communication* 45, no. 3 (1995): 40-66.

Thursday, Nov 4: Begin: Counterculture and the PC
Ch 1 "The Shifting Politics of the Computational Metaphor" pp 11-39 in Turner, Fred. *From Counterculture to Cyberculture: Stewart Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Chicago: University of Chicago Press, 2006.

Week 12, Nov 8-12
Tuesday, Nov 9
Ch 2 "Stewart Brand Meets the Cybernetic Counterculture" pp 41-68 in Turner
Essay 5 FINAL Due

Thursday, Nov 11
Ch 3 "The *Whole Earth Catalog* as Information Technology" pp 69-102 in Turner

Assign Essay 6
Topic Essay 6 (7-10 pages): Choose one:
1) Using the readings in Ceruzzi and Bardini and Horvath, make an argument for which machine you think should be considered the first "personal computer": the MITS Altair, or the Xerox Alto. Define what you mean by "personal." (You may also choose a different machine, such as the Apple II, or the IBM PC, if you wish, but you must clear this with me and discuss your choice with me in office hours.)
2) Was the "PC Revolution" really a revolution? Why or why not? (Compare the Ceruzzi and Pfaffenberger articles.)
3) To what extent was the creation of the PC shaped by the counterculture? To what extent was it shaped by the semiconductor industry? In other words, was the invention of the PC technologically determined, or was it a contingent product of culture? (Use the Turner and Ceruzzi readings.)

Week 13, Nov 15-19
Tuesday, Nov 16:
Brand, Stewart. "Spacewar: Fanatic Life and Symbolic Death Among the Computer Bums." *Rolling Stone*, December 7, 1972. http://www.wheels.org/spacewar/stone/rolling_stone.html.

Ch 4 "Taking the Whole Earth Digital" pp 103-140 in Turner

Thursday, Nov 11:
Ch 1 "White Heat and Cold War: The Origins and Meanings of Packet Switching" pp 7-41 in Abbate, Janet. *Inventing the Internet*. Inside Technology. MIT Press, 1999.

Thursday, Nov 18
Chapter 2 "Building the ARPANET: Challenges and Strategies" pp 43-81 in Abbate

Week 14, (Thanksgiving) Classes meet Nov 22-24 to 1:10 pm
Tuesday, Nov 23
Chapter 4 "From ARPANET to Internet" pp 113-145

Essay 6 draft 1 due

Week 15 Nov 29-Dec 3
Tuesday, Nov 30
Ch 5 "Virtuality and Community on the WELL" pp 141-174 in Turner

Thursday, Dec 2: Final Meeting
Essay 6 draft 2 due

Final Essay 6 Due on Thursday, December 16, during the scheduled final exam period, 2:00 pm-4:30pm.
I will give you a tentative grade for Essay 6 by December 8 based on your second draft turned in on the last day of class.
Instead of turning in a revision of Essay 6, you may instead turn in a revision of any other previous paper in the course, which will replace the grade you originally got on that paper. But this means that the tentative grade you received for the second draft of Essay 6 will be the final grade for it.

There will be no final exam, but I will be in my office during this time to receive your revised papers.