CSE 2221—SYLLABUS
Software I: Software Components
Autumn 2020 – Online

COURSE OVERVIEW

Instructors
See section pages at http://web.cse.ohio-state.edu/software/2221/web-sw1/.

Course description
Intellectual foundations of software engineering; design-by-contract principles; mathematical modeling of software functionality; component-based software from client perspective.

Levels and credits
U 4 (two one-hour lectures, two one-hour labs)

Prerequisites
CSE 1211 or CSE 1212 or CSE 1221 or ENGR 1221 or CSE 1222 or CSE 1223 or CSE 201 or CSE 202 or CSE 203 or CSE 204 or CSE 205 or EG 167 or CSE Placement Level A; co-req: Math 1151 or Math 1161

General information, exclusions, etc.
Java is taught and used
Course learning outcomes

- Be familiar with the reasons it is important that software be "correct", i.e., why "good enough" is not good enough when it comes to software quality
- Be familiar with the reasons for designing software to minimize the impact of change, and why it is difficult to achieve this
- Be familiar with using design-by-contract principles to write software that uses existing software components based on their interface contracts
- Be familiar with using interface contracts that are described using simple predicate calculus assertions with mathematical integer, string, finite set, and tuple models
- Be familiar with extending existing software components by layering new operations on top of existing operations
- Be familiar with using simple recursion
- Be familiar with using simple techniques to test application software and layered implementations of extensions, including developing and carrying out simple specification-based test plans
- Be familiar with using simple techniques to debug application software and layered implementations of extensions
- Be exposed to using basic algorithm analysis techniques and notations to analyze and express execution times of operations whose implementations involve straight-line code and simple loops
- Be competent with writing Java programs in a procedural style using the basic control structures, primitive value types, character strings, and input/output
- Be familiar with writing Java programs using core language features including interfaces, classes, inheritance, and assertions
- Be familiar with using an understanding of the difference between value types and reference types to trace the execution of simple Java code in situations involving both flavors of types, including their use as parameters to method calls
- Be familiar with writing Java programs that use software components similar to (but simplified from) those in the Java collections framework
- Be exposed to writing Java simple programs with graphical user interfaces
- Be familiar with testing using JUnit
- Be familiar with illustrating key dependencies between software components using UML class diagrams (or similar)
- Be familiar with using the most important features of a modern IDE such as Eclipse
Course topics

- Introduction to Java; introduction to Eclipse; basic input/output; value types; control structures; methods, calls, and parameter passing
- Software components; design-by-contract; packages; interfaces; classes; reference types; equals and toString methods; XMLTree components; NaturalNumber components; introduction to UML class diagrams (or similar)
- Layered implementations of new NaturalNumber methods; introduction to recursion; introduction to specification-based testing and JUnit
- Generics; Sequence components; Queue components; Stack components
- Iterators; Set components; Map components
- Graphical user interfaces (GUIs) using Swing; model-view-controller (MVC) design pattern
- Reasoning about software correctness; loop invariants

HOW THIS COURSE WORKS

Mode of delivery: This course will hold regular Zoom sessions at the scheduled class time Tuesday through Friday. Recording of lectures may be provided in advance and some Zoom sessions may be recorded and made available after the meeting. Contact your section’s instructor for details on requirements and expectations including attendance requirements.

Pace of online activities: This course follows the schedule posted at http://web.cse.ohio-state.edu/software/2221/web-sw1/schedule.html. Students are expected to keep pace with all lecture topics, and lab, homework, and project assignments.

Credit hours and work expectations: This is a 4-credit-hour course. According to Ohio State policy, students should expect around 4 hours per week of time spent on direct instruction (daily Zoom sessions) in addition to 8 hours of homework (reading, homework, and project assignment preparation) to receive a grade of (C) average.

Attendance and participation requirements: Because this is an online course, your attendance is based on your online activity and participation. The following is a summary of everyone’s expected participation:

- **Participating in online activities for attendance: AT LEAST ONCE PER CLASS DAY**
  Contact your section’s instructor for details on attendance requirements and expectations. In general, for “lecture” days, you may be required to watch a recorded lecture before a Zoom meeting, attend a Zoom meeting, and/or watch a recording of a Zoom meeting. In any case, you must complete the requirements for each lecture day
before the next lab day. For “lab” days, you may be required to attend the live “lab” Zoom session and complete the lab activity during the session or complete the lab activity on your own before the next lecture day (and, if needed, get feedback or ask questions during an instructor’s office hours). You should also log in to the course in Carmen every day. (During most weeks you will probably need to log in many times.) If you have a situation that might cause you to miss several days of class, discuss it with your instructor as soon as possible.

- **Office hours and live sessions: SPECIFIC TO EACH SECTION**
  Contact your section’s instructor for details on office hours and requirements for live session attendance.

- **Participation activities: MULTIPLE TIMES PER WEEK (AS PER SCHEDULE)**
  As part of your participation, you are required to submit homework and project assignments by their due dates.

### COURSE MATERIALS AND TECHNOLOGIES

**Textbooks**

All course materials are provided on-line for free, including the recommended textbook used as a Java reference:

- C.S. Horstmann, *Java for Everyone*, John Wiley and Sons, 2013 (available online for free)

**Baseline technical skills for online courses**

- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the Canvas Student Guide.

**Required Technology skills specific to this course**

- Zoom for live sessions (lectures, labs, office hours)
- Piazza class discussion group for “anytime” Q&A

**Required equipment**

- Computer: current Linux, Mac (macOS 10.13+), or PC (Windows 8+) system with high-speed internet connection.
• Authentication device: a mobile device (smartphone or tablet), or landline, or security key (e.g., YubiKey, Feitian) to use for BuckeyePass authentication.
• Scanner: a camera, smartphone, tablet, or document scanner for scanning and uploading hand-written documents such as homeworks and exams.
• Webcam: built-in or external webcam, fully installed and tested.
• Microphone: built-in laptop or tablet mic or external microphone.

Required software

• Lab activities and project assignments will require the use of a Java SE JDK and of Eclipse IDE for Java Developers with appropriate plugins; instructions on downloading and setting up these tools on your own computer are available at http://web.cse.ohio-state.edu/software/2221/web-sw1/extras/instructions/environment-setup/home-setup.html.
• Current Chrome browser with Proctorio extension installed. Exams will be online on Carmen (possibly using the Proctorio online proctoring platform supported by OSU and Carmen).
• Recommended: Microsoft Office 365. All Ohio State students are eligible for free Microsoft Office 365 ProPlus through Microsoft’s Student Advantage program. Full instructions for downloading and installation can be found at go.osu.edu/office365help.

GRADING AND FACULTY RESPONSE

How your grade is calculated

<table>
<thead>
<tr>
<th>ASSIGNMENT CATEGORY</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework Assignments (many)</td>
<td>6%</td>
</tr>
<tr>
<td>Project Assignments (several)</td>
<td>30%</td>
</tr>
<tr>
<td>Quizzes/Exams (instructor-dependent)</td>
<td>60%</td>
</tr>
<tr>
<td>Class Participation (instructor-dependent)</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>
Late assignments

Homework assignments are due by the start of class on the due date. Late homework submissions will not be accepted and will not receive any credit.

Project assignments are due one hour before the start of class on the due date. Maximum credit of 10 points is reduced by 2 points for each day (24 hours), or part thereof, the assignment is late. After a project assignment is 48 hours late, no credit is given.

Please refer to the schedule for due dates.

Grading scale

93–100: A
90–92.9: A-
87–89.9: B+
83–86.9: B
80–82.9: B-
77–79.9: C+
73–76.9: C
70 –72.9: C-
67 –69.9: D+
60 –66.9: D
Below 60: E

Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call 614-688-HELP at any time if you have a technical problem.)

- **Grading and feedback:** For homework assignments, you can expect feedback within a few days. For project assignments, you can generally expect feedback within 5-6 days.
- **Email:** I will reply to emails within 24 hours on days when class is in session at the university.
- **Discussion board:** I will check and reply to messages in the discussion boards every 24 hours on school days.
COURSE POLICIES
See http://web.cse.ohio-state.edu/software/web/policies.html for course official policies.

Cooperation, Collaboration, and Professional Ethics
See http://web.cse.ohio-state.edu/software/web/policies.html#ccpe.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations
The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university’s request process, managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; 098 Baker Hall, 113 W. 12th Avenue. Go to https://slds.osu.edu/ for more information.

Accessibility of course technology
This online course requires use of Carmen (Ohio State’s learning management system) and Zoom (academic audio and web conferencing tool at Ohio State) and possibly other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Carmen (Canvas) accessibility
- Zoom accessibility
- Piazza accessibility
- Proctorio accessibility

ADDITIONAL INFORMATION
See http://web.cse.ohio-state.edu/software/web/other.pdf for additional information.