

CS 4423 and CS 5599 – Spring 2020

Software Evolution and Program Analysis



Instructor: Isaac Griffith

Office: BA 315

Phone: (208) 282-4876

Email: grifisaa@isu.edu

URL: <https://www2.cose.isu.edu/~{}grifisaa/>

Office Hours:

- TBD: TBD
- By appointment scheduled at: <https://isaac-griffith.youcanbook.me/>

Course Information

Meeting Time: TBD: TBD Room: Pocatello: TBD, Idaho Falls: TBD

Final Exam Dates

Section: 4423-01 | 5599-03 – Pocatello

Date: TBD

Time: TBD

Room: TBD

Section: 4423-02 | 5599-04 – Idaho Falls

Date: TBD

Time: TBD

Room: Idaho Falls Testing Center

Prerequisites:

- CS 3321

Textbooks:

- ***Software Evolution and Maintenance: A Practitioner's Approach, 1st Edition*** – Tripathy and Naik. ISBN: 978-0470603413
- ***Principles of Program Analysis, 1st Edition*** – Nielson, Nielson, and Hankin. ISBN: 978-3642084744

Course Description

An exploration of the theory and issues surrounding the maintenance and improvement of existing software systems. Topics will include the identification and triage of software bugs, patching and deploying fixes to existing software systems, refactoring software in large code bases, and the processes for managing change and maintenance of software systems. The second half of this course will focus on the identification of issues in software using program analysis. Specifically, focusing on current techniques used in static and dynamic analysis of software to identify maintainability, security, and performance issues. The course will culminate in two projects, one being the successful modification and refactoring of a large software system and the second in the development of a basic dynamic analysis tool.

1 Technology

This is a Software Engineering course and thus will heavily rely upon the use of current technology. As a student you are expected to have at your disposal a computer system capable of running a recent operating system such as MacOS X, Windows 10, or Linux. In addition, you will be required to use Git, a professional grade IDE (e.g., IntelliJ IDEA or Eclipse) and build system. Furthermore, you, as a future technologist, are responsible for installing and learning to use these tools.

2 Learning Outcomes

The following outcomes will be evaluated via homework assignments and exams

The following outcomes will be evaluated via the course project

3 Student Expectations

The above objectives cannot be met unless you, the student, take an active role in your education. Thus you are expected to:

- Attend class on a regular basis and devote your attention to the material presented
- I expect students to be on time to class. Towards that I will lock the doors at the start of each class.
- Prepare for each and every class by reading the assigned material and completing both pre- and post-lecture assignments
- Devote the necessary time to preparing assignments and turning them in on time.
 - Computer Science is time-intensive
 - You should be prepared to give the time need for each assignment
 - As the class progresses the time required for assignments will increase, be prepared.
- Time Management is a requirement. Do not procrastinate, as the amount of time required for any given assignment and any given student cannot be estimated. For this reason you are encourage to begin assignments at the earliest possible date so that you will be able to complete them on time.

This is a 3 credit course junior level course, as a student, you should expect to put forth on average 6 – 9 hours of additional effort outside the classroom towards this course. Given that, I expect to utilize this completely.

4 Moodle

Course material including lectures, assignment requirements, handouts, and solutions can be viewed using your Moodle account. Announcement and Help forums will also be available on Moodle. Students are expected to access their Moodle account on a daily basis to keep apprised of course developments.

5 Assignments

Homework assignments are due as assigned on Moodle. Do the homework, it helps. Late homework will not be accepted and will incur a 0 grade.

This course is based upon four components:

- Attendance at lectures and participation during in class exercises.

- Reading assignments
 - Project
 - Exams
-

6 Project

A significant portion of your final grade is based on the group project. This project consists of the application of software engineering principles and processes to the development of a product. Teams will be assigned at random at the beginning of the third week of the course. Team members will not be reassigned during the course. Note that your grade on the project is a direct result of the team functioning as a unit and on the satisfactory completion of each of the deliverables. The end results of the project consist of a document describing the design of the system and an implementation of the system. Each team member is required to work on all components of the project which includes, but is not limited to:

- Project documentation
- Project presentation
- Project code
- Project testing
- Project management
- Project requirements engineering

A failure to participate in each of these will result in a significant deviation of your individual grade from the team's project grade.

6.1 Individual Project Multiplier

Individual team member final project grades will be modified from the team project grade by a multiplier. The value of this multiplier ranges between 0.0 and 1.0. This value is determined by an aggregation of peer evaluations, observations by your instructor, and participation in project activities as evidenced on git, attendance at meetings, etc. Thus, it is possible that your team scores perfectly on the project but you still receive a failing grade for the project.

7 Exams

You will be tested on your mastery of topics listed above as taken from lecture, readings, and assignments. Any information addressed by a component of this class will be considered for exams. There will be two exams, a mid-term and a final. The final will be a comprehensive exam.

Note: If you do not earned a 60% or higher average on the exams in this course the highest grade you will receive in this course is a 60% which equates to a D–

8 Grade Distribution

Grades for all assignments, exams, and the final grade will be assigned according to the following table:

Grade	–	+
A	90.00 – 92.99	93.00 – 100.0
B	80.00 – 82.99	83.00 – 86.99
		87.00 – 89.99

Grade	–		+
C	70.00 – 72.99	73.00 – 76.99	77.00 – 79.99
D	60.00 – 62.99	63.00 – 66.99	67.00 – 69.99
F		00.00 – 59.99	

The final grade calculation for this course will be allocated as follows:

CS 4423

Grade Event Type	Percent of Final Grade
Homework	25%
Project	50%
Exams	25%

CS 5599

Grade Event Type	Percent of Final Grade
Homework	15%
Leadership	15%
Graduate Project	45%
Exams	25%

9 Learning Environment

We are all committed to maintaining an inoffensive, non-threatening learning environment for every student. Class members (including the instructor) are thus to treat each other politely—both in word and deed. Offensive humor and aggressive personal advances are specifically forbidden. If you feel uncomfortable with a personal interaction in class, see your instructor for help in solving the problem.

10 Content

I reserve the right to change the content as needed to fit the flow of the class and experience of the students. Changes will be reflected on Moodle.

11 Policies & Procedures

11.1 Academic Integrity

Academic Integrity is expected at Idaho State University and both the College of Business and the College of Science and Engineering. All forms of academic dishonesty, including cheating and plagiarism, are strictly prohibited, the penalties for which range up to permanent expulsion from the university with “Expulsion for Academic Dishonesty” noted on the student’s transcript. %If you are unclear as to what constitutes academic dishonesty, you can get a copy of the College of Business Policy on Academic Integrity from the College of Business office in BA 202, or from the College of Business website at www.cob.isu.edu, or refer to

the ISU Faculty/Staff Handbook policy on academic dishonesty at: http://www.isu.edu/policy/fs-handbook/part6/6_9/6_9a.html or <http://www.isu.edu/library/research/ait/aitsitemap.html>.

Academic dishonesty includes, but is not limited to:

1. Cheating on Exams
2. Plagiarism
3. Collusion

Definitions

Cheating on an examination include:

- Copying from another's paper, any means of communication with another during an exam, giving aid to or receiving aid from another during an exam;
- Using any material during an examination that is unauthorized by the proctor;
- Taking or attempting to take an exam for another student or allowing another student to take or attempt to take an exam for oneself
- Using, obtaining, or attempting to obtain by any means the whole or any part of an administered exam.
- Talking to anyone other than the professor during an exam.

Plagiarism is the unacknowledged incorporation of another student's work into work which the student offers for credit.

Collusion is the unauthorized collaboration of another in preparing work that a student offers for credit.

Other types of academic dishonesty include:

- Using other student's content from their assignments, disk, etc.
- Performing any act designed to give unfair advantage to a student or the attempt to commit such acts

Notes:

- The use of the source code of another person's program, even temporarily, is considered plagiarism.
- Copying material from a source without attributing (citing) the source
- Allowing another person to use your source code, even temporarily, is considered collusion

In this course, the specific exceptions given below are not considered scholastically dishonest acts:

- Discussion of the algorithm and general programming techniques used to solve a problem.
- Giving and receiving aid in debugging.
- Discussion and comparison of program output (output only not code)

Academic Integrity violations are a scourge at any University. I detest them with a passion. Anyone found to be violating the academic integrity code on any assignment or exam will be dealt with with extreme prejudice. The standard remedy, in this course, for any Academic Integrity Violation will be FAILURE of the course. Please note that in accordance with the Policy at Idaho State University that attempts to withdraw from the course to avoid such punishment will work to no avail.

11.2 Student Notification

All students are responsible for checking the web page and their email on a regular basis, preferably daily, for notification of any class scheduling changes or assignment clarification. Notice of quizzes or assignment clarifications may be posted late at night.

11.3 Instructor Availability

The instructor will be available during posed office hours, but additional efforts are made to increase accessibility to the students. If the instructor is not available at the telephone number above, the student can leave a detailed voicemail message. However, the instructor's email is checked throughout the day and often the student will get an immediate response to questions submitted by email. Email is usually the most reliable means of contact.

Note that I am a working research scientist, thus I may need to attend conferences both with my local colleagues and with my international colleagues. Thus, I am constantly in meetings, both here and abroad. That being said, I work 7 days a week 12 months a year. If you need my help and all other means of scheduling have led to no avail, please do not hesitate to contact me. Note that I am not an emergency service, I will require that you contact me 24 hours prior to an assignment being due, for which you need help. If you do not plan ahead, I cannot help.

11.4 Email Etiquette

Email is the best possible method of reaching me outside of my office hours. Note that I have certain expectations for communicating with me via email, as follows:

- DO NOT use chat or SMS shorthand in your messages.
- Use full words, and full sentences.
- Maintain the frame of mind that you are communicating to a professional, and that a professional demeanor is required.

Failure to abide by these requirements will result in your email being deleted and forgotten.

11.5 Disability and Special Needs

The Computer Science program at Idaho State University is committed to ensuring that all students achieve their potential. If you have a disability (physical, hearing, vision, psychiatric, or learning disability) that may need a reasonable accommodation, please contact the ADA & Disabilities Resource Center located in the Rendezvous Complex, Room 125, 282-3599, as early as possible.

11.6 Closed Week Policy

Information about the ISU Closed Week Policy can be found online. Note that the policy does not prevent the presentation of new material during closed week.

11.7 CoSE X Grade Policy

In the College of Science and Engineering, a student who earns a failing grade via course work (exams, homework, etc.) and has unexcused absences that total more than 30% of class meetings will receive a grade of "X".