

SYLLABUS

CSCI 3308: SOFTWARE DEVELOPMENT METHODS AND TOOLS

Course Information

Semester: Fall 2018
Credit: 3 CREDITS
Dates: Monday, August 27, 2018 through Wednesday, December 12, 2018
Class Meetings: **Section 100:** Lecture – Monday & Wednesday, 10:00 – 10:50 a.m., ECCR 105
Section 200: Lecture – Monday & Wednesday, 1:00 – 1:50 p.m., HUMN 150
Distance Section 100B: All lectures will be available and viewable via a Canvas site that you can link to from the main Moodle site. (Moodle cannot display these videos...)

- All distance students MUST also register for a lab/recitation section 1xx.
- Students in Section 100 must register for a Section 1xx lab/recitation section.
- Students in Section 200 must register for a Section 2xx lab/recitation section.

LAB/RECITATIONS:

Recitation Section	TA	Day/Time	Classroom	Enrollment
CSCI 3308-102	Michael Schneider	Th 10-11:40 am	ECCS 112C	22
CSCI 3308-103	Chelsea Chandler	Th 4-5:40 pm	ECCS 112C	23
CSCI 3308-104	Ajay Kedia	F 12-1:40 pm	ECCS 112C	23
CSCI 3308-111	Ajay Kedia	Th 8-9:40 am	ECCS 112C	24
CSCI 3308-112	Michael Schneider	Th 5-6:40 pm	ECES 112	24
CSCI 3308-113	Nikhil Sulegaon	F 1-2:40 pm	ECES 112	29
CSCI 3308-201	Chelsea Chandler	W 3-4:40 pm	ECCS 112C	22
CSCI 3308-202	Rohit Mehra	W 5-6:40 pm	ECCS 112C	22
CSCI 3308-203	Rohit Mehra	Th 12-1:40 pm	ECCS 112C	22
CSCI 3308-204	Nikhil Sulegaon	Th 2-3:40 pm	ECCS 112C	22
CSCI 3308-205	Ajay Kedia	F 8-9:40 am	ECCS 112C	20
CSCI 3308-206	Nikhil Sulegaon	F 10-11:40 am	ECCS 112C	22

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Instructor Information

Name: Alan Paradise
Email: alan.paradise@colorado.edu
Office Location: ECOT 520
Office Hours: By appointment through email

Course Information

Fit within curriculum: Required foundation course for Computer Science BS students; core option for Computer Science BA students.

Course description and prerequisites:

This course covers technology tools and methods for software development with a strong focus on best practices used in industry and professional development, such as agile methodologies, full-stack development, pair-programming, front-end user interface, back-end database, front-end-to-back-end integration, application security, using the cloud, using web services, and test-driven design.

The course consists of two lectures per week, and one lab/recitation session per week. Students are assigned to a small group of five or six students from within their lab/recitation section. Each small group then works together outside of class time to develop a working software application while applying the technology methods and tools covered in lecture.

Requisites: Requires prerequisite course of CSCI 2270 (minimum grade C-).

Textbooks and Materials

Required text: None.

Other required reading materials: Will be provided by the instructor each week via Moodle. Readings will include the following topics:

Unix, Regex, Bash Shell Scripting, Software Process & Methodologies, Scrum, Version Control, HTML/CSS, NodeJS, RDBMS, E-R Diagrams, Intro to SQL, NoSQL, XML, JSON, SOAP vs REST, Cloud Computing & Heroku, Testing, Software as Intellectual Property, Software Security

Course Outcomes

- The student will learn the fundamentals of software development methods and gain exposure and practice using common industry tools that are likely to be used in the workplace.
- The student will acquire state-of-the-art skills that will not only help them do their work in other programming classes but will also give them a very useful vocabulary to use on job applications and during interviews.
- The student will apply software knowledge and skills in the context of a small group semester-long project.

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- From an employer's perspective, skills learned in this course will boost the student's resume.
- During the semester-long Small Group Application Development Project, the student will successfully use a variety of software development skills and tools introduced in class.
- The student will be equipped to choose the best software tool for use in a specific situation.

Brief, high-level list of topics to be covered (subjects may change as the semester proceeds.)

- Unix Shell Scripting
- Waterfall, Agile development methodologies
- Principles of Project Management
- Requirements Definition and Analysis
- Relational Database Design & Construction
- Pair Programming
- Source Code Version Control and Managing Code Conflicts
- HTML & CSS ("Front-end")
- NodeJS ("middle layer")
- SQL Query Language ("Back-end")
- Documentation of Code
- Web Services
- Cloud Computing
- Licensing/Copyright/Patents/IP
- Code Quality Assessment
- Testing Methods and Strategies
- Application Security
- Static and Dynamic Analysis
- Refactoring
- Code/Peer Review

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Grading

Component	%	Points	Letter Grade Scale
Team Surveys (Each student is required to complete two surveys, 10 points each)	2	20	930 to 1000 = A
Homework Assignments (Four Assignments. Points Vary)	24	240	900 to 929 = A-
Exams (Two exams, 100 points each)	20	200	870 to 899 = B+
Labs (12 Labs, Points Vary)	24	240	830 to 869 = B
Team Project & Presentations 8 graded milestones including the final presentation and final summary report. Points vary by milestone.	30	300	800 to 829 = B-
TOTAL	100	1000	770 to 799 = C+
			730 to 769 = C
			700 to 729 = C-
			600 to 699 = D
			0 to 599 = F

Using Moodle

The Moodle course pages are the official site for all notifications, assignments, and all submissions of work for grading (lab assignments, homework, quizzes and exams.)

Homework Assignments

The course includes FOUR homework assignments that comprise 24% (240 points) toward your grade. Each assignment must be completed and submitted via Moodle by its due date to earn full credit.

1. Bash Shell Scripts (50 points)
2. HTML & CSS (50 points)
3. SQL (60 points)
4. REST Weather Map (80 points)

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Group Project

Students are required to form a team with other students in the same lab section. Each team will execute a software development project. The team will agree upon a software product that they will design, develop and present to the rest of the class during the course of the semester. This project makes up 30% (300 points) toward your grade. The project challenges students to use most of the software tools and development methods covered in lectures/labs. Project grades are based on the submission of the following milestones submitted during the course of the project.

Milestone 1	40 points	Project Proposal
Milestone 2	35 points	Project Tools and Project Management Methodology Approach
Milestone 3	50 points	1-on-1 Student Meetings (Individual)
Milestone 4	45 points	Database Design
Milestone 5	25 points	Application Testing Plan
Milestone 6	40 points	Project Presentations
Milestone 7	50 points	Final Project Report and Product Functionality
Milestone 8	15 points	Final Reflection (individual)

Note on Group Project Grade:

Milestones 1, 2, 4, 5, 6, & 7 are submitted to a team github repository for the team as a whole, not as individuals. So every member of the team receives the same score. However, at the end of the term, scores may be adjusted for each individual's contribution to the team effort. Your final grade for the group project will depend on your effort and involvement on the project.

Milestones 3 and 8 are submitted via Moodle. You will receive an individual grade for these milestones.

Your Project Grade = (sum of project milestone grades) adjusted by your peers' evaluation of your contributions and participation as a member of the team.

Peer evaluation is based on your team members' ratings of your contributions. This includes your time, your work, your attitude, your communication, your accessibility, your persistence.

Your TA will be reviewing all of your team's github commits.

Late Submissions

You can receive a three-day extension on any homework or milestone assignment with a 20% grade penalty. After three days, your assignment is considered past due and will not be accepted.

Each Lab/Recitation includes a lab assignment. The assignment for each lab should be submitted to the TA by the end of the lab. In some cases, you might need more time to complete the lab assignment.

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You can have the remainder of the day, up until midnight, to submit your work for that that lab. After midnight on the day of the lab, no late lab assignments will be accepted.

In the event of a documented personal, family, or medical emergency, consult your TA about receiving a penalty free extension.

If you know you will be missing a weekly lab recitation, you must talk with your TA before going to an alternate recitation period. If you attend an alternate lab session, then your lab assignment is due on the day you actually attend lab, not on the day of your normally scheduled lab recitation.

Lab work should be completed and turned in or approved by the TA during lab time. If you need more time to complete the lab work, it **MUST** be turned in via Moodle by 11:59 p.m. the day of your lab/recitation section or it will be considered late and will not be accepted.

Distance Section

All lectures will be recorded. The videos from the lectures will be available on a Canvas website to which you can link from the course's Moodle site. (Moodle cannot display the videos.)

Exams

During Weeks 9 and Week 15 there will be exams. Together the exams make up 20% of your final grade. The exams will be administered and graded by Moodle. An exam will become unavailable in Moodle at the end of the week it is given.

Cheating

(See the section on Honor Code below.)

For the most part, you must do your own work for this course. In some cases, assignments are completed by a team of students. In such cases, you can share the work, and share the grade. Note that on any work completed by a team of students or "pair programming", you **MUST** include the names of ALL participating students on the work submitted.

Warning: Lab assignments and homework assignments are revised each semester. So turning in answers from a past semester will, at a minimum, cause you to lose points for incorrect answers. And, worst case, if you are caught submitting word-for-word answers from a past semester, you will be considered in violation of the honor code and subject to sanctions.

Under no circumstances are you allowed to submit someone else's work and claim it as your own. If you are caught doing so, you will be in violation of the academic integrity policy and will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). The [Honor Code Office](#) has more information.

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Course Calendar

This course consists of 17 weeks. Each week typically begins Monday morning at 8:00 a.m. and ends on Sunday evening at 11:59 p.m. (however there are some exceptions for holidays which will be announced via Moodle.) Lectures take place on Mondays and Wednesdays, and will cover the week's topics. Lab times vary. Each student will sign up for a weekly lab time, and will attend that lab most weeks during the semester. There are a few weeks with no lab/recitation scheduled.

Week	Lecture	Lab	Homework Due	Project Milestone Due
Week 1 Aug 27-Sep 2	Lecture 1 Introductions, Course Overview Lecture 2 Unix, Command Shell, Shell Scripting, RegEx		Enroll for class in Moodle	-----
Week 2 Sep 4 - 9 (NO CLASS on Monday Sep 3)	Lecture 3 Software Development Methodologies (Waterfall, Agile, Scrum)	Lab 1: VM Setup, Basic Unix commands	Complete skills survey for group team formation	-----
Week 3 Sep 10 - 16	Lecture 4 Project Management (continued) Lecture 5 Requirements Definition	Lab 2: Regex, AWK, Sed	-----	Project Teams Formed and Posted
Week 4 Sep 17 -23	Lecture 6 Version Control, using Git Lecture 7 HTML	Lab 3: Initial Small Group Team meetings	Homework # 1 Bash Shell Script	FIRST Project Team Meetings THIS WEEK
Week 5 Sep 24 - 30	Lecture 8 CSS (Cascading Style Sheets), Bootstrap Lecture 9 Relational Database Concepts, the Entity	Lab 4: Version Control – Github	-----	Project Milestone # 1

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	Relationship Diagram			
Week 6 Oct 1 - 7	Lecture 10 Basic SQL NOTE: - Lecture 10 will be VIDEO ONLY - NO live lecture Lecture 11 Advanced SQL	Lab 5: HTML/CSS	-----	Project Milestone # 2
Week 7 Oct 8 - 14	Lecture 12 Java Script Lecture 13 NodeJS Basics	Lab 6: SQL	Homework # 2 HTML & CSS	-----
Week 8 Oct 15 - 21	Lecture 14 Integrating Front-End and Back-End using NodeJS, Part One Lecture 15 Integrating Front-End and Back-End using NodeJS, Part Two	Lab 7: Integrating the front-end with the back-end	-----	-----
Week 9 Oct 22 - 28	Lecture 16 Intellectual Property, Software Patents Exam # 1 – Wednesday, October 24	Lab 8: 1-on-1 Interviews during recitation period	Homework # 3 SQL	Project Milestone # 3 1-on-1 Interview with TA -----
Week 10 Oct 29 – Nov 4	Lecture 17 Web Services, REST/SOAP Lecture 18 Cloud Computing, Heroku	Lab 9: Web Services	-----	Milestone # 4 Database Design Project
Week 11 Nov 5 - 11	Lecture 19 Testing Methods, Automated testing Lecture 20 Documenting your code	Lab 10: Heroku deployment	-----	-----
Week 12	Lecture 21			

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Nov 12 - 18	Securing your application Lecture 22 Using an automated Debugging tool	Lab 11: Automated Unit Testing	-----	Project Milestone # 5 Test Plan
Week 13 Nov 19 - 25	FALL BREAK No classes this week	-----	-----	-----
Week 14 Nov 26 – Dec 2	Lecture 23 Static and Dynamic Analysis Lecture 24 TBD	Lab 12: Continuous Integration	Homework # 4 RESTful Web Services – Weather Map	-----
Week 15 Dec 3 – 9	Lecture 254 TBD Exam # 2 Wednesday, November 28	No Lab this week	-----	-----
Week 16 Dec 10 - 16	Student Project Presentations 12/10, 12/12. Sign up for time slots on Moodle.	Student Project Presentations – All Week during recitations. Sign up for time slots on Moodle	-----	Project Milestone # 6 Presentation
Week 17 Dec 17,18,19 Finals Week	No Lecture, No Lab, No final exam.	No Lecture, No Lab, No final exam.	-----	Project Milestones # 7 and 8

** Short Week

Attendance

In general, attendance at all lectures is not graded per se, but is highly recommended. You are responsible for knowing the material presented during lectures and labs, even if you are not in attendance when the material was presented. Distance students are expected to view all video lectures.

Attendance at lab/recitations is required. Your attendance at each lab/recitation will be recorded by the TA. Participation in a lab/recitation by PROXY is NOT ALLOWED. Each lab/recitation will require work for each student to complete. You can leave lab once your work is done and approved by the TA.

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Accommodations

The university is committed to providing to all students the support and services needed to participate in this course. If a student qualifies for accommodations because of a disability, the student should submit to the instructor a letter from Disability Services in a timely manner (for exam accommodations provide your letter at least one week prior to the exam) so that your needs can be addressed. Disability Services determines accommodations based on documented disabilities. Contact Disability Services at 303-492-8671 or by e-mail at dsinfo@colorado.edu. If you have a temporary medical condition or injury, see Temporary Medical Conditions: Injuries, Surgeries, and Illnesses guidelines under Quick Links at Disability Services website and discuss your needs with the instructor.

Religious Observances

[Campus policy regarding religious observances](#) requires that faculty make every effort to deal reasonably and fairly with all students who, because of religious obligations, have conflicts with scheduled exams, assignments or required assignments/attendance. For students in situations where this applies, such issues must be communicated to the instructor as early as possible.

Classroom Behavior

Students and faculty each have responsibility for maintaining an appropriate learning environment. Those who fail to adhere to such behavioral standards may be subject to discipline. Professional courtesy and sensitivity are especially important with respect to individuals and topics dealing with differences of race, color, culture, religion, creed, politics, veteran's status, sexual orientation, gender, gender identity and gender expression, age, ability, and nationality. Class rosters are provided to the instructor with the student's legal name. The instructor will honor student requests to be addressed by an alternate name or gender pronoun. Students must advise the instructor of this preference early in the semester so that appropriate roster annotations may be made. For more information, see the policies on [class behavior](#) and [the student code](#).

Discrimination and Harassment

The University of Colorado Boulder (CU-Boulder) is committed to maintaining a positive learning, working, and living environment. CU-Boulder will not tolerate acts of discrimination or harassment based upon Protected Classes or related retaliation against or by any employee or student. For purposes of this CU-Boulder policy, "Protected Classes" refers to race, color, national origin, sex, pregnancy, age, disability, creed, religion, sexual orientation, gender identity, gender expression, veteran status, political affiliation or political philosophy. Individuals who believe they have been discriminated against should contact the Office of Discrimination and Harassment (ODH) at 303-492-2127 or the Office of Student Conduct (OSC) at 303-492-5550. The [full policy on discrimination and harassment](#) has more information.

Honor Code

All students of the University of Colorado at Boulder are responsible for knowing and adhering to [the academic integrity policy](#) of this institution. Violations of this policy may include: cheating, plagiarism, aid of academic dishonesty, fabrication, lying, bribery, and threatening behavior. All incidents of

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academic misconduct shall be reported to the Honor Code Council (honor@colorado.edu; 303-735-2273). Students who are found to be in violation of the academic integrity policy will be subject to both academic sanctions from the faculty member and non-academic sanctions (including but not limited to university probation, suspension, or expulsion). The [Honor Code Office](#) has more information.

Syllabus Changes

The instructor reserves the right to modify this syllabus as needed during the semester. Should any changes be necessary, the instructor will inform students of the change and post an updated copy of the syllabus to Moodle.