

## **CS 635 Advanced Object-Oriented Programming**

Fall Semester, 2021

### **COURSE INFORMATION**

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Class Days: Tuesday, Thursday

Class Times: 5:30-6:45 pm

Class Location: P-146

Instructor: Roger Whitney

Email: [whitney@sdsu.edu](mailto:whitney@sdsu.edu)

Zoom Office hours: 10:30-Noon Tuesday, Thursday, Meeting ID: 914 283 418

### **COVID**

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Effective Fall 2021, students who register for face-to-face classes are expected to attend as indicated in the course schedule. Faculty teaching face-to-face courses will not be required to create a new, alternative on-line class as an accommodation for any student.

Students with medical conditions that would present a COVID-related risk in a face-to-face instructional setting should contact the Student Ability Success Center (<https://sdsu.edu/sasc>) to begin the process of getting support. Students who do not adhere to the [Covid19 Student Policies](#) or the directives of their faculty will be directed to leave the classroom and will be referred to the Center for Student Rights and Responsibilities.

Do not come to campus if you do not feel well. Remain home and monitor your symptoms and seek medical attention as needed.

### **CLASS RECORDINGS**

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The class lectures will be recorded and made available on-line for those that can not make it to class. If the recent surge in covid cases makes you uncomfortable sitting in a classroom full of people you can avoid class and listen to the lectures remotely. The lectures will be recorded using Zoom. In theory this means one can attend class in real time via Zoom. However in practice this may not work well. First there may be bandwidth issues in the classroom. Secondly it is difficult to monitor the in-person students and the distance students while presenting material. There may be times when there are technical issues making the recording. Given that the lecture is being given live there is very limited time to resolve such issues.

### **COURSE CATALOG DESCRIPTION**

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Advanced topics in object-oriented programming and design, code reuse, building class libraries, quality of objects, coupling, cohesion, design patterns, distributed objects.

### **STUDENT LEARNING OUTCOMES**

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Learn basic design patterns

Understand when to apply design patterns to improve the quality of your code

Understand the affects of coupling and cohesion on code quality

This will improve your ability to:

Design, implement, and evaluate a computer-based system, process, component, or program to meet desired needs

Use current techniques, skills, and tools necessary for computing practice.

## COURSE MATERIALS

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### Texts:

- Design Patterns: Elements of Reusable Object-Oriented Software, Gamma, Helm, Johnson, Vlissides, Addison-Wesley, 1995. Required
- Refactoring: Improving the Design of Existing Code On-line access via SDSU Library, Optional
- Object Coupling and Object Cohesion, chapter 7 of Essays on Object-Oriented Software Engineering, Vol. 1, Berard, Prentice-Hall, 1993, Available on course website.
- Big Ball of Mud by Brian Foote and Joseph Yoder, <http://www.laputan.org/mud/mud.html>

**Prerequisites:** CS535 and working knowledge of Java, C++, Swift, Kotlin, Python 3, or Dart.

This is a graduate course in object-oriented programming that assumes you have taken an undergraduate course in object-oriented programming and have a working knowledge of one of Java, C++, Swift, Kotlin, Python 3, or Dart. In the recent past a number of students have taken this course without this background and done poorly in this course. Sept 3 is the last day to add or drop the course. Grades in this course are based only on performance of the student. Problems with languages (English and/or Java) are not considered in assigning grades.

## COURSE DESIGN

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### Topics covered in the course:

- Coupling, Cohesion,
- Refactoring
- Unit testing
- Basic OO concepts and principles
- OO metrics
- Affect of functional programming features on design patterns
- Design Patterns
  - Abstract Factory, Builder, Factory Method
  - Prototype, Singleton, Adapter
  - Bridge, Composite, Decorator, Facade
  - Flyweight, Proxy, Chain of Responsibility

- Command, Interpreter, Iterator
- Mediator, Memento, Observer
- State, Strategy, Template Method
- Visitor, Pipes & Filters, Null Object

## GRADING POLICIES

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**Grading:** Your grade will be based on two exams (40% of your grade) and homework (60% of your grade). If needed there will be quizzes. There is no extra credit work in this course. There will be between 4 and 5 programming assignments. Missing a programming assignment may drop your course grade by considerably. Some assignments in this class may seem easy at first glance. This causes some students to delay starting the assignment. Often they find out too late that the assignment is harder than they think, which hurts their grade.

**Late Policy:** Late homework will be accepted, but with a penalty. An assignment will lose 5% of the total value of the assignment per day late. Once a solution to an assignment has been posted or discussed in class, the assignment will no longer be accepted. Late penalties are always rounded up to the next integer value.

## SCHEDULE

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**Waitlist Policy:** SDSU is now using wait listing to fill empty seats in classes. Instructors have no control over who gets added to the course. As students drop out of the course other students will be added automatically. Last day to add/drop classes is Sept 3

### Exams

Midterm Oct 28

Final Dec 16

## UNIVERSITY POLICIES

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**Accommodations:** If you are a student with a disability and are in need of accommodations for this class, please contact Student Ability Success Center at (619) 594-6473 as soon as possible. Please know accommodations are not retroactive, and I cannot provide accommodations based upon disability until I have received an accommodation letter from Student Ability Success Center.

**Student Privacy and Intellectual Property:** The [Family Educational Rights and Privacy Act](#) (FERPA) mandates the protection of student information, including contact information, grades, and graded assignments. I will use Canvas to communicate with you, and I will not post grades or leave graded assignments in public places. Students will be notified at the time of an assignment if copies of student work will be retained beyond the end of the semester or used as examples for future students or the wider public. Students maintain intellectual property rights to work products they create as part of this course unless they are formally notified otherwise.

**Religious observances:** According to the University Policy File, students should notify the instructors of affected courses of planned absences for religious observances by the end of the second week of classes.

**Student email addresses:** Students are provided with an SDSU Gmail account for their official use. This [SDSU email address](#) will be used for all communications. Per university policy, students are responsible for checking their official university email once per day, please see [Student Official Email Address Use Policy here](#).

**Academic Honesty:** The University adheres to a strict policy prohibiting cheating and plagiarism. Examples of academic dishonesty include but are not limited to:

- copying, in part or in whole, from another's test or other examination;
- obtaining copies of a test, an examination, or other course material without the permission of the instructor;
- collaborating with another or others in work to be presented without the permission of the instructor;
- falsifying records, laboratory work, or other course data;
- submitting work previously presented in another course, if contrary to the rules of the course;
- altering or interfering with grading procedures;
- assisting another student in any of the above;
- using sources verbatim or paraphrasing without giving proper attribution (this can include phrases, sentences, paragraphs and/or pages of work);
- copying and pasting work from an online or offline source directly and calling it your own;
- using information you find from an online or offline source without giving the author credit;
- replacing words or phrases from another source and inserting your own words or phrases.

The California State University system requires instructors to report all instances of academic misconduct to the Center for Student Rights and Responsibilities. Academic dishonesty will result in disciplinary review by the University and may lead to probation, suspension, or expulsion. Instructors may also, at their discretion, penalize student

grades on any assignment or assessment discovered to have been produced in an academically dishonest manner.

**Resources for students:** A complete list of all academic support services--including the [Writing Center](#) and [Math Learning Center](#)--is available on the Student Affairs' [Academic Success](#) website. [Counseling and Psychological Services](#) (619-594-5220) offers confidential counseling services by licensed therapists; you can Live Chat with a counselor at [http://go.sdsu.edu/student\\_affairs/cps/therapist-consultation.aspx](http://go.sdsu.edu/student_affairs/cps/therapist-consultation.aspx) between 4:00pm and 10:00pm, or call San Diego Access and Crisis 24-hour Hotline at (888) 724-7240.

**Sexual violence / Title IX mandated reporting:** As an instructor, one of my responsibilities is to help create a safe learning environment on our campus. I am a mandated reporter in my role as an SDSU employee. It is my goal that you feel able to share information related to your life experiences in classroom discussions, in your written work, and in our one-on-one meetings. I will seek to keep the information you share private to the greatest extent possible. However, I am required to share information regarding sexual violence on SDSU's campus with the Title IX coordinator, Jessica Rentto 619-594-6017. She (or her designee) will contact you to let you know about accommodations and support services at SDSU and possibilities for holding accountable the person who harmed you. Know that you will not be forced to share information you do not wish to disclose and your level of involvement will be your choice. If you do not want the Title IX Officer notified, instead of disclosing this information to your instructor, you can speak confidentially with the following people on campus and in the community. They can connect you with support services and discuss options for pursuing a University or criminal investigation. Sexual Violence Victim Advocate 619-594-0210 or Counseling and Psychological Services 619-594-5220, [psycserv@sdsu.edu](mailto:psycserv@sdsu.edu). For more information regarding your university rights and options as a survivor of sexual misconduct or sexual violence, please visit [titleix.sdsu.edu](http://titleix.sdsu.edu) or [sdsutalks.sdsu.edu](http://sdsutalks.sdsu.edu).

**Classroom Conduct Standards:** SDSU students are expected to abide by the terms of the Student Conduct Code in classrooms and other instructional settings. Prohibited conduct includes:

- Willful, material and substantial disruption or obstruction of a University-related activity, or any on-campus activity.
- Participating in an activity that substantially and materially disrupts the normal operations of the University or infringes on the rights of members of the University community.
- Unauthorized recording, dissemination, or publication (including on websites or social media) of lectures or other course materials.
- Conduct that threatens or endangers the health or safety of any person within or related to the University community, including

1. physical abuse, threats, intimidation, or harassment.
2. sexual misconduct.

Violation of these standards will result in referral to appropriate campus authorities.

**Medical-related absences:** Students are instructed to contact their professor/instructor/coach in the event they need to miss class, etc. due to an illness, injury or emergency. All decisions about the impact of an absence, as well as any arrangements for making up work, rest with the instructors. [Student Health Services](#) (SHS) does not provide medical excuses for short-term absences due to illness or injury. When a medical-related absence persists beyond five days, SHS will work with students to provide appropriate documentation. When a student is hospitalized or has a serious, ongoing illness or injury, SHS will, at the student's request and with the student's consent, communicate with the student's instructors via the Vice President for Student Affairs and may communicate with the student's Assistant Dean and/or the [Student Ability Success Center](#).

**SDSU Economic Crisis Response Team:** If you or a friend are experiencing food or housing insecurity, technology concerns, or any unforeseen financial crisis, it is easy to get help! Visit [sdsu.edu/ecrt](https://sdsu.edu/ecrt) for more information or to submit a request for assistance.

SDSU's Economic Crisis Response Team (ECRT) aims to bridge the gap in resources for students experiencing immediate food, housing, or unforeseen financial crises that impacts student success. Using a holistic approach to well-being, ECRT supports students through crisis by leveraging a campus-wide collaboration that utilizes on and off-campus partnerships and provides direct referrals based on each student's unique circumstances. ECRT empowers students to identify and access long term, sustainable solutions in an effort to successfully graduate from SDSU. Within 24 to 72 hours of submitting a referral, students are contacted by the ECRT Coordinator and are quickly connected to the appropriate resources and services.

For students who need assistance accessing technology for their classes, visit our ECRT website ([sdsu.edu/ecrt](https://sdsu.edu/ecrt)) to be connected with the SDSU library's technology checkout program. The technology checkout program is available to both SDSU and Imperial Valley students.

### **Land Acknowledgement**

For millennia, the Kumeyaay people have been a part of this land. This land has nourished, healed, protected and embraced them for many generations in a relationship of balance and harmony. As members of the San Diego State University community, we acknowledge this legacy. We promote this balance and harmony. We find inspiration from this land, the land of the Kumeyaay.