SJSU SAN JOSÉ STATE UNIVERSITY

College of Science · Computer Science

Object-Oriented Design Section 05

CS 151

Spring 2024 3 Unit(s) 01/24/2024 to 05/13/2024 Modified 01/24/2024

Contact Information

Instructor: Nidhi Zare

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Office Hours: Tuesday 3 - 5 PM, through Zoom

Class Days and Time: Tuesday and Thursday 1:30 PM - 2:45 PM

Classroom: MH 422

Course Description and Requisites

Design of classes and interfaces. Object-oriented design methodologies and notations. Design patterns. Generics and reflection. Exception handling. Concurrent programming. Graphical user interface programming. Software engineering concepts and tools. Required team-based programming assignment.

Prerequisite(s): MATH 42, CS 46B, and [(CS 48 or CS 49J) if CS 46B was not in Java], each with a grade of "C-" or better; Allowed Declared Majors: Computer Science, Applied and Computational Math, Software Engineering, or Data Science;ï¿½or instructor consent.

Letter Graded

Classroom Protocols

- This course is an in-person class.

- There will be **no lecture recordings** for later review/study. Recording a lecture is prohibited. Students are prohibited from recording class activities (including class lectures, office hours, advising sessions, etc.), distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures lecture notes, presentations, etc.) are copyrighted by the instructor. This university policy (S12-7) is in place to protect the privacy of students in the course, as well as to maintain academic integrity through reducing the instances of cheating. Students who record, distribute, or post these materials will be referred to the Student Conduct and Ethical Development office. Unauthorized recording may violate university and state law. It is the responsibility of students that require special accommodations or assistive technology due to a disability to notify the instructor.

- Attendance is not mandatory but crucial to doing well on quizzes, assignments and examinations.

- Course materials such as handouts, notes, assignment instructions, etc. can be found on Canvas Learning Management System available at https://sjsu.instructure.com. Students are responsible for regularly checking with its messaging system (or other communication systems as indicated by the instructor) to learn of any updates.

- Plagiarism/Cheating will not be tolerated and will be reported to the Department and the University. (Obtaining homework solutions from someone or giving/showing your Homework solutions to someone is also treated as plagiarism/cheating.)

Program Information

Diversity Statement - At SJSU, it is important to create a safe learning environment where we can explore, learn, and grow together. We strive to build a diverse, equitable, inclusive culture that values, encourages, and supports students from all backgrounds and experiences.

Course Goals

The course provides a comprehensive exploration of advanced Java programming, focusing on three essential pillars: Object-Oriented Design, Advanced Java Language, and GUI Programming. Through a systematic approach, students will delve into object-oriented design methodologies, cultivating the skills to analyze and develop use cases, construct CRC cards, and interpret UML diagrams. A solid grasp of object-oriented concepts, design patterns, and the application of SOLID principles will be fostered. In the realm of Advanced Java Language, students will delve into the implementation of Java's core concepts within an object-oriented paradigm. This entails mastering constructs such as Interfaces, Abstract classes, and Nested classes, as well as honing the utilization of Java's robust type system, lambda expressions, and serialization mechanisms. Exception handling, threads, and thread-safe data structures will also be addressed in depth. Moreover, the course empowers students with the art of GUI Programming, enabling them to craft dynamic graphical user interfaces using the JavaFX framework for desktop applications. By embracing these interconnected domains, students will acquire a holistic skill set essential for proficient Java programming and modern application development.

Course Learning Outcomes (CLOs)

Object-Oriented Design

- Employ a structured methodology for object-oriented design.
- Formulate use cases, conduct noun/verb analysis, and generate CRC cards.
- Interpret and generate UML diagrams.
- Comprehend the foundational principles of object-oriented programming.
- Apply established design patterns.
- Apply SOLID design principles.

Advanced Java Language

- Apply fundamental Java concepts in object-oriented programming.
- Implement Java constructs, including Interfaces, Abstract classes, and Nested classes.
- Implement standard Java Object methods.
- Utilize the Java type system, lambda expressions, serialization, and Java generics.
- Implement robust exception handling.
- Create and manage threads, along with thread-safe data structures.

GUI Programming

- Utilize JavaFX to craft graphical user interfaces (GUIs) tailored for desktop applications.

Course Materials

Textbook

This course does not have a required textbook. The lecture notes contain all the required materials.

References

- Cay Horstmann, "Object-Oriented Design & Patterns," 3rd edition: A watermarked edition will be provided in the Canvas. The resources of this book can be found online at: http://horstmann.com/oodp3/
- Stephen Gilbert and Bill McCarty, "Object-Oriented Design in Java," Sams ISBN-13: 978-1571691347
- The references at the end of each lecture note

Course Requirements and Assignments

Homework Assignments

The assignments are to be submitted on time. I encourage submission by the due date. To practice time management, late submissions will lose 20% of the total assignment score and an additional 20% for each 24-hour afterward.

Quizzes

The purpose of quizzes is to encourage you to learn, study, and review the concepts and materials presented/discussed in the lecture. These will generally be problems covered.

Exams

- The exams are based on lectures, homework/lab assignments, and reading materials covered before the exam's date.
- Exams are CLOSED book and NO items may be shared during the exams, including books, notes, and calculators.
- Absolutely NO usage of cell phones during exams. Cell Phones must be in off or silent mode and not within your reach.

Makeup exams will only be granted in case of a documented medical emergency with advanced notice to the instructor. If a student misses an exam without a legitimate excuse, a grade of zero will be recorded.

✔ Grading Information

Your individual grade will be weighted as follows:

- Quiz 15%
- Homework 20%
- Midterm exam 20%
- Final project 20%
- Final Exam 25%
  Total 100%

Digit number grades will be assigned according to the following policy:
97 - 100 A+
93 - 96 A
90 - 92 A-
87 - 89 B+
83 - 86 B
80 - 82 B-
77 - 79 C+
73 - 76 C

70 - 72 C-
67 - 69 D+
63 - 66 D
60 - 62 D-
0 - 59 F

Note: This is subject to change but with fair notice

University Policies

Per University Policy S16-9 (PDF) (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on the Syllabus Information (https://www.sjsu.edu/curriculum/courses/syllabus-info.php) web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Note: This is a tentative schedule and is subject to change but with fair notice.

Week	Date	Topics
1	1/25	Motivation, Orientation/Syllabus, Course Introduction
2	1/30	Object-Oriented Programming Fundamentals
2	2/1	Object-Oriented Programming Fundamentals
3	2/6	Abstraction, Inheritance
3	2/8	Encapsulation, Interfaces
4	2/13	Polymorphism
4	2/15	Java Constructs abstract class, nested class

Week	Date	Topics
5	2/20	UML Diagrams
5	2/22	Software Development Lifecycle
6	2/27	Software Development Lifecycle
6	2/29	Software Development Lifecycle
7	3/5	Midterm Syllabus Review
7	3/7	Mid Term Exam
8	3/12	Java Constructs Anonymous class, Lambda expressions
8	3/14	Introduction to GUI programming Project doubts and discussion
9	3/19	GUI Programming
9	3/21	GUI Programming
10	3/26	GUI Programming
10	3/28	Object-Oriented Design Design Patterns
11		Spring Break
12	4/9	Object-Oriented Design Design Patterns Project doubts and discussion

Week	Date	Topics
12	4/11	Object-Oriented Design Design Patterns
13	4/16	Object-Oriented Design Design Patterns
13	4/18	SOLID Principles
14	4/23	SOLID Principles
14	4/25	Advanced Java
15	4/30	Advanced Java
15	5/2	Advanced Java
16	5/7	Projects Doubts and Discussion
16	5/9	Final Exam Review
	5/17	Final Exam 12:15-2:30 PM