# **CSC 335: Object-Oriented Programming and Design**

Tuesday & Thursday 9:30 - 10:45 AM J P Schaefer CCP, Room 108

#### **Course Description**

Fundamentals of object-oriented software development. Includes design principles, inheritance, polymorphism, Unified Modeling Language (UML), testing, event-driven programming with graphical user interfaces, applications of design patterns, and use of existing frameworks.

## **Instructor and Contact Information**

Melanie Lotz GS 847 lotz@cs.arizona.edu

#### **Teaching Assistants:**

Course Coordinator: Michelle Ramos Hernandez – <u>mramoshernandez@arizona.edu</u> Course Coordinator in Training: Noelle Healey-Stewart – <u>nhealeystewart@arizona.edu</u> Paulina Aguirre – <u>paulinaa3@arizona.edu</u> Eman Ayaz – <u>emanayaz@arizona.edu</u> Jenny Yu – <u>jennyyu@arizona.edu</u> Gabriel Hernandez – <u>gabehernandez07@arizona.edu</u> Stephin Tomson – <u>stephintomson@arizona.edu</u> Nathan Oswald – <u>nathanoswald1@arizona.edu</u> Michele Lobato – <u>mlobato@arizona.edu</u>

#### **Office Hours:**

- Lotz office hours will be held in GS 847
- TA office hours will be held in GS 813
- The office hours schedule will be posted on Piazza, and office hours will officially start the second week of classes.
- Our scheduled office hours have an open door policy, which means you do not have to make an appointment. If you need to meet with any of us at an unscheduled time, you can email to set up an appointment.

## **Course Format and Teaching Methods**

There will be lectures, as well as in-class discussions and activities. This class also requires group work, so you should expect to work with other students both inside and outside of class.

## **Course Objectives**

- Learn to think like a software developer, specifically with respect to object-oriented design and programming in Java.
- Design and implement software both individually and as part of a team.
- Understand object-oriented design principles and the Java programming language in

depth and apply that knowledge to software development projects.

• Build up and practice the essential skill of working on a team.

## **Expected Learning Outcomes**

- Understand and utilize principles of object-oriented languages and program design.
- Understand and use tools for software design and development, including Java libraries, UML, an IDE, Git, Github, design patterns and antipatterns, unit testing, and various Java frameworks.
- Analyze object-oriented Java code and determine if the design is good or bad and how it can be improved.
- Design, implement, and test object-oriented software.
- Utilize event-driven programming and graphical user interfaces in software
- Work on a team to develop a large software project utilizing the principles of Agile software development.

## **Transferable Career Skills**

#### National Association of Colleges and Employers (NACE) Career Readiness:

Career readiness is a foundation from which to demonstrate requisite core competencies that broadly prepare the college-educated for success in the workplace and lifelong career management. For new college graduates, career readiness is key to ensuring successful entrance into the workforce.

There are eight career readiness competencies, each of which can be demonstrated in a variety of ways." (NACE, 2025)

- Career & Self Development
- Communication
- Critical Thinking
- Equity & Inclusion
- Leadership
- Professionalism
- Teamwork
- Technology

In this course, we will focus on the following competencies:

- **Critical Thinking** Students will think critically about software design, identify common issues in object-oriented code, and explain how to address them in order to improve the software.
- **Teamwork** Students will work together using Agile development principles to develop software, including one large software project.
- **Technology** Students will utilize software development technology that is used in industry, including an IDE, Github, and various Java frameworks.

## Makeup Policy for Students Who Register Late

Students who register late are encouraged to work through the missed material, but credit will not be given for any missed assignments.

## **Course Communications**

There will be various ways that communication will take place in this course, and it is important that you keep track of all of them.

- **Class**: Regular attendance is expected and it is your responsibility to find out what you missed if you do not come to class.
- **Email**: Check your UA email regularly.
- **D2L**: Announcements may be made on D2L, so make sure you check that page regularly. I recommend checking both the announcements and the calendar on a daily basis (at least on weekdays). D2L is also where the official gradebook and calendar are.
- **Piazza**: Announcements may be made on Piazza, which is also used for questions and discussions *about course content*.
  - Please do not use Piazza to ask about grades or request a regrade.
  - Please note that although you are able to post anonymously to other students, none of your posts are anonymous to the instructor or the TAs.
  - You may be added automatically, but if you register late, you can add yourself using the following link: <u>https://piazza.com/arizona/spring2025/csc335</u>
- **Gradescope:** Gradescope is used for grading some of the assignments and can also be used for submitting regrade requests on said assignments. Please note that the official gradebook is in D2L, but grades from Gradescope will not be transferred to D2L until after the regrade request window has closed.

## **Required Texts or Readings**

There is no *required* textbook for this class, but much of the material will come from the following *recommended* textbook:

Introduction to Software Design with Java Second Edition Martin P. Robillard ISBN: 978-3-030-97898-3

## **Required or Special Materials**

- Device for programming
- Internet access
- Software including the required IDE and Github

## Assignments and Examinations: Schedule/Due Dates

#### Small Assignments. (125 points)

There will be 8 small assignments, each worth 18 points. The points you earn will be capped at 125 to provide some flexibility. These assignments can basically be of any type (writing, reading, coding, learning how to use various tools, etc.), so you will have to read and follow all the instructions carefully as the submission guidelines may change. These assignments will be released on Wednesday (or earlier) and will be due the following Wednesday by 11:59 PM. See the schedule for details. They will not be accepted late, and there will be no make-ups. If you provide a Dean's Excuse or a letter from the Dean of Students office, the assignment may be excused.

#### Large Assignments. (100 points)

• These are larger assignments for which you have a little less than 2 weeks. They are primarily programming assignments, but they may have other components as well. Each one is worth 50 points. There are two total, and they will both require

collaboration.

- You may submit these assignments late, but there is a steep penalty for late submissions: Each day late results in a 13-point deduction, and any part of a day counts as a full day.
- You must follow all the submission guidelines given in the spec. Improperly submitted assignments will not be accepted.
- If you submit the assignment on time and you receive a grade that is less than 25/50 (50%), you may fix the issues with the submission and resubmit within 72 hours of the grade being released for up to 50% credit (i.e. the max grade you can get with a resubmission is 25/50). If you did not submit the assignment on time, you may not resubmit it.
- These assignments are released on Mondays and due approximately two weeks later (excluding Spring Break) on Friday at 11:59 PM. See the schedule for details.
- Extensions are only given in valid situations that are indicated by Dean's Excuses or a letter from the Dean of Students office indicating an emergency situation.

#### Quizzes. (125 points)

There will be 7 quizzes given, and they are already on the schedule. The schedule, however, is tentative, so those dates could change. Quizzes can cover anything from the course, but will usually cover material from the most recent classes and material from recent assignments. Each quiz will be worth 20 points, and your points are capped at 125, so there is some flexibility. Quizzes cannot be made up, and you must be in class to take the quiz. However, if you have DRC accommodations that entitle you to more time on quizzes and exams, come see me to make other arrangements. If you provide a Dean's Excuse or a letter from the Dean of Students office indicating an emergency situation that stopped you from being able to complete the work, a quiz may be excused.

#### Final Project. (150 points)

The final project is a large software development project that you will do in teams. The final deadline for this is given in the calendar, but there will likely be smaller deadlines leading up to that as well. If you miss those intermediary deadlines, you will not get credit for that part of the project. For the final deadline, each day late will result in a 50-point deduction (so there's really no point turning it in more than 2 days late.) This project is due at 11:59 PM and must be submitted according to the instructions given in the spec.

#### Exams. (500 points)

There will be two midterms, each worth 150 points, and a final exam worth 200 points. See the schedule for the dates. If your final exam score is better than your lowest midterm score, I will replace that midterm score with the final exam score. Therefore, make-ups will not be given unless you provide a Dean's excuse or a letter from the Dean of Students office indicating an emergency situation. Exams are cumulative and closed-book, and must be done in person on the day they are scheduled (unless accommodation is provided through the DRC or due to a valid, documented excuse).

#### Dean's Excuses and Letters from the Dean of Students Office.

As indicated above, I only allow make-ups and excuse assignments in cases where I receive official documentation in the form of a Dean's Excuse or an official letter from the Dean of Students Office. Below is information about how that works.

- Dean's Excuses are special excuses provided for students *for school-sanctioned events*, such as sporting competitions.
- A Letter from the Dean of Students Office is an official notification from the Dean of

Students Office that they may send out to your instructors if you contact them about an emergency situation, typically when it causes you to miss class for a week or more. Please note that just talking to someone in that office is not sufficient. I require an official letter from them indicating the dates of your absence and verifying that they have deemed it an emergency situation. (Note that they don't usually share details of the situation, just a general idea.) This is required for my class because I am not allowed to ask for medical documentation. The Dean of Students information can be found here: <u>https://deanofstudents.arizona.edu/</u>

#### **Supplemental Instruction & Extra Credit**

There will be supplemental instruction offered at least every two weeks, which will include a presentation about the course material and activities to help you practice the material. These will usually be led by a TA. The schedule for these will be provided on Piazza along with the office hour schedule.

I offer a small amount of extra credit for various aspects of course engagement and participation. You can earn up to 10 points total this way, and the options are detailed below.

- *Attend the supplemental instruction sessions.* You can earn 1 point per session, but in order to earn the point, you must attend the entire session and participate fully.
- Attend office hours. You can earn ½ point per office hour session, but in order to earn the half-point, you must engage with the instructor/TA in a meaningful way by asking questions about the course material or checking in regarding how the course is going. You do not have to attend the full session, though. Even a five-minute check-in about the course is fine.
- *Participate in class.* You can earn ½ point per class session, but your participation must be meaningful and related to the content for the day. This offer does not apply to exam days or final project work days.

Please note that it can be challenging for us to keep track of these points particularly during class sessions or when office hours get busy, so I strongly encourage you to keep track of your own points and to check with the instructor/TA to make sure you got credit before leaving the session.

## **Final Examination**

Date & Time: Tuesday, May 13, 2025, 8:00 - 10:00 AM Location: ILC 120

#### Final Exam Regulations and Final Exam Schedule:

https://registrar.arizona.edu/faculty-staff-resources/room-class-scheduling/schedule-classes /final-exams

## **Grading Scale and Policies**

Your grade will be calculated based on how many points you earn (out of 1000), so every point in the class is equally weighted. A summary of the point distribution is below.

| Category/Assignment    | Points |
|------------------------|--------|
| Small Assignments (SA) | 125    |

| Large Assignments (LA) | 100 |
|------------------------|-----|
| Quizzes (Q)            | 125 |
| Final Project (FP)     | 150 |
| Midterms (MT)          | 300 |
| Final (F)              | 200 |

The following are the expected grade cut-offs. Although these can vary a bit at the end of the semester (sometimes I lower them a bit, but I never raise them), you should expect them to be around the same as what is listed.

| Points  | Grade |
|---------|-------|
| 900+    | Α     |
| 800-899 | В     |
| 700-799 | С     |
| 600-699 | D     |
| 0-599   | E     |

University policy regarding grades and grading systems is available at <a href="https://catalog.arizona.edu/policy/courses-credit/grading/grading-system">https://catalog.arizona.edu/policy/courses-credit/grading/grading-system</a>

#### Incomplete (I) or Withdrawal (W):

Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at <a href="https://catalog.arizona.edu/policy/courses-credit/grading/grading-system">https://catalog.arizona.edu/policy/courses-credit/grading/grading-system</a>.

#### **Dispute of Grade Policy:**

- Regrade requests and grade disputes must be handled within 72 hours of the grade being released or by a specific deadline posted in a D2L announcement or Gradescope email when the grades are released.
- You must also follow the instructions for how to handle regrade requests, which will be given when the grades for an assignment are released.
- The specific guidelines may vary depending on the assignments, so make sure you read the announcements and/or Gradescope emails when the grades are released.
- It is your right as a student to know how you are being graded and to ask for regrades. However, requesting regrades through Gradescope is a privilege, and you are expected to do so by following the guidelines and with courtesy to the graders. I reserve the right to turn off the regrade request feature on Gradescope and require all regrade requests and grade disputes to be handled by me in person.

## **Honors Credit**

Students wishing to contract this course for Honors Credit should e-mail me to set up an appointment to discuss the terms of the contact and to sign the Honors Course Contract

Request Form. The form is available at <u>http://www.honors.arizona.edu/honors-contracts</u>.

| Date   | Lecture Topics                                                          | Released | Due  | Reading               |
|--------|-------------------------------------------------------------------------|----------|------|-----------------------|
| Week 1 |                                                                         |          |      |                       |
| W 1/15 |                                                                         |          |      |                       |
| R 1/16 | Course Overview                                                         |          |      |                       |
| F 1/17 |                                                                         |          |      |                       |
| Week 2 |                                                                         |          |      |                       |
| M 1/20 | MLK Day – no class                                                      |          |      |                       |
| T 1/21 | <ul> <li>Software Development<br/>Tools</li> <li>Java Basics</li> </ul> |          |      |                       |
| W 1/22 |                                                                         | SA 1     |      |                       |
| R 1/23 | <ul><li>Java Basics</li><li>Packages &amp; JARs</li></ul>               |          |      | Appendix<br>Chapter 1 |
| F 1/24 |                                                                         |          |      |                       |
| Week 3 |                                                                         |          |      |                       |
| M 1/27 |                                                                         |          |      |                       |
| T 1/28 | <ul> <li>Quiz 1</li> <li>Software Testing</li> </ul>                    |          |      | Chapter 5             |
| W 1/29 |                                                                         | SA 2     | SA 1 |                       |
| R 1/30 | <ul><li>Agile Development</li><li>Encapsulation</li></ul>               |          |      | Chapter 2             |
| F 1/31 |                                                                         |          |      |                       |
| Week 4 |                                                                         |          |      |                       |
| M 2/3  |                                                                         |          |      |                       |
| Т 2/4  | Encapsulation                                                           |          |      |                       |
| W 2/5  |                                                                         | SA 3     | SA 2 |                       |
| R 2/6  | <ul><li> Quiz 2</li><li>Types &amp; Type Checking</li></ul>             |          |      |                       |

## Scheduled Topic and Activities

Note: This is a tentative schedule and may change as necessary.

|        | Polymorphism                                    |      |      |           |
|--------|-------------------------------------------------|------|------|-----------|
| F 2/7  |                                                 |      |      |           |
| Week 5 |                                                 |      |      |           |
| M 2/10 |                                                 | LA 1 |      |           |
| T 2/11 | Composition                                     |      |      | Chapter 6 |
| W 2/12 |                                                 | SA 4 | SA 3 |           |
| R 2/13 | Inheritance                                     |      |      | Chapter 7 |
| F 2/14 |                                                 |      |      |           |
| Week 6 |                                                 |      |      |           |
| M 2/17 |                                                 |      |      |           |
| T 2/18 | <ul> <li>Quiz 3</li> <li>Inheritance</li> </ul> |      |      |           |
| W 2/19 |                                                 |      | SA 4 |           |
| R 2/20 | Review/Buffer Day                               |      |      |           |
| F 2/21 |                                                 |      |      |           |
| Week 7 |                                                 |      |      |           |
| M 2/24 |                                                 |      |      |           |
| Т 2/25 | Midterm 1                                       |      |      |           |
| W 2/26 |                                                 |      |      |           |
| R 2/27 | Interfaces                                      |      |      | Chapter 3 |
| F 2/28 |                                                 |      | LA 1 |           |
| Week 8 |                                                 |      |      |           |
| M 3/3  |                                                 | LA 2 |      |           |
| Т 3/4  | Interfaces                                      |      |      | Chapter 3 |
| W 3/5  |                                                 | SA 5 |      |           |
| R 3/6  | • <b>Quiz 4</b><br>• Buffer Day                 |      |      |           |
| F 3/7  |                                                 |      |      |           |

| Week 9  | 3/8-3/16: Spring Break                                     |      |      |           |
|---------|------------------------------------------------------------|------|------|-----------|
| Week 10 |                                                            |      |      |           |
| M 3/17  |                                                            |      |      |           |
| T 3/18  | Object State                                               |      |      | Chapter 4 |
| W 3/19  |                                                            | SA 6 | SA 5 |           |
| R 3/20  | Object State                                               |      |      |           |
| F 3/21  |                                                            |      | LA 2 |           |
| Week 11 |                                                            |      |      |           |
| M 3/24  |                                                            | FP   |      |           |
| Т 3/25  | Event-driven Programming                                   |      |      | Chapter 8 |
| W 3/26  |                                                            | SA 7 | SA 6 |           |
| R 3/27  | <ul> <li>Quiz 5</li> <li>Inversion of Control</li> </ul>   |      |      |           |
| F 3/28  |                                                            |      |      |           |
| Week 12 |                                                            |      |      |           |
| M 3/31  |                                                            |      |      |           |
| Т 4/1   | Inversion of Control                                       |      |      |           |
| W 4/2   |                                                            | SA 8 | SA 7 |           |
| R 4/3   | Final Project Work Day                                     |      |      |           |
| F 4/4   |                                                            |      |      |           |
| Week 13 |                                                            |      |      |           |
| M 4/7   |                                                            |      |      |           |
| T 4/8   | <ul> <li>Quiz 6</li> <li>Final Project Work Day</li> </ul> |      |      |           |
| W 4/9   |                                                            |      | SA 8 |           |
| R 4/10  | Review/Buffer Day                                          |      |      |           |
| F 4/11  |                                                            |      |      |           |
| Week 14 |                                                            |      |      |           |

| M 4/14  |                                                     |      |           |
|---------|-----------------------------------------------------|------|-----------|
| T 4/15  | Midterm 2                                           |      |           |
| W 4/16  |                                                     |      |           |
| R 4/17  | Final Project Work Day                              |      |           |
| F 4/18  |                                                     |      |           |
| Week 15 |                                                     |      |           |
| M 4/21  |                                                     |      |           |
| T 4/22  | Other Design Patterns                               |      | Chapter 6 |
| W 4/23  |                                                     |      |           |
| R 4/24  | Final Project Work Day                              |      |           |
| F 4/25  |                                                     | FP   |           |
| Week 16 |                                                     |      |           |
| M 4/28  |                                                     |      |           |
| Т 4/29  | Other Design Patterns                               |      |           |
| W 4/30  |                                                     |      |           |
| R 5/1   | <ul> <li>Quiz 7</li> <li>Metaprogramming</li> </ul> |      | Chapter 5 |
| F 5/2   |                                                     |      |           |
| Week 17 |                                                     |      |           |
| M 5/5   |                                                     |      |           |
| Т 5/6   | Review/Buffer Day                                   |      |           |
| W 5/7   |                                                     | <br> |           |
| Week 18 | Final Exam Week                                     |      |           |
| T 5/13  | Final Exam: 8-10 AM                                 | <br> |           |

## **Classroom Behavior Policy**

To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting,

chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

## **Course-specific Academic Integrity Policy**

Whenever you submit work in this class, it must be your own work from beginning to end or the work of your team when it is a team project. Although you are allowed to use available resources, you must be using them in a way that furthers *your work* and *your learning*.

Unless you are told otherwise *by your instructor*, the following behaviors are considered violations of the academic integrity policy in this class:

- Posting any assignments online or into any AI system
- Using code that you did not write yourself (or as a team for the team projects)
- Using any unauthorized resources in order to complete assignments
- Looking at solutions that are not your own for any of the assignments (unless the deadline for the assignment has passed that includes any resubmission deadlines)
- Sharing your solutions to any assignments with anyone except instructional staff for the course (unless the deadline for the assignment has passed – that includes any resubmission deadlines)
- Asking AI to do any assignments for you or to write or fix code for you.
- Asking AI to put things into sentences for you.

(To be safe, I recommend avoiding AI altogether.)

This is not an exhaustive list and individual assignments may have additional academic integrity details, so read and follow the instructions. <u>When in doubt, ask.</u>

If I believe, after investigation, that you have violated the academic integrity policy, I will file a report with the Dean of Students office, and the recommended sanction will likely be that you fail the course. (It could be better or worse than that depending on the situation, but be aware that I take this seriously and have very low tolerance for cheating.)

## Safety on Campus and in the Classroom

For a list of emergency procedures for all types of incidents, please visit the website of the Critical Incident Response Team (CIRT): <u>https://cirt.arizona.edu/case-emergency/overview</u>

Also watch the video available at

https://arizona.sabacloud.com/Saba/Web\_spf/NA7P1PRD161/app/me/ledetail;spf-url=com mon%2Flearningeventdetail%2Fcrtfy00000000003841

## **University-wide Policies link**

Links to the following UA policies are provided here: <a href="https://catalog.arizona.edu/syllabus-policies">https://catalog.arizona.edu/syllabus-policies</a>

- Absence and Class Participation Policies
- Threatening Behavior Policy
- Accessibility and Accommodations Policy
- Code of Academic Integrity
- Nondiscrimination and Anti-Harassment Policy

#### **Department-wide Syllabus Policies and Resources link**

Links to the following departmental syllabus policies and resources are provided here, <a href="https://www.cs.arizona.edu/cs-course-syllabus-policies">https://www.cs.arizona.edu/cs-course-syllabus-policies</a> :

- Department Code of Conduct
- Class Recordings
- Illnesses and Emergencies
- Obtaining Help
- Preferred Names and Pronouns
- Confidentiality of Student Records
- Additional Resources
- Land Acknowledgement Statement

## **Subject to Change Statement**

Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.