NORTHERN ARIZONA UNIVERSITY

School of Informatics, Computing, and Cyber Systems

CS 499 **Open Source Software Development** Syllabus

Term	Class No.	Section	Units	Days & Times	Room	Mode
Fall 2018	5529	003	3	TuTh 8:00AM - 9:15AM	090-102	Face-to-face

Enrollment Requirements

Course Website

https://github.com/igorsteinmacher/CS499-2018
http://bblearn.nau.edu

Instructor(s)

Dr. Igor Steinmacher
Email: Igor.Steinmacher@nau.edu
Office Hours: TuTh 09:30AM – 11:20AM; Room 090-115. I also welcome and encourage students to schedule appointments in different hours.

Course Purpose

This course is intended to familiarize students with the fundamentals of Open Source Software development. We aim to prepare the students for the real world, exposing them to real projects. The practical objective of the course is to teach students how to participate in an OSS project. Specific areas addressed in this course are:

- Open source concepts and history;
- Open source communities and forges;
- Intellectual property and license;
- Version control systems;
- Communications tools;
- Issue trackers;
- Contribution to Open Source Software project.

Informal Explanation

In this course, the students will learn and be exposed to Open Source Software (OSS) projects. OSS projects are environments inherently collaborative, which stand on the shoulders of a community that interacts in order to build a software system. Participation in this kind of project enables students to interact with real systems, real problems, and real software development teams interested in building high quality working software. Thus, students have a unique opportunity to learn attitudes only present in real-world scenarios, which can increase not only their skills but also their self-confidence.

Course Student Learning Outcomes

Upon successful completion of this course, students will be able to demonstrate the following advanced competencies:

- LO1: understand how a team interact and collaborate to develop a software;
- LO2: differentiate between open source and closed source software;
- LO3: use version control system and issue tracker as development tools;
- LO4: evaluate and review code contributions;

- LO5: understand intellectual property rights, licensing, and the implications of using open source;
- LO6: build solutions and fixes in order to contribute to a project with legacy code;
- LO7: participate in an OSS community, contributing code;
- LO8: understand open source project management.

Assignments / Assessments of Course Student Learning Outcomes

Methods of assessment will include:

1. Setting up an Open Source project: In this group assignment, you will be required to set up an Open Source project of your choice (some previous assignment for another course or piece of code produced by one member of the group). By working on this assignment, students will have the opportunity to exercise LO3, LO5, and LO8. This assignment will have two parts:
    a. creating a welcoming environment, defining a proper home page for the project, and providing documentation;
    b. licensing the code properly (document justifying the choice required).
2. Short-term/in-class assignments (hands-on/quizzes): at least 4 assignments are planned, including quizzes and hands-on projects. The goal is to exercise specific points of LO1, LO2, and LO5. Some of these assignments are already planned (see those marked with # in the class outline).
3. Contribution to Wikipedia: each student will be required to make a significant contribution to a Wikipedia article of their choice. This will introduce the students to the process of contributing to a crowd-sourced platform. The deliverable can either be a link to the contribution (if accepted) or a brief explanation why the contribution was not accepted by the community.
4. Contribution to Open Source project: multi-step assignment focusing on making the students have contact with real-world problems and to interact with a real community, learning practices, values and procedures of a software team. With this final assignment, the students will exercise all learning objectives.
    a. This assignment consists of, at least, the following parts: deciding the project to contribute to; choosing the task to be conducted; understanding the process of contribution of the project; explaining the architecture of the project; developing the solution for the chosen task; address the comments and revisions done by the peers and by project members; submitting the changes back to the project.
    b. There are 4 checkpoints planned, each of them will be graded accordingly.
    c. The final deliverable is composed of an informal presentation and a two/three-page document describing the contribution process of an existing large open source project, based on investigating the publicly available information about this project.
5. Code review (pre-submission): This assignment is a part of the previous one. Each group will be asked to review the code of another group before the submission is actually made to the main repository. This assignment aims to help students achieving LO3, LO4, and LO8.
6. Extras: the students will have the opportunity to complement some of the other assignment grades by volunteering to one of the following activities. These assignments are optional and may sum up to 8 points (8%) of the final grade, aiming to sub any other assignment, or complementing any other graded assignment.
    a. Mediating discussions (4 points): there will be (at least) four discussion classes in which we will have the opportunity to talk about trending topics related to Open Source. I would like to have at most 4 students per discussion playing the mediator role, by bringing questions and fostering the discussion. Volunteers need to open issues on GitHub requesting to be a mediator, which needs to be approved by the instructor. This will work in a First to Come First to Serve basis.
    b. Making short presentations (4 points): you can choose a topic related to Open Source to prepare and make a short presentation at the beginning of any lecture. The instructor will provide an initial list of topics, and the students can add anything they find relevant. There can be at most TWO presentations per lecture, and it needs to be authorized by the day before the class. The student

needs to open an issue on GitHub proposing the talk at least 24 hours before the class, and the instructor needs to acknowledge and put in the schedule. This will work in a First to Come First to Serve basis.

c. Writing small essays (4 points each): the instructor will provide a list of papers that can be read and the students may write a one-page document summarizing and criticizing one of the papers. Each student can write UP TO TWO essays.
d. Attending to invited talks (2 points each): whenever there is a seminar at SICCS or any online interesting talk, students will be invited to attend and write a small essay about it.
e. Other ways to earn extra points can be announced during the course. Check the GitHub for this course for information.

Grading System

A weighted sum of assessment components is used to calculate your final grade in the course (deadlines may change):

Assignment	Planned Deliverable	Weight	Deadline
Short-term/in-class assignments (multiple)	List of commands (document submitted)	20%	Sept. 18
Setting up an open source project	Your project created in GitHub	10%	Oct. 4
Choosing a license for your project	Document justifying the choice of the license	5%	Oct. 4
Contribution to Wikipedia	Link to the contribution (if accepted) or a document explaining why it was not accepted	10%	Oct. 18
Contribution to Open Source (Checkpoint 0)	**Stand up presentation** Decision about project and plan on steps towards contribution	5%	Oct. 9
Contribution to Open Source (Checkpoint 1)	**Presentation** * Present the task(s) details + progress report * First impressions/guidelines availability * Architectural analysis (document)	10%	Oct. 25
Contribution to Open Source (Checkpoint 2)	**Group + instructor presentation** Progress report	5%	Nov. 15
Contribution to Open Source - Peer (in-class) code Review	Code review performed by other group (This task may be done throughout the period, depending on the flux of submissions)	5%	Nov. 29
Contribution to Open Source (Checkpoint 4)	Final presentation (group + instructor) *can be done during office hours*	10%	Dec. 6
Contribution to Open Source (Final report)	Summary of the contribution process (I recommend to be written on-the-fly to avoid forgetting things)	20%	Dec. 13
Extras (to substitute or complement any other graded assignment)	Presentations, discussion mediation, participation in talks, etc.	8%	Multiple

Grades will be awarded on the following scale:

Percentage Grade	Letter Grade
90% or above	A
80% through 89%	B
70% through 79%	C
60% through 69%	D
59% or below	F

There is no "curve". Each student's grade is based on their own outcomes assessments and not affected by the grades of other students. Extra credit opportunities may present themselves throughout the semester and will be announced during class meetings. Mistakes in grading to happen, and students are encouraged to discuss such concerns with the instructor during office hours.

Readings and Materials

The main reading materials for this course are:

- FOGEL, Karl. Producing Open Source Software. O'Reilly. Available online: http://producingoss.com (Creative Commons)
- RAYMOND, Eric S. The Cathedral and the Bazaar. Available online: http://catb.org/esr/writings/cathedral-bazaar,1997-2009.

Other recommended sources include:

- BENKLER, Yochai. The Wealth of Networks: How Social Production Transforms Markets and Freedom. New Haven: Yale University Press. Available online: http://cyber.law.harvard.edu/wealth_of_networks, 2006
- CHACON, Scott; STRAUB, Ben. Pro Git. Ed.2. Apress, 2014. ISBN 978-1484200773. Available online: https://git-scm.com/book/en/v2
- DIBONA, Chris; OCKMAN, Sam; STONE, Mark. Open Sources: Voices from the Open Source Revolution. O'Reilly Media. 1999. ISBN 978-1565925823. Disponível online: http://www.oreilly.com/openbook/opensources/book/index.html
- MÄENPÄÄ, Hanna; MÄKINEN, Simo; KILAMO, Terhi; MIKKONEN, Tommi; MÄNNISTÖ, Tomi; RITALA, Paavo. Organizing for openness: six models for developer involvement in hybrid OSS projects. Journal of Internet Services and Applications (2018) 9: 17. https://doi.org/10.1186/s13174-018-0088-1
- St. LAURENT, Andrew M. St. Understanding Open Source and Free Software Licensing. Sebastopol: O'Reilly, 2004. Available online: http://www.oreilly.com/openbook/osfreesoft/book/index.html
- PINTSCHER, Lydia. Open Advice FOSS: What We Wish We Had Known When We Started. ISBN: 978-1-105-51493-7. Available online: http://open-advice.org/Open-Advice.pdf (Creative Commons)
- ROSEN, Lawrence. Open Source Licensing: Software Freedom and Intellectual Property Law. New Jersey: Prentice Hall, 2005.
- STALLMAN, Richard M. Free Software Free Society: selected essays of Richard M. Stallman. GNU Press. Available online: http://shop.fsf.org/product/free-software-free-society, 2002.
- STEINMACHER, Igor. Supporting newcomers to overcome the barriers to contribute to open source software projects. 2015. PhD Dissertation. Institute of Mathematics and Statistics - University of São Paulo. Available online: http://www.igor.pro.br/publica/TeseSteinmacher.pdf
- TAPSCOTT, Don; WILLIAMS, Anthony D. Wikinomics: how mass collaboration changes everything. 375 Hudson Street, New York, NY: The Penguin Group, 2006.

Additional content will be provided from various sources, including research papers, blog posts, videos, podcasts, etc.

Class Outline and Tentative Schedule

The course topics and a tentative schedule serve as an outline for the class:

		Content	Pre-readings and in-class activities
Week 1	**Aug 28**	Introductions – Basics of Open Source	
	Aug 30	Open Source: what it is and what it is not History of Open Source	
Week 2	**Sept 4**	Discussion: The Cathedral and The Bazaar	Pre-reading (The Cathedral and the Bazaar)/ mediator needed
	Sept 6	Git and GitHub	
Week 3	**Sept 11**	Git and GitHub	
	Sept 13	Git and GitHub / Code Review	
Week 4	**Sept 18**	How to "create" an Open Source project	
	Sept 20	Licenses and Copyrights	
Week 5	**Sept 25**	Time for code review (hands-on)	**Code review: Hands on!**
	Sept 27	OSS Technical Infrastructure	Pre-reading: producingoss.com chapter 3.
Week 6	**Oct 2**	Contributing to Open Source projects	
	Oct 4	Information about the contribution assignment	
Week 7	**Oct 9**	Contribution project presentations (**Checkpoint 0!**)	
	Oct 11	Continuous Integration (Prof. Toby Hocking)	
Week 8	**Oct 16**	OSS governance / social infrastructure	Pre-reading: producingoss.com chapter 4.
	Oct 18	Invited Talk (Creative Communities)	
Week 9	**Oct 23**	*Discussion (i)*	Pre-reading: TBD / mediator needed
	Oct 25	Contribution to Open Source **Checkpoint 1!**	**Presentation**
Week 10	**Oct 30**	Guest lecture (Filipe Saraiva): My history	
	Nov 1	*Discussion (ii)* *	Pre-reading: TBD /mediator needed
Week 11	**Nov 6**	Managing participants	Pre-reading: producingoss.com chapter 8.
	Nov 8	Code hour!	
Week 12	**Nov 13**	*Discussion (iii)* *	Pre-reading /mediator needed
	Nov 15	Contribution to Open Source **Checkpoint 2!**	**Presentation**
Week 13	**Nov 20**	NAU Holiday	
	Nov 22	*Discussion (iv)* *	Pre-reading: TBD /mediator needed
Week 14	**Nov 27**	Code hour!	
	Nov 29	Google Summer of Code (Prof. Toby Hocking)	*Final submission is desired before this date*
Week 15	**Dec 4**	Last minute work on projects	
	Dec 6	Contribution to Open Source **Checkpoint 3!**	**Final Presentation**
Week 16	**Dec 13**	Final date to submit the contribution process summary	**Final Report due** – Summary of the contribution process (I recommend to be written on-the-fly to avoid forgetting things)

* Discussion topics (subject to change/new ideas are welcome):

- How to make money with Open Source
- Why are companies Open Sourcing?
- Gender and Open Source.
- Behavior in Open Source.

Course Policies

Attendance. Attendance is required and will be recorded. Coming to class more than 15 minutes late will count as an absence. Leaving class more than 30 minutes early if work has not been completed will be counted as an absence. Excessive absences will reduce your overall grade:

- **3** unexcused absences will result in a 10% penalty in your final grade;
- **4** unexcused absences will result in a 20% penalty in your final grade;
- **5** unexcused absences will result in a 30% penalty in your final grade;
- **6 or more** unexcused absences will result in a 40% penalty in your final grade.

Contact Methods: Don't hesitate to stop by at my office or send me an email with any personal concerns. I appreciate to be in touch with students and will happily do my best to answer your questions and address your concerns. I reserve the right to ask you to come in for a chat during office hours for long answers, and reserve email for shorter answers. I will answer your emails as soon as I possibly can but don't bank on a response time measured in minutes (though, that may sometimes happen too). Also, please make sure that you put your name somewhere in the message. Without this information, there's no guarantee that I will answer your email.

Grading review: If you feel a mistake has been made in grading your assignment, please address your concerns during office hours or after class. The instructor will gladly explain his reasoning for deductions and correct any mistakes. However, any corrections must be discussed and made within a week of the assignment return date.

Assignment Sharing: The instructor may share anonymized student assignments (or parts of them) with the class for didactic purposes. If you don't want that something that you have produced to be shared with the rest of the class, state clearly in the respective deliverable.

Interventions: We have limited time. I will push, challenge, and question you hoping you will quickly learn. We hope you can recognize that the comments aren't personal, but part of the process. I also expect you to question me, challenge my point of view if you disagree, and engage in a real dialog with the teaching team. This approach may seem harsh or abrupt, but it is all part of our wanting you to learn to challenge yourselves quickly and objectively and to appreciate that as professionals, you need to learn and evolve faster than you ever imagined possible.

Workload: As we will have extensive practice, reserve time in your schedule for this course. Per the University Academic Contact Hour Policy, it is expected that the students do a minimum of 7.5 hours of work per week additionally to the class time.

Electronic Devices: Feel free to bring your laptops and take electronic notes or try things out as we talk about them during lecture. Note that watching YouTube videos or updating your Facebook page does not count as taking notes and trying things out. Please be courteous to your classmates and me by silencing your cell phones. I reserve the right to ask you to stop using any device if I feel its use is bothersome or distracting to the class.

Late Submissions: Observe the due date/time on BB Learn or GitHub. If not explicitly mentioned, the assignments are due at the beginning of the class time. Unless otherwise stated, late submissions will not be accepted, unless in exceptional cases. The course provides multiple opportunities for earning extra points to compensate missed assignments.

In-class assignments: There is no second chance to turn in in-class assignment.

Grades: Grades will be entered in BBLearn but your final grade will be calculated in Excel using the grading system described above and then entered in LOUIE. Your final course grade will **not** necessarily appear in BBLearn. Please check LOUIE for your final grade.

Appendix A. POLICY STATEMENTS FOR COURSE SYLLABI

ACADEMIC INTEGRITY

NAU expects every student to firmly adhere to a strong ethical code of academic integrity in all their scholarly pursuits. The primary attributes of academic integrity are honesty, trustworthiness, fairness, and responsibility. As a student, you are expected to submit original work while giving proper credit to other people's ideas or contributions. Acting with academic integrity means completing your assignments independently while truthfully acknowledging all sources of information, or collaboration with others when appropriate. When you submit your work, you are implicitly declaring that the work is your own. Academic integrity is expected not only during formal coursework, but in all your relationships or interactions that are connected to the educational enterprise. All forms of academic deceit such as plagiarism, cheating, collusion, falsification or fabrication of results or records, permitting your work to be submitted by another, or inappropriately recycling your own work from one class to another, constitute academic misconduct that may result in serious disciplinary consequences. All students and faculty members are responsible for reporting suspected instances of academic misconduct. All students are encouraged to complete NAU's online academic integrity workshop available in the E-Learning Center and should review the full academic integrity policy available at https://policy.nau.edu/policy/policy.aspx?num=100601.

COURSE TIME COMMITMENT

Pursuant to Arizona Board of Regents guidance (Academic Credit Policy 2-224), for every unit of credit, a student should expect, on average, to do a minimum of three hours of work per week, including but not limited to class time, preparation, homework, and studying.

DISRUPTIVE BEHAVIOR

Membership in NAU's academic community entails a special obligation to maintain class environments that are conductive to learning, whether instruction is taking place in the classroom, a laboratory or clinical setting, during course-related fieldwork, or online. Students have the obligation to engage in the educational process in a manner that does not breach the peace, interfere with normal class activities, or violate the rights of others. Instructors have the authority and responsibility to address disruptive behavior that interferes with student learning, which can include the involuntary withdrawal of a student from a course with a grade of "W". For additional information, see NAU's disruptive behavior policy at https://nau.edu/university-policy-library/disruptive-behavior.

NONDISCRIMINATION AND ANTI-HARASSMENT

NAU prohibits discrimination and harassment based on sex, gender, gender identity, race, color, age, national origin, religion, sexual orientation, disability, or veteran status. Due to potentially unethical consequences, certain consensual amorous or sexual relationships between faculty and students are also prohibited. The Equity and Access Office (EAO) responds to complaints regarding discrimination and harassment that fall under NAU's Safe Working and Learning Environment (SWALE) policy. EAO also assists with religious accommodations. For additional information about SWALE or to file a complaint, contact EAO located in Old Main (building 10), Room 113, PO Box 4083, Flagstaff, AZ 86011, or by phone at 928-523-3312 (TTY: 928-523-1006), fax at 928-523-9977, email at equityandaccess@nau.edu, or via the EAO website at https://nau.edu/equity-and-access.

TITLE IX

Title IX is the primary federal law that prohibits discrimination on the basis of sex or gender in educational programs or activities. Sex discrimination for this purpose includes sexual harassment, sexual assault or relationship violence, and stalking (including cyber-stalking). Title IX requires that universities appoint a "Title IX Coordinator" to monitor the institution's compliance with this important civil rights law. NAU's Title IX Coordinator is Pamela Heinonen, Director of the Equity and Access Office located in Old Main (building 10), Room 113, PO Box 4083, Flagstaff, AZ 86011. The Title IX Coordinator is available to meet with any student to discuss any Title IX issue or concern. You may contact the Title IX Coordinator by phone at 928-523-3312 (TTY: 928-523-1006), by fax at 928-523-9977, or by email at pamela.heinonen@nau.edu. In furtherance of its Title IX obligations, NAU will promptly investigate and equitably resolve all reports of sex or gender-based discrimination, harassment, or sexual misconduct and will eliminate any hostile environment as defined by law. Additional important information about Title IX and related student resources, including how to request immediate help or confidential support following an act of sexual violence, is available at http://nau.edu/equity-and-access/title-ix.

ACCESSIBILITY

Professional disability specialists are available at Disability Resources to facilitate a range of academic support services and accommodations for students with disabilities. If you have a documented disability, you can request assistance by contacting Disability Resources at 928-523-8773 (voice), 928-523-6906 (TTY), 928-523-8747 (fax), or dr@nau.edu (e-mail). Once eligibility has been determined, students register with Disability Resources every semester to activate their approved accommodations. Although a student may request an accommodation at any time, it is best to initiate the application process at least four weeks before a student wishes to receive an accommodation. Students may begin the accommodation process by submitting a self-identification form online at https://nau.edu/disability-resources/student-eligibility-process or by contacting Disability Resources. The Director of Disability Resources, Jamie Axelrod, serves as NAU's Americans with Disabilities Act Coordinator and Section 504 Compliance Officer. He can be reached at jamie.axelrod@nau.edu.

RESPONSIBLE CONDUCT OF RESEARCH

Students who engage in research at NAU must receive appropriate Responsible Conduct of Research (RCR) training. This instruction is designed to help ensure proper awareness and application of well-established professional norms and ethical principles related to the performance of all scientific research activities. More information regarding RCR training is available at https://nau.edu/research/compliance/research-integrity.

SENSITIVE COURSE MATERIALS

University education aims to expand student understanding and awareness. Thus, it necessarily involves engagement with a wide range of information, ideas, and creative representations. In their college studies, students can expect to encounter and to critically appraise materials that may differ from and perhaps challenge familiar understandings, ideas, and beliefs. Students are encouraged to discuss these matters with faculty.