SYLLABUS

CSCI 3308: SOFTWARE DEVELOPMENT METHODS AND TOOLS

Course Information

Semester: Fall 2017
Credit: 3 CREDITS
Dates: Monday, August 28, 2017 through Friday, December 15, 2017
Class Meetings: Lecture – Monday & Friday, 3:00 – 3:50 p.m.,

LABS:

CSCI 3308-101	LAB	TUE 1:00-2:50	ECCE 141	33 (48)	Prasanna Srinivasachar
CSCI 3308-102	LAB	TUE 3:00-4:50	ECCE 141	33 (48)	Rashmi Shetty
CSCI 3308-103	LAB	WED 11:00 am-12:50 pm	ECCS 112C	24 (24)	Pratima Sherkane
CSCI 3308-104	LAB	WED 1:00 -2:50 pm	ECCS 112C	24 (24)	Rashmi Shetty
CSCI 3308-105	LAB	WED 6:00 -7:50	ECCS 112C	24 (24)	Pratima Sherkane
CSCI 3308-106	LAB	THU 5:00-6:50	ECCE 141	33 (48)	Rashmi Shetty
CSCI 3308-107	LAB	FRI 9:00 -10:50	ECCS 112C	24 (24)	Prasanna Srinivasachar

Instructor Information

Name: Alan Paradise
Email: alan.paradise@colorado.edu
Office Location: ECOT 520
Office Hours: Wednesdays & Thursdays, 3-5 p.m. - By appointment through Outlook

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 tools and practices for software development with a strong focus on best practices used in industry and professional development, such as agile methodologies, pair-programming and test-driven design. Students develop software applications while learning these methods and tools.

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, Planning Poker, RDBMS, E-R Diagrams, Intro to SQL, NoSQL, XML, JSON, SOAP vs REST, Retrospectives, Cloud Computing & Heroku, Testing

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 successfully use a variety of software tools introduced in class.
- The student will be equipped to choose the best software tool for use in a specific situation.
- The student will apply software knowledge and skills in the context of a small group semester long project.

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

- Unix Shell Scripting
- Waterfall, Agile development methodologies
- Application Architectural Design
- Requirements Definition and Analysis
- Relational Database Design & Construction
- HTML & CSS (“Front-end”)
- PHP and/or Python (“middle layer”)
- SQL Query Language (“Back-end”)
- Documentation of Code
- Licensing/Copyright/Patents/IP
- Code Quality Assessment
- Testing Methods and Strategies
- Static and Dynamic Analysis
- Code Repair Strategies
- Refactoring
- Code/Peer Review
- Source Code Version Control and Managing Conflicts
- Software Configuration Management Systems
- Bug Tracking
- Managing Dependencies/Build tools/Integration
- Continuous Integration

Grading

Component	%	Points		Letter Grade Scale
				930 to 1000 = A
Team Surveys (Each student is required to complete two surveys, 10 points each)	2	20		900 to 929 = A-
Quizzes on Lecture & Readings (10 pts per quiz * 10 quizzes)	10	100		870 to 899 = B+
Homework Assignments (Four Assignments. Points Vary)	20	200		830 to 869 = B
Exams (Two mid-term exams, 100 points each)	20	200		800 to 829 = B-
Labs (12 Labs, Points Vary)	20	200		770 to 799 = C+
Team Project & Presentations 7 graded milestones including the final presentation and final summary report. Points vary by milestone.	28	280		700 to 769 = C
TOTAL	100	1000		0 to 699 = 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 20% (200 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. Progress tracking tools comparison and Pair programming (25 points)
3. SQL (50 points)
4. REST Weather Map (75 points)

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 28% (280 points) toward your grade. The project challenges students to use some 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	Agile Client demo and write up of milestones and retrospective
Milestone 3	45 points	Database Design
Milestone 4	40 points	Unit Testing
Milestone 5	20 points	Individual Student Meetings
Milestone 6	40 points	Project Presentations
Milestone 7	60 points	Final Project Report and Product Functionality

Note on Group Project Grade:

Each milestone is submitted for the team as a whole, not as individuals. So every member of the team receives the same score. However, scores are adjusted for each individual's contribution to the team effort. Your individual score for the group project will depend on your effort and involvement on the project.

Your Grade = (sum of project milestone grades) * peer evaluation * individual participation

Peer evaluation is based on your team members' rating of your contribution.
Individual participation is based on the TA's observation of your github commits and the TA's assessment during Milestone 5.

Late Submissions

You can receive a three-day extension on any assignment, homework or milestone, for a 20% grade penalty. After three days, your assignment is considered past due and cannot be turned in.

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, talk with the TA before going to a lab with the same TA being held at a different time.

Quizzes

Over the course of the 16-week semester, there will be 10 quizzes which together make up 10% of your grade for the course. The quiz questions are based on reading assignments and lectures. The quizzes will be administered and graded by Moodle. A quiz will become unavailable in Moodle at the end of the week it is given.

Exams

During Week 9 and Week 15 during your recitation section there will be Midterm Exams. That is, there will be TWO midterm 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.

Course Calendar

This course consists of 16 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 Monday and Friday afternoons, 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. Some weeks there will be no lab.

Week	Lecture	Lab	Homework Due	Milestone Due
Week 1 Aug 28 – Sep 3	**Lecture 1** – 08/28 Introductions, Course Overview **Lecture 2** – 09/01 Unix, Command Shell, Shell Scripting, RegEx	**Lab 1**: VM Setup, Basic Unix commands (10 points)	Register for class in Moodle	-----
Week 2 Sep 4 – Sep 10	09/04 Labor Day Holiday No Lecture **Lecture 3** – 09/08 Project Management	**Lab 2:** Regex, AWK, Sed, (20 points)	Complete skills survey via Qualtrics	-----
Week 3 Sep 11 – Sep 17	**Lecture 4** – 09/11 Software Development	**Lab 3:** Agile Planning and Sizing (10 points)	**Homework # 1** Bash Shell Script	

	Methodologies (Waterfall, Agile, Scrum) **Lecture 5** – 09/15 Version Control in Git			-----
Week 4 Sep 18 – Sep 24	**Lecture 6** – 09/18 HTML **Lecture 7**– 09/22 CSS (Cascading Style Sheets)	**Lab 4:** Version Control – Github (10 points)	-----	-----
Week 5 Sep 25 – Oct 1	**Lecture 8** – 09/25 Relational Database Concepts **Lecture 9** – 09/29 Database Design using the Entity Relationship Diagram	**Lab 5:** HTML/CSS (10 points)	-----	**Project Milestone # 1**
Week 6 Oct 2 – Oct 8	**Lecture 10** – 10/02 Basic SQL **Lecture 11** – 10/06 Advanced SQL	**Lab 6:** SQL (20 points)	**Homework # 2** Progress Tracking Tool Comparison, Pair Programming	-----
Week 7 Oct 9 – Oct 15	**Lecture 12** – 10/09 PhP Basics **Lecture 13** – 10/13 Integrating Front-End and Back-End using PhP/Python	**Lab 7:** Peer Code Review and Sprint Retrospective (10 points)	-----	-----
Week 8 Oct 16 – Oct 22	**Lecture 14** – 10/16 Defining and documenting requirements **Lecture 15** – 10/20 Review for MidTerm exam # 1	**Lab 8:** Integrating the front-end with the back-end (20 points)	-----	**Project Milestone # 2**
Week 9 Oct 23 – Oct 29	**Lecture 16** -- 10/23 Security, Intellectual Property, Software Patents **Lecture 17** – 10/27 Web Services, REST/SOAP	**Midterm Exam # 1 during lab this week**	**Homework # 3** SQL	-----
Week 10 Oct 30 – Nov 5	**Lecture 18 –** 10/30 Cloud Computing, Heroku	**Lab 9:** Web Services		**Project**

	Lecture 19 – 11/03 Testing Methods, Automated testing		-----	**Milestone # 3**
Week 11 Nov 6 – Nov 12	**Lecture 20 –** 11/06 Documenting your code **Lecture 21 –** 11/10 Static and Dynamic Analysis	**Lab 10:** Heroku deployment (20 points)	**Homework # 4** REST Web Services – Weather Map	-----
Week 12 Nov 13 – Nov 19	**Lecture 22** – 11/13 TBD **Lecture 23** – 11/17 TBD	**Lab 11:** Automated Unit Testing (20 points)	-----	**Project Milestone # 4**
Week 13 Nov 20 – Nov 26	**Fall Break**	-----	-----	-----
Week 14 Nov 27 – Dec 3	**Lecture 24 –** 11/27 Using an automated Debugging tool **Lecture 25** - 12/1 Continuous Integration	**Lab 12:** Automated Debugging (20 points)	-----	**Project Milestone # 5**
Week 15 Dec 4 – Dec 10	**Lecture 26 –** 12/04 Review for Midterm Exam # 2 **Lecture 27 –** 12/8 Static and Dynamic Analysis	**Midterm Exam # 2 during lab this week**	-----	-----
Week 16 Dec 11 – Dec 15**	**Student Project Presentations** – sign up for time slots on Moodle	**Student Project Presentations** – sign up for time slots on Moodle	-----	**Project Milestone # 6**
Week 17 Dec 18 – 20 **	No Lecture, No Lab, No final exam.	No Lecture, No Lab, No final exam.	-----	**Project Milestone # 7**

** Short Week

Attendance

In general, attendance at all class meetings and recitations 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.

However, your attendance at the following class meetings and events IS MANDATORY, and missing these class meetings will adversely affect your grade.

Week 9 Lab (Midterm)
Week 12 One-on-One Meeting with TA / Instructor
Week 15 Lab (Midterm)
Week 16 Lecture & Lab

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 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 and updated copy of the syllabus to Moodle.