Algorithms and Protocols in Cyberspace
UCLA DH150/250 Spring 2016

Dr. Bradley Fidler

This outline will be modified slightly before class begins

Brief Summary

Why was the online world constructed the way it was? Who determined the ways in which information gets to you over the Internet, how you see it -- and why? What does the presence of technologies like the Internet, search engines, the World Wide Web, and encryption mean for our world and for ourselves? This course provides a non-technical introduction in the form of case studies to technologies that make the online world what it is today, such as cryptography (public key and bitcoin/blockchain) and cybersecurity, email, TCP/IP, routing, search engines, databases, artificial intelligence, and the World Wide Web. You will learn how the creators of these technologies -- companies, firms, and the defense and intelligence communities -- understood the world and the problems within it the sought to solve. This way, you will learn about the history and evolution of the online world, and learn to use social and humanistic thinking to better understand technology.

Why Take This Course?

If you are a social science or humanities student, it is important that you understand the protocols and algorithms that are governing increasingly large portions of our world. No corner of politics, society, culture, economics, or geography is left untouched by these technologies. Understanding them will make you a better social scientist or humanistic thinker. If you are an engineering student, after you leave university you will quickly learn that building things and getting them into the world is not just a technical matter, and involves political, cultural, and other social forces. The sooner you learn to navigate and exploit them, the more successful you will be. For everyone, this course will help you think critically and with sophistication about how society and technology work together, impacting everything from politics to your sense of self. You do not require a technical background to take this course.

Times, Places, Contact Information

Class: Tuesdays and Thursdays, 11:00-12:15, 2118 Rolfe Hall

Office Hours: 4731E Boelter Hall, Tuesdays and Thursdays, 12:30-1:30pm or by appointment.

You can ask me questions via email. Putting DH150 in the email subject will ensure that I see your email and respond.

Course Structure
We proceed mostly chronologically, beginning in the 1960s and ending in the 2000s. Each week we study a technology or a group of similar technologies, exploring how they originated, their functions, and their consequences. When possible, we read original documents -- that way, you get a direct line to history and do not need to rely as much on the interpretations of others (i.e. “secondary sources”). We go over their significance in class and you are not expected to wrestle with the overly technical parts. Some readings are straightforward, and others are more complex. Each class we go through them together and work through any challenging parts.

Graduate students enrolled in DH250 will use an expanded reading list and different assignment/grading structure.

**Evaluation**

**30% Blog posts**

For weeks 2-9, once per week you will write an approximately 400 word (maximum 600 word) blog post by choosing one of the assigned articles or book chapters and answering the following questions:

1. What is the topic and/or primary question? (This is typically a 1-2 sentence answer.)
2. What is the argument or hypothesis? (This is typically a 1-2 sentence answer.)
3. What is the method or evidence for supporting the the argument or hypothesis?
4. Is the argument and evidence effective?
5. What is a question you have about this reading? Pose a question that demonstrates your understanding of the reading; I will use these questions for class discussion.

These blog posts are not formal essays and can be written as such. You get full points for completing each blog post with reasonable effort, and no points for failing to complete it by Monday at 5:00pm PST of the week the reading is due. Each post is worth 3.75% of your total grade.

We will use internal UCLA blog software that is not indexed online.

**20% Participation**

Each week you should make a contribution to discussion that shows you have done the readings and given them some thought. The question you pose in your blog post does not count -- however you may bring it up in class in response to a related discussion. You cannot backdate participation points.

Week one is a warmup, and week ten is general discussion, which means there are eight weeks at 2.5% of your total grade per week in which your participation counts

You get one free unexplained absence for this course. Your next two unexplained absences drop your grade 3% each time. Four unexplained absences or above and your grade will suffer
significantly, up to a failing grade. Absences are explained with a note from a health professional such as a doctor or Student Psychological Services that does not describe the situation in any detail.

35% Main Project: Wikipedia Contribution and Essay

For this assignment you will:

1. Take what you are learning about the social aspects of technology (such as their design priorities and implications) and contribute your knowledge to a Wikipedia article by improving (or creating) an article
2. Write an essay
   a. analyzing the article as it exists before your contributions, or, if it does not exist, the priorities in related articles
   b. documenting your hypothesis, evidence, and findings regarding your subject (as you would in a typical research paper)
   c. explaining the thinking and strategy behind your edits

During class (in particular weeks four through eight) we will learn about Wikipedia, how to edit it, and how to choose an article to edit, amongst other things.

Your essay and edits will be 2,500 words. By default your edits will not be linked to your name.

My evaluation criteria is 20% analysis of topic/resource, 15% quality of edit(s). You are not judged on the popularity of your edits. If you come to see me before the project is due with questions regarding your drafts or research, your grade will automatically go up a level (e.g. B to B+, or A- to A). Your edit(s) and write-up will be judged much like a research paper, on the quality of your evidence and argument, and the clarity of your expression.

Due Friday 3 June. 5% total grade per day late.

15% Final Exam

During class I will identify key terms and concepts in our readings, and we will define them as a group. For the final exam you will be asked to write a short essay comparing two terms or concepts, drawing on the research you did for your main project. You will be able to choose between five prompts, with the objective of letting you choose a topic where you can really show off.

Important Rules

It is up to you to know what plagiarism is, and to avoid it. We will discuss plagiarism before you begin your writing. I do not use Turnitin, but I automatically report plagiarism up the chain of command.
Be nice to each other as per University of California regulations and your humanity.

**WEEK 1: Algorithms, Protocols, Cyberspace**

**March 29**

Course introduction

**March 31**


**WEEK 2: Routing Algorithms on the First Galactic Network**

**April 5**


**April 7**

Abbate, *Inventing the Internet*. Chapter Two.


**WEEK 3: Designing Freedom: Email, the Host-Host Protocol, and Cyberstride**

**April 12**

Abbate, *Inventing the Internet*. Chapter Three.

April 14 (in-class software demo: Adventure)


WEEK 4: Protocol Wars and the Rise of the Modern Internet: Transmission Control Protocol (TCP), Internet Protocol (IP), and Border Gateway Protocol (BGP)

April 19 (in-class guest lecture)


April 21 (Wikipedia assignment work)


WEEK 5: Edge Cryptography and Ordering Machines: The Private Line Interface and the Blockchain

April 26


April 28


WEEK 6: Closed World Cyberwar: From SAGE to the Global Information Grid

May 3

May 5


WEEK 7: Hypertext Transfer Protocol (HTTP), WWW, and the Network Citizen

May 10


May 12


WEEK 8: (Big) Databases and Search from Operation Igloo White to the PageRank Algorithm

May 17


May 19


**WEEK 9: Network Societies, Discipline, Buzzfeed**

May 24


May 26


**WEEK 10: Lightning Presentations and Discussion**