Institute of Communication, Culture and Information Technology
Institute Office: Room 3014, CCT Building
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Course Outline
Special Topics in CCIT: Understanding Open Source Software Production

Course Code: CCT490H5F

Course Section:

Semester Offered: Fall 2010 (20109)

Course Meeting Time: Wednesdays, 9-11 am.

Course Location: CC3124

Credit Value: 0.5

Pre-requisites: This is a 4th year CCIT course but the 13.0 credit requirement can be waived. The students are not expected to have programing experience, but should be prepared to deal with engineering concepts. Similarly, no specific prior social science coursework is required, but the students should be ready to read and understand literature from several fields of social science.

Instructor

Professor:	Yuri Takhteyev
Contact Information:	yuri.takhteyev@utoronto.ca 415-946-3809 (week days except for Wednesday)
Office Hours:	2-3 pm on Wednesdays and by appointment, in CCT3018
Website:	http://takhteyev.org/courses/10F/cct490/

Course Description

The course will apply a variety of lenses (economic, political, cultural, technical) to the production of free / open source software — i.e., software that users are allowed to modify and redistribute without having to ask for permission or to pay royalties. In the recent years such software has grown in prominence. Today it includes both popular end-user software such as Mozilla Firefox and Google Chrome, as well as back-end software that today dominates many domains of IT infrastructure (e.g., the Apache web-server and the GNU/Linux operating system). In addition to creating many opportunities (and challenges) to IT professionals, the success of open source software has presented a number of puzzles and questions for social science researchers and policy makers. Why do individuals and companies allow their work to be freely shared? What reasons do they have for contributing time and money? How do they coordinate their activities? Can the open source software model be applied to the production of other goods, e.g., can we have “open source textbooks” or “open source pharmaceuticals”? What shall the government policy be in regards to free and open source software? Shall intellectual property laws be strengthened or relaxed in the face of those new developments? The course will explore those questions, seeking to understand the open source phenomenon itself, but also using it as a testing ground for ideas from several fields of social science, observing the strengths and weaknesses of the different approaches and the ways in which they challenge and complement each other.

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Goals and Learning Objectives

Students will learn about free / open source software, becoming familiar with its current state, its history, and a number of alternative perspectives on how and why it works. The course will prepare them to make informed decisions related to use or production of free / open source software. Additionally, students they will gain exposure to ideas from economics of innovation, intellectual property law, as well sociology and anthropology of work and technology. They will also improve their ability to engage in close and critical reading of a variety of texts, including those written by theorists from several fields, journalists, advocates, and practitioners.

Course Requirements

Students are expected to come to class every week and to dedicate their full undivided attention to the content of the course while in the classroom. Students are encouraged to take notes, but should do so on paper, as laptops are generally not allowed in class. Students are not expected to write down every word that is being said in class and should focus on understanding the ideas rather than remembering minute details. Students are expected to have done all the required readings *before* the class and to come to class ready to ask questions about those readings and engage in a discussion about them. (Revisiting the readings after the class is *highly* recommended.)

Students are expected to approach the readings actively and critically, striving to understand *what* the author intends to say, *how* they say it, and *why* they do so.

Students are expected to submit their assignments on time, adhering strictly to required format (see below) and specified word limits. The assignments should be written clearly and should demonstrate understanding of the material.

Teaching Methods

The class will be taught in the form of interactive lectures. The instructor will present a substantial amount of new material during the class, which will often involve topics not covered by the readings. The lectures and the readings are meant to be complementary, rather than alternative sources of the same information. On the other hand, the students are expected to take advantage of the small size of this class by asking questions and participating in a discussion.

The course will stress critical thinking. While we will take as our point of departure the stunning success of free / open source software in the recent years, we will not aim to rehearse the laundry list of arguments that has been offered for this approach to developing and licensing software. Rather, we will examine a variety of perspectives, looking to understand their strengths and weaknesses.

Required Materials

Most of the required readings are available as a course pack at the Copy Center, in Room 1132 of South Building (near the bookstore). The remaining ones are available from the Internet. The students are asked to bring the reading materials to class, as we may sometimes turn to them during our discussion.

Assessment and Grading Policies

45% of the grade will come from 3 assignments, which will be spread out through the semester. Each assignment will ask the students to answer a series of questions related to the readings or the material presented in the lecture. The questions will ask for clear and a *concise* answers and will have a word limit (e.g., 50 words, 500 words, etc.), which will be enforced ruthlessly. Please think of the word limit not as a target to be achieved, but rather as your *budget* for the question. If a question asks for a 300 word answer, you should aim not simply to write 300 words, but rather to provide the best response that can be written without exceeding 300 words. Some of the questions may require students to use additional resources, e.g., websites. For example, students may be asked to look up certain information or find and analyze a case. In general, however, assignment questions will aim to encourage and test students understanding of the readings and their ability to engage with those readings critically. (Your grade will also depend, of course, on your ability to *express* your understanding of the readings and lectures. Students who have difficulty expressing themselves in English should discuss their situation with the instructor at the earliest opportunity.)

50% of the grade will be determined by the final exam, which will consist of questions similar to those used in the assignments but may also involve multiple choice or short-answer questions. The final will cover material from readings *and* lectures, from the whole semester.

5% of your grade is based on class participation. Please note that class participation does *not* mean attendance. Students who attend all lectures but remain silent will get 0 for class participation. (This is per University of Toronto regulations.) Students who have difficulty speaking in public should see the instructor early in the semester, so that we could discuss possible remedies.

Grading Scheme

Assignment	Weight	Due Date	Type
Assignment #1	15%	October 6, 2010	individual
Assignment #2	15%	October 27, 2010	individual
Assignment #3	15%	November 17, 2010	individual
Class participation	5%		individual
Final Exam	50%		individual

Final Exam

YES	✓
NO	

[If yes, please include following details:]

Duration (2 or 3 hours)	2 hours
Tablet Arms (Yes or No)	No
Aids Permitted (Yes or No, if yes, explain)	No
Audio-visual Requirement (enter details)	None
Open-Book (Yes or No)	No

Weekly Class Schedule and Readings

The readings are identified by symbols showing where to find them:

- ★ a reading from the course pack,
- ☆ a reading from the Internet,
- ♻ a reading from the course pack that was assigned during a previous week,
- ♲ a reading from the Internet that was assigned during a previous week.

Abbreviations for sources used multiple times:

FSFS: Richard Stallman (2002). *Free Software, Free Society: Selected Essays of Richard Stallman, edited by Joshua Gay.* Boston, MA: GNU Press. Articles from this book are **included in the course pack**, and are *also* available on the web at http://www.gnu.org/philosophy/fsfs/rms-essays.pdf.

Open Sources: Chris DiBona, ed. (1999) *Open Sources: Voices from the Open Source Revolution.* Sebastopol, CA: O'Reilly. Chapters from this book are **included in the course pack**, and are *also* available on the web a http://www.oreilly.de/catalog/opensources/book/toc.html.

Perspectives: Joseph Feller, Brian Fitzgerald, Scott A. Hissam and Karim R. Lakhani, eds. (2005). *Perspectives on Free and Open Source Software.* Boston, MA: The MIT Press. Articles form this book are **not** included in the course pack but are available at http://mitpress.mit.edu/catalog/item/default.asp?ttype=2&tid=10477&mode=toc. (You can use http://bit.ly/pfoss as a shortcut.) Students should download and print the required chapters.

Please note that individual readings vary substantially in both length and difficulty. You may find that some of the longer readings may take less time than some of the shorter ones.

Week 1 | September 8
An Introduction to Free and Open Source Software

What is free and open source software? Why do we care? (Who uses it anyway?) How will we go about understanding free and open source software in this course?

- ☆ "Open source software" → http://en.wikipedia.org/wiki/Open_source_software
- ☆ "Free Software" → http://en.wikipedia.org/wiki/Free_Software
- ★ Richard Buckman and Joshua Gay (2004). "A Note on Software" in *FSFS.*
- ★ "Open Source Definition." [Also available at http://www.opensource.org/osd.html.]
- ★ "Free Software Definition" in *FSFS.* [Also available at http://www.gnu.org/philosophy/free-sw.html.]

Week 2 | September 15
Free and Open Source Software Today

What the difference between "free" and "open source" software? (Is there any?) What is their current state today? (The readings provide some historical background, while the lecture will focus more on the current state of affairs.)

- ★ Richard Stallman (1999/2004). "The Gnu Project," ch. 1 in *FSFS*.
- ★ Eric Raymond (1999). "The Revenge of the Hackers," in *Open Sources.*
- ★ Eric Raymond (1997). "The Cathedral and the Bazaar." RedHat Technical Whitepapers. [Also available at http://www.redhat.com/support/wpapers/community/cathedral/whitepaper_cathedral.html.]

★ Greg Kroah-Hartman, Jonathan Corbet, and Amanda McPherson (2009). "Linux Kernel Development : How Fast it is Going, Who is Doing It, What They are Doing, and Who is Sponsoring It: An August 2009 Update." A Linux Foundation report. [Also available at http://bit.ly/wwlnx.]

★ Richard Stallman (1998/2004). "Why 'Free Software' is Better than 'Open Source'", ch. 6 in *FSFS.* [Also available at http://www.gnu.org/philosophy/free-software-for-freedom.html.]

Week 3 | September 22
Software and Culture

Who are "hackers"? Where did they come from? Are they an occupational culture? Are they a counter-culture? Is free / open source software a culture? (If so, one culture or two?)

★ Eric Raymond (1998). "A Brief History of Hackerdom" in *Open Sources.*

★ Steven Levy (1984/1994). Ch. 1 and 2 in *Hackers: Heroes of the Computer Revolution.* New York: Penguin Books.

★ Fred Turner (2006). "The Shifting Politics of the Computational Metaphor," ch. 1 in *From Counterculture to Cyber Culture: Steward Brand, the Whole Earth Network, and the Rise of Digital Utopianism*. Chicago: The University of Chicago Press.

Week 4 | September 29
Economics of Innovation

What are "public goods"? (Specifically, what does it mean for something to be "nonrival" and "non-excludable"?) In what sense are ideas and software "public goods"? Why might it make sense to limit the use of information goods? What are some of the other ways of supporting production of such goods?

☆ Tyler Cowen (no date). "Public Goods", The Concise Encyclopedia of Economics. → http://www.econlib.org/library/Enc/PublicGoods.html

★ Suzanne Scotchmer (2004). Ch. 1 and 2 in *Innovation and Incentives*. Cambridge, MA: The MIT Press.

Week 5 | October 6
Software as Intellectual Property

► **Assignment # 1 due at the beginning of the class.**

How did software get to be protected by intellectual property laws? And where did the idea of selling software as a "product" come from?

★ Martin Campbell-Kelly (2004). "Origins of the Software Product Industry, 1965-1970," ch. 4 in *From Airline Reservations to Sonic the Hedgehog: A History of the Software Industry*. Cambridge, MA: The MIT Press.

☆ Joel Spolsky (no date). "Five Worlds" → http://www.joelonsoftware.com/articles/FiveWorlds.html

★ Peter Menell (2002). Part I (pp. 68–98) in "Envisioning Copyright Law's Digital Future," UC Berkeley Public Law Research Paper No. 95. [Also available at SSRN: http://ssrn.com/abstract=328561]

Week 6 | October 13
The Free Software Movement in the 1980s

How did the free software movement arise in the 1980s? What is "copyleft"? In what sense is the free software movement a "movement"? How does it work? What is its ideology and why is it important? What is the role of non-profit foundations?

★ Glen Moody (2002). "The New GNU Thing," ch. 2 in *Rebel Code: The Inside Story of Linux and the Open Source Revolution.* New York: Basic Books.

♻ Have another look at Stallman's "The Gnu Project" from week 2.

★ Richard Stallman (1999/2004). "The Gnu Manifesto", ch. 2 in *FSFS*.

☆ "GNU General Public License" → http://www.gnu.org/licenses/gpl.html

☆ "Frequently Asked Questions about GNU Licenses" → http://www.gnu.org/licenses/gpl-faq.html

☆ O'Mahony, S. (2005). "Non-Profit Foundations and Their Role in Community-Firm Software Collaboration," ch. 20 in *Perspectives.* [**pp 393–400 only**] → http://bit.ly/pfoss

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Week 7 | October 20
The Rise of Linux

What is Linux? Where did it come from? Why does it matter? What are some of the other significant free / open software projects?

★ Glen Moody (2002). "A Minor Rebellion," ch. 3 in *Rebel Code*.

★ Linus Torvalds and David Diamond (2001). selections from *Just for Fun: The Story of an Accidental Revolutionary*. New York: HarperBusiness.

♲ Revisit Kroah-Hartman, et al's "Linux Kernel Development" from week 2.

♲ *Finish* Siobhan O'Mahony (2005). "Non-Profit Foundations and Their Role in Community-Firm Software Collaboration," ch. 20 in *Perspectives.* [pp. 401-413] → http://bit.ly/pfoss

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Week 8 | October 27
Producing Open Source Software

► **Assignment # 2 due at the beginning of the class.**

How do open source projects actually work?

★ Karl Fogel (2006). Chapters 2 ("Getting Started"), 3 ("Technical Infrastructure") and 4 ("Social and Political Infrastructure") in *Producing Open Source Software: How to Run a Successful Free Software Project.* Sepastopol, CA: O'Reilly. [Also available at http://producingoss.com/]

Week 9 | November 3
Economics of Open Source – 1

What motivates people and companies to contribute to open source software? What is "job market signaling"? What are "complimentary goods"?

☆ Josh Lerner and Jean Tirole (2005). "Economic Perspectives on Open Source," ch. 3 in *Perspectives.* → http://bit.ly/pfoss

☆ Karim Lakhani and Robert Wolf (2005). "Why Hackers Do What They Do," ch. 1 in *Perspectives.* → http://bit.ly/pfoss

★ Joel Spolsky (2004). "Strategy Letter V: The Economics of Open Source," ch. 40 in *Joel on Software: And on Diverse and Occasionally Related Matters That Will Prove of Interest to Software Developers, Designers, and Managers, and to Those Who, Whether by Good Fortune or Ill Luck, Work with Them in Some Capacity.* Apress.

Week 10 | November 10
Economics of Open Source – 2

Can open source software be somehow more efficient than proprietary software? What is "deadweight loss" again? What is the "hold-up problem"? What are "transaction costs"? What are "network effects"? What is "user innovation"? How do all of them relate to software production?

♻ Revisit ch. 2 in Scotchmer's *Innovation and Incentives*, especially 2.1 and 2.6.

- ★ Michael Schwarz and Yuri Takhteyev (2010). “Half a Century of Public Software Institutions: Open Source as a Solution to the Hold-Up Problem.” *Journal of Public Economic Theory*, 12 (4), **pp. 609-618 only**.
- ★ Eric von Hippel (2004). “Open Source Software Projects as ‘User Innovation Networks,’” ch. 14 in *Perspectives.* → http://bit.ly/pfoss
- ♻ Have another look at Raymond’s “The Cathedral and the Bazaar” from week 2.

Week 11 | November 17
The Contemporary Politics of Free and Open Source Software

- ► **Assignment # 3 due at the beginning of the class.**

What have the free software movement been up to since the 1980s? Is it a political *movement? If so, what are its politics?*

- ★ Gabriella Coleman (2004). “The Political Agnosticism of Free and Open Source Software and the Inadvertent Politics of Contrast,” *Anthropological Quarterly,* 77(3).
- ★ Anita Chan (2004). “Coding Free Software, Coding Free States: Free Software Legislation and the Politics of Code in Peru ,” *Anthropological Quarterly,* 77(3).

Week 12 | November 24
Wikipedia, Creative Commons, Open Science

Can the idea of “open source” be extended to other domains? Can we have “open source books” and “open source science”? What are Creative Commons and the “free culture movement.” What is “open publishing.” How successful have those endeavors been so far? What can we expect in the future?

- ☆ Lawrence Lessig (2008). “Early Creative Commons History” (video), iCommons Summit, Sapporo, Japan. July 30, 2008. → http://bit.ly/cchistory
- ☆ http://creativecommons.org/
- ☆ Yuri Takhteyev (2009). “The Source in Free Culture.” Free Culture Research Workshop, Harvard Law School, Cambridge, MA, USA. October 23, 2009. → http://bit.ly/fcrw
- ☆ Paul Duguid (2006). “Peer Production and ‘Laws of Quality.’” *First Monday,* 11 (10) → http://bit.ly/duguid06

Course Communication Policy

Only student Utormail accounts should be used for course communication. All emails from students must include the course code (“CCT490”) in the subject line and should be signed with the student’s full name. The students should expect their questions to be answered in 2 business days. (If you don’t hear back within two days, please resend your message.) Before sending an email, please check if the requested information is available in the course outline, assignment handouts, announcements posted on Blackboard or emails from the instructor. Questions on the content of the course that are likely to require lengthy explanations should ideally be asked in class or brought to office hours. (The students are invited to make use of office hours.)

The instructor may send course-related announcements to the students by email. The students are responsible for making sure they receive those announcements and read them.

Assignment Submission

Students should submit assignments by bringing **a paper copy** to class on the day the assignment is due. Electronic submissions will generally not be accepted. All written assignments should also satisfy the following requirements:

- Student’s full name and student number shown in the upper right corner of the first page
- Stapled

- Strictly adhering to specified word limit, which should be stated after each answer.
- 12 point serif font (like “Times New Roman), not Comic Sans or Arial.
- 1.5 spaced
- 2 cm margins
- No cover page

Assignments that fail those requirements **will not be accepted**. The students will be asked to resubmit the assignment, which will be subject to penalty for lateness.

Late Assignments and Missed Exams

You are expected to complete assignments on time. There will be a penalty for lateness of 3% deducted for each day or part of a day that the assignment is late. Assignments that are due at the beginning of a class will be considered late if they are not handed in at the moment when the class is scheduled to begin. Work that is not handed in one week after the due date will not be accepted.

As of September 2010, students are **required to declare their absence on ROSI,** in order to receive academic accommodation for any course work such as missed tests, late assignments, and final examinations. In addition to this policy, students must also adhere to the following CCIT policy after declaring an absence on ROSI.

Deadline extensions will be granted only for a compelling reason and with appropriate documentation and students should contact instructors immediately, and no later than the due date, if a deadline cannot be met.

The Office of the Registrar handles all missed final exams.

Academic Integrity

According to University of Toronto *Code of Behaviour on Academic Matters* it is an academic offense for a student to knowingly “represent as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work, i.e. to commit plagiarism.” Committing plagiarism “knowingly” includes the cases where the student ought reasonably to have known that they are presenting as their own work done by someone else.

The University of Toronto treats academic offenses very seriously. Students suspected of academic misconduct will be subject to a formal process to determine whether an academic offense has in fact been committed. For students convicted of a academic offense the consequences can be quite severe. Please consult the *Code of Behaviour on Academic Matters*[1] and the *Code of Student Conduct,*[2] for more information your rights and responsibilities and the range of possible sanctions for academic offenses.

Students should familiarize themselves with the following website, which provides details suggestions on how to avoid plagiarism:

→ http://www.writing.utoronto.ca/advice/using-sources/how-not-to-plagiarize

Classroom Management

Students are expected to come to class on time. Cell phones and other mobile devices can never be used during class time and should be kept in silent mode.

Use of laptops in class is strictly restricted to note-taking and tutorial exercises. Additionally, students who wish to use their laptops for taking notes **must sit in the front seats of the classroom**. Students sitting elsewhere and wishing to use their laptops before the beginning of the class are responsible for making sure that their laptops are not visible by the time the class is scheduled to start.

Religious Observance

Students whose religious observances may conflict with the course schedule should consult University’s Policy on Scheduling of Classes and Examinations and Other Accommodations for Religious Observances.[3]

1 http://www.governingcouncil.utoronto.ca/policies/behaveac.htm
2 http://www.governingcouncil.utoronto.ca/policies/studentc.htm
3 http://www.governingcouncil.utoronto.ca/policies/religious.htm

Other Resources

AccessAbility

The University accommodates students with disabilities who have registered with the AccessAbility Resource Centre. Please let me know in advance, preferably in the first week of class, if you will require any accommodation on these grounds. To schedule a registration appointment with a disability advisor, please call the Centre at 905-569-4699 or e-mail at: access.utm@utoronto.ca.

→ http://www.utm.utoronto.ca/access/

Robert Gillespie Academic Skills Centre

Students can visit the Academic Skills Centre to consult with one of its strategists about understanding learning style, developing study plans for upcoming tests/exams, or discussing papers. Special Diagnostic Assessments are also offered and are designed to help you learn exactly where you stand with respect to critical academic skills.

→ http://www.utm.utoronto.ca/asc

UTM Library (Hazel McCallion Academic Learning Centre)

The University of Toronto boasts the biggest academic library in Canada and the second biggest in North America. Various services are available to students at the UTM Library and across the UofT library system. Services include borrowing, interlibrary loans, online references, laptop loans and the RBC Learning Commons.

→ http://library.utm.utoronto.ca

Every attempt will be made to follow this syllabus, but its contents are subject to change, according to the rules outlined in the UTM Instructor's Handbook, section 3.2.2.