CSCI-201: Principles of Software Development

Prof. Victor Adamchik

Course Description:

This course provides an introduction to backend and frontend web development in Java. Creating web applications requires various approaches and involves the integration of numerous technologies. The topics covered include object-oriented paradigm for programming (in Java); writing sophisticated concurrent network applications; managing data from relational databases using SQL and JDBC; building modern web pages with HTML, CSS, servlets, JSP and JavaScript; using professional tools on team project.

Learning Objectives:

- The ability to use Java in writing programs
- The ability to produce a software design based on requirements
- Understanding of concurrency
- The ability to write multi-threaded programs
- Understanding networking (socket) programming
- Understanding databases (MySQL) and SQL
- The ability to use HTML and CSS in designing graphical user interfaces
- The ability to utilize servlets, JSP and JavaScript for building web pages
- The ability to work effectively on a team

Prerequisites:

CSCI 104L – Data Structures and Object-Oriented Design

Recommended Textbooks:

Liang, Y. Daniel. *Introduction to Java Programming and Data Structures*, Comprehensive Version, 12th Edition Prentice Hall, Inc., 2017, ISBN 978-0136520238

Computing Environment:

To be able to do program development in this class, it is necessary to install

1. JDK (Java Development Kit)
2. Eclipse (an integrated development environment)
3. Gson (JSON data-binding support for Java from Google)
4. Tomcat (a web server designed to host and run Java-based web applications)
5. MySQL (relational database management system)
6. Workbench (a visual tool for database architects)
7. JDBC (an API for accessing database)
8. Java.servlet (an API for the HTTP protocol)

Lectures:

All lectures are in-person; they also will be videotaped. The recordings will be available in DEN. Since the class is split into two sessions and you will be learning the same material in each, only one session will be recorded.

Programming Labs:

The CPs will lead the lab section each week. There will be an assigned lab program each week that reinforces the topics covered in the lectures. The labs are intended to be completed during the lab period, and you are expected to work *individually* on the lab during the section. The lab assistants are there to answer any questions and help you, so use your time in lab wisely. You will be asked one or more questions by the lab assistants at the end of each lab to ensure you understood what was covered. You may drop any one lab with the lowest grade. We will not video record labs, because during the lab no new material will be taught. Accommodations will be provided for students taking the class online.

Final Project:

The project will be assigned approximately half-way through the semester. You are required to submit an initial proposal. Once we receive all proposals, CPs will create (pseudo randomly) project groups. As a group you will have weekly meetings with your CPs. The project will consist of between 6-7 students. Formal documentation following the software engineering process will be required. The project deliverables should be submitted to DEN by the due date. We will discuss this in more details when the time comes.

Programming Assignments:

Assignments will be discussed in class and worked on individually. Discussion among students is fine, but no copying of other student's code is allowed. The program needs to compile, and grading will only occur if the program is able to be run. Assignments shall be submitted to DEN and due by 11:59p.m. on the due date. Grading criteria will be provided with the assignment description. CPs will grade the assignments. Due to the manual grading, we require you to submit Eclipse project. All grades will be posted to DEN's gradebook.

Each student will have **three (3) grace days** to use during the semester for submitting assignments late. A grace day will be counted for any assignment submitted after 11:59p.m. on the due date. To state that another way, if an assignment is submitted at 12:00a.m. (midnight) or later, grace days will be used. After the three grace days have been used, any assignment submitted late will receive a 0. The days can be used in any combination. For example, you could use two grace days on assignment 1 and one grace day on assignment 2. The grace days do not need to be approved by the professor.

Quizzes:

There will be online quizzes in DEN. The quizzes are an individual effort. You may not use any means to communicate to other students on quizzes for any reason. The goal of quizzes is to ensure that students are attending/watching the lectures and understanding some of the concepts covered. All quizzes will be available starting on Thursday at 5pm with the deadline Friday at 11:59p.m. There are no makeup quizzes. The quiz length is set to 15 mins. Students can take the quiz (only once) at any time during this time frame. Accommodations for students with letters from DSP/OSAS will be provided.

Midterm Exam:

There will online midterm exam (using a DEN quiz tool). The exam is closed book and will consist of theoretical questions. The exam is an individual effort. The exam can only be taken within the scheduled time period. Accommodations for students with letters from DSP and for international students taking the class online will be provided. There are no makeup exams. If you miss an exam due to an emergency, official written documentation, whatever that may be based on the situation, will need to be submitted to me as soon as you are physically able (before the exam if possible).

Piazza & Emails: (piazza.com/usc/fall2021/csci201)

If you have a question about the material or logistics of the class, please post it on the piazza page (do not use e-mail). You may post it publicly to the whole class or privately to the instructors. Often times, if one student has a question/comment, other also have a similar question/comment. Please DO NOT send emails to the course staff unless your issue is private and/or a private post on Piazza is unsuitable.

Grading:

Labs	**10%**
Assignments	**25%**
Quizzes	**10%**
Midterm exam	**25%**
Group Project	**30%**

Letter Grade Distribution:

≥ 93	A	73 – 77	C
90 – 93	A-	70 – 73	C-
87 – 90	B+	67 – 70	D+
83 – 87	B	63 – 67	D
80 – 83	B-	60 – 33	D-
77 – 80	C+	<60	F

Schedule:

This schedule is meant as an outline. Depending on progress, material may be added or removed.

Week	Date	Topics Covered	PA	Labs
1	Aug. 23 Aug. 25	Lecture 1: OO design. Inheritance Lecture 2: Generics. Garbage Collector		no lab
2	Aug. 30 Sep. 1	Lecture 3: Arrays. Cloning. Iterator. Comparator Lecture 4: I/O. Exceptions, Serialization	**PA-1**	**1:** Installation
3	Sep. 6 Sep. 8	No Class – Labor Day Lecture 5: Collections. Bounded wildcards		**2:** Unbounded Arrays
4	Sep. 13 Sep. 15	Lecture 6: Concurrent Computing Lecture 7: Pools. Synchronization		**3:** Collections
5	Sep. 20 Sep. 22	Lecture 8: Monitors. Locks. Conditions Lecture 9: Concurrent Computing	**PA-2**	**4:** Generics
6	Sep. 27 Sep. 29	Lecture 10: Semaphores. Concurrent Collections Lecture 11: Parallel Computing		**5:** Threads
7	Oct. 4 Oct. 6	Lecture 12: **Project Discussion** Lecture 13: Network Programming		**6:** Doordash Driver
8	Oct. 11 Oct. 13	Lecture 14: Network Programming Lecture 15: Server/Client model	**PA-3**	**7:** Networking
9	Oct. 18 Oct. 20	Lecture 16: Review for exam Midterm Exam		no lab
10	Oct. 25 Oct. 27	Lecture 17: Databases. MySQL Lecture 18: SQL		**8:** MySQL installation
11	Nov. 1 Nov. 3	Lecture 18: JDBC Lecture 19: HTML. CSS	**PA-4**	**9:** SQL

12	Nov. 8 Nov. 10	Lecture 20: Java Servlets Lecture 21: JSP. JSTL		10: JDBC
13	Nov. 15 Nov.17	Lecture 22: JavaScript Lecture 23: DOM. XML		11: Servlets
14	Nov. 22 Nov. 24	Lecture 23: AJAX. Web Sockets. No Class - Thanksgiving Holiday		no lab
15	Nov. 29 Dec. 1	Final Project Demonstrations Final Project Demonstrations		no lab

Programming Assignments (tentative dates):

Assignment	Content	Out	Due
PA1	JSON, Collections	Aug. 30	Sep. 20
PA2	JSON, Multi-Threading	Sep. 20	Oct. 11
PA3	Networking, Concurrency Issues	Oct. 11	Nov. 1
PA4	Java Servlets, Databases	Nov. 1	Nov. 22

Academic Integrity:

The USC Student Conduct Code prohibits plagiarism. All USC students are responsible for reading and following the Student Conduct Code, which appears on https://policy.usc.edu/files/2018/07/SCampus-2018-19.pdf.

In this course we encourage students to study together. This includes discussing general strategies to be used on individual assignments. However, all work submitted for the class is to be done individually. Some examples of what is not allowed by the conduct code: copying all or part of someone else's work (by hand or by looking at others' files, either secretly or if shown), and submitting it as your own; giving another student in the class a copy of your assignment solution; consulting with another student during an exam. If you have questions about what is allowed, please discuss it with the course staff.