COSC480: Software Engineering for the Cloud
Course Syllabus
Spring 2018

Instructor	Joel Sommers
Office	McGregory 306
Office hours	Tues and Thurs, 12:30–14:30
Phone	x7587
email	jsommers@colgate.edu
Course Time/Location	MWF 9:20–10:10/McGregory 315
Lab Time/Location	F 12:20–14:10/McGregory 315
Course materials	http://moodle.colgate.edu/
Questions & discussion	https://piazza.com/colgate/spring2018/cosc480

Goals

This course introduces students to Agile software development in the context of building a software-as-a-service (SaaS) application to deploy in the cloud (the Internet). We will examine challenges, opportunities, and open problems of SaaS applications as compared with "shrink-wrapped software". An integral part of the course will be for students to take a SaaS project from conception through planning, development, testing, and deployment. The project will be developed using the Ruby on Rails framework, which is a Ruby programming language-based platform for developing SaaS applications and websites. Through the course and project, students will use Agile development methodologies and tools, including user stories, behavior- and test- driven development, version control for team-based development, and cloud-based environments for deployment. Moreover, students will learn and apply fundamental programming constructs and techniques including design patterns for software architecture, higher-order functions, metaprogramming, and reflection, to improve the maintainability, modularity and reusability of their code.

Course Materials

Required text: Engineering Software as a Service, 1st Edition (preferably version 1.2.1), by Armando Fox and David Patterson. Strawberry Canyon, LLC, May 9, 2016.

Online Materials: We are using both Moodle and Piazza for posting announcements, videos, lecture notes, example code, quizzes, surveys, discussions, and other course materials. See above for links.

Student Resources

Case Library/Informational Literacy and Reference. Use of Colgate's library offerings, including the services of the outstanding reference and informational literacy librarians, is something to be made the most of during your time at Colgate. If you have not already done so, I suggest you get to know the librarians and to use their exceptional and imaginative expertise for assistance in ways that will enrich and enliven your intellectual studies and academic work.

Writing and Speaking Center; Jennifer Lutman, Director (228-6085); 208 Lathrop Hall. Expressing yourself clearly through words is an essential part of the college learning experience. Regardless of your current level of expertise or past experience, you are encouraged to visit the Writing Center for helpful tips on writing and successfully completing assignments. While the Writing Center is not a "cleaning service" (no editing, proofreading, *etc.*), the talented and helpful peer tutors can assist with brainstorming, organization, research, style, and grammar, as well as a multitude of other skills that support excellence in academic work.

Student Academic Support Services; 101A Lathrop Hall. The CLTR offers a variety of services to help you get and stay on track to succeed academically at Colgate. Moreover, it is intended that students with particular needs be able to participate as fully as possible in this course. If you think you could benefit from improving your learning strategies or time management, or if you have special circumstances that you believe may affect your learning and performance in this class, please contact CLTR.

NASC Liaison Group. NASC liaisons are a group of natural science and mathematics faculty members dedicated to providing science-interested students from underrepresented groups with mentorship, motivation, and individualized support as they navigate their paths in the sciences at Colgate. NASC liaisons do not replace the role of an academic advisor or offer formal academic advising. Rather a NASC liaison may meet one-on-one with a student to give another perspective on their academic plan; give tips on effective studying; or introduce a student to upper-class peers, alumni, or other faculty members that might be able to help them. The roles of NASC liaisons will depend on students' needs, and we encourage students to reach out for mentorship and moral support.

The NASC Liaison Group includes professors Gerry Gogel (Chemistry), Engda Hagos (Biology), Silvia Jiménez Bolaños (Mathematics), Patricia Jue (Chemistry), Spencer Kelly (Psychology & Neuroscience), Amy Leventer (Geology), Rebecca Metzler (Physics & Astronomy), Jason Meyers (Biology), and Joel Sommers (Computer Science).

Counseling Center; (228-7385). College life can sometimes get bumpy; if you are experiencing emotional or personal difficulties, the Counseling Center offers completely confidential and highly professional services.

Technology Support for Students; (228-7111). Just because you're a computer science student doesn't mean you don't run into tech problems! Peer support and expertise related to computer and technology questions and problems, such as Moodle, email, internet, and public access computers on campus.

Coursework

First, a comment: for all applicable course work, *please make sure to show all of your work*. For many problems, the exact answer is less important than the process of getting there. Most importantly, *be explicit in any assumptions you make*.

The requirements for this course are as follows:

Classroom activities: The purpose of our class time is for you to see the big picture and interrelatedness of ideas. We will have lectures and in-class activities to help clarify difficult or confusing concepts. We will also work through examples and problems to help make ideas concrete. In order for you to get the most out of class time, you are expected to have completed the bulk of the assigned reading(s) before coming to class.

My job as the instructor is to guide you through the process of learning operating systems concepts. However, *the ultimate responsibility for learning the material is your own*. I will do my best to adapt to you and your many backgrounds, motivations, and interests. Although our class time will be primarily lecture, discussion, and problem solving-based, it will be structured differently from time to time in order to provide multiple ways to approach and grapple with topics.

Reading Quizzes: To encourage you to do the assigned readings before class, we will have regular *reading quizzes* on Moodle, due before the class for which the reading is assigned. These quizzes do not comprise a major portion of your grade (about a half-letter grade), so missing a handful will not have a big impact. Doing them, however, will help you to be more prepared for in-class problem solving exercises and other activities, and will help us as a class to go into more depth.

Homework Problems: There will be periodic homework problems assigned to help you learn and reinforce concepts from class. These homeworks will be assigned over the first half of the semester to provide you with sufficient background to tackle the major group project.

Late homeworks will not be graded.

Labs: You are required to concurrently register for a laboratory section for this course. Lab activities will generally be organized as a series of problems of relatively small scope through which you gain practice and experience with topics covered in recent classes. Note that the lab and course sections are considered as two parts of a whole, thus the *same* grade will be issued for both the lab and course according to the composition outlined below.

Group Project: You will work in groups of 4–6 students over the second half of the semester on a project that has the goal of building a "significant" SaaS application. Further details about the project will be provided in class.

Quizzes: There will be four quizzes, spaced through the semester. Think of these as mini-exams, as they will take the place of exams during the term. The quizzes will be done individually.

Final Exam: There will be a final exam for this course, held during the University-scheduled exam time.

Policies

Attendance. Students are expected to attend class and participate fully in classroom discussion and activities, including doing any assigned reading. Attendance will be taken and is required for both class and lab. You can miss up to 2 classes/labs without penalty. After that, each absence (or lateness by 10 minutes) will result in a penalty of 1% of your grade.

Some exceptions can be made due to extentuating circumstances; please contact me in advance if you know that you will not be able to attend class.

Academic honesty. You are expected to abide by Colgate's Academic Honor Code. If you're having trouble with an assignment, if you are unclear as to what constitutes plagiarism, or if you're having trouble meeting a deadline, please see me as soon as possible.

In general, you may *share ideas* with other students but you may not share code. If you discuss a problem with other students and you collectively agree on an approach for solving the problem, it is ok to sketch the code together (for example, on a whiteboard or on paper), but when it comes time to write the code to complete the assignment you must do the writing.

If you arrive at a solution as a result of discussing with others or by doing some additional reading online, *you must cite the source* to remain in compliance with Colgate's Honor Code. An appropriate

form of citation would be to include a comment at the top of the affected source code file(s) and briefly note (1) the source and (2) what information from the source was used.

I strongly discourage use of search engines and/or stack exchange for finding "answers" to problems. Even if cited properly, "answers" found through these sources tend to mislead more often than not. It is recognized that in certain situations you may find it necessary to read an online tutorial and follow instructions for configuring and installing 3rd party software (e.g., a Ruby gem used as part of a Rails app). In these (fairly narrow) cases, copying without attribution is acceptable.

Classroom etiquette. You are expected to practice common courtesy with regard to all course interactions. Cell phones must be off before class begins. Laptops must be off or closed unless a classroom activity requires their use. If you have a special need or reason why you need to use a laptop, e.g., for taking notes, please come see me to discuss how we can come up with a workable arrangement.

If you are using a laptop or other device in violation of this policy, I will first issue you (by email) a *yellow card warning*. On the second infraction I will issue you a *red card*. Upon a red card, there will be a reduction of 1% of your overall grade. Each subsequent violation will result in a doubling of the grade reduction amount (i.e., 2% on the third infraction, 4% on the third, etc.).

Why ban laptops and other devices in a computer science class unless their use is necessary? For starters, see these articles:

- Ill Communication: Technology, distraction & student performance
- The Pen Is Mightier Than the Keyboard: Advantages of Longhand Over Laptop Note Taking
- Laptop multitasking hinders classroom learning for both users and nearby peers

Grading. An outline of the composition of your final grade is as follows. Grading is on an absolute scale (*i.e.*, no curve). I reserve the right to adjust these proportions in extraordinary circumstances. Generally, late assignments will not be accepted unless prior arrangements have been made (or in case of serious illness or family emergency). Technical problems (computer died, printer blew up, paper self-destructed, git troubles) are unacceptable reasons for late or incomplete assignments. Plan ahead.

You are expected to meet all deadlines for turning in assignments. If you fail to do so, I will not be able to provide you with helpful feedback so that you can prepare for subsequent assignments.

Coursework	Portion of grade
Reading Quizzes	5%
Homework	25%
Labs	10%
Quizzes (4)	25%
Project	25%
Final Exam	10%

Note that your final **lab and course grades will be identical** and computed according to the above weighting. Letter grade assignments are as follows; rounding is not done unless in extraordinary circumstances.

F	D-	D	D+	C-	C	C+	B-	B	B+	A-	A	A+
< 60	60–62	63–66	67–69	70–72	73–76	77–79	80–82	83–86	87–89	90–92	93–99	≥ 100

For the **schedule of topics**, readings, exams, etc., see Moodle.