

**San José State University**  
**Computer Science Department**  
**CS152, Programming Paradigms, 03, Fall 2022**

**Course and Contact Information**

Instructor(s): Yulia Newton, Ph.D.  
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Office Hours: Tue/Thur 6:15 – 7:15pm (via zoom). Also by appointment via zoom upon request. I am available to do one-on-one or group meetings.  
Class Days/Time: Tue/Thur 7:30 - 8:45pm (online lecture via zoom; always recorded and posted in Canvas)  
Classroom: Online (zoom)  
Prerequisites: Object Oriented Design and Programming CS 151 or CMPE 135 (with a grade of "C-" or better in each of the classes)

**COVID-19 safety measures for in-person courses**

*All students registered for a College of Science (CoS) class with an in-person component must view the CoS COVID-19 Training slides ([https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV\\_Nh6](https://drive.google.com/drive/folders/1Vmp39U9-CNpbwRobtZsGIZPTgRwV_Nh6)) and the SJSU Phased Adapt Plan website (<https://www.sjsu.edu/healthadvisories/sjsu-adapt/phases/index.php>) and acknowledge reading them according to their instructor's directions. By working together to follow these county and SJSU safety practices, we can keep our college safer. Students who do not follow COVID-19 Safety practice(s) outlined in the training, the SJSU Phased Adapt Plan, or instructions from their instructors, TAs or CoS Safety Staff may be dismissed from CoS buildings, facilities or field sites. Please review this training as needed throughout the semester, as updates will be implemented as changes occur (and posted to the same links).*

**Course Description**

Programming paradigms, programming languages, Turing completeness, computer architecture, data storage, data types and type checking, scope, bindings, environments, compilers and interpreters, lambda calculus, recursion. Imperative vs. declarative languages. Hands-on introduction to Python, Prolog, and JavaScript. Introduction to Scheme.

**Course Format:** technology intensive, online

**Faculty Web Page and MYSJSU Messaging**

We will use Canvas for most class related materials. Any specific/personal questions (grade related or personal situations) must be communicated via email or canvas message.

**Course Goals**

Understanding fundamentals of computer computing, from computer architecture to compiler design to programming language constructs. Specifically, much emphasis is given to different programming paradigms

and how different programming languages can be used to follow those paradigms. Students will gain working hands-on knowledge of the following programming languages: Python, Prolog, JavaScript, and Scheme.

### **Course Learning Outcomes (CLO)**

Upon successful completion of this course, students will be able to:

- Have a basic knowledge of the history of programming languages.
- Have a good understanding of computer architecture, data types, scope, typing.
- Have a good understanding of programming language purpose, design, different types of programming languages, and language constructs.
- Have a good understanding of how programming languages are parsed and processed by computers.
- Understanding of differences between compiled and interpreted languages. Basic understanding of compiler design.
- Have a good understanding of imperative programming paradigms: procedural, object oriented, and parallel.
- Have a good understanding of declarative programming paradigms: logic, functional, dataflow, database.
- Have a working hands-on knowledge of Python programming language.
- Have a working hands-on knowledge of Prolog programming language.
- Have a working hands-on knowledge of JavaScript programming language.
- Have a working hands-on knowledge of Scheme programming language.
- Understanding of lambda calculus.
- Understanding of recursion.

### **Optional Texts/Readings (no required text)**

This class does not require a mandatory textbook. Google is your friend! Always refer to the programming language documentation.

#### ***Optional textbook (I will not be teaching by it)***

#### **Programming Languages: Principles and Practice, 3rd edition 2012**

Authors: Kenneth Loudon and Kenneth Lambert

Publisher: Cengage Learning

ISBN-13: 978-1-111-52941-3

### **Other technology requirements / equipment / material**

We will be using Python, Prolog, and JavaScript in this class. Appropriate environments will need to be installed. I will outline a few options in my slides for how to run code in those languages. However, if a student already has a favorite way to do that they don't need to follow my suggestions.

### **Course Requirements and Assignments**

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

- Each student is expected to be present, punctual, and prepared at every scheduled class and lab session. It is assumed that the students already have basic knowledge of digital Boolean logic and fundamentals of programming.
- Attendance is NOT optional though it does not form any part of your grade. Individual participation is also required. There will be no make-ups for missed midterm or assignments, unless any special arrangements is made with the instructor beforehand. The student is responsible for any material he/she may have missed.
- There will be 6-7 homework assignments (some of which might be team based), one final project, one midterm and final exam. All homework should be submitted through Canvas. No scanned copy of handwritten solution is allowed.

**Final Examination**

There is an online Final Exam for this course.

**Grading calculation will be based on the following:**

- Programming assignments (30%)
- Quizzes (30%)
- Midterm exams (20%)
- Final Examination (20%)

**Incomplete work:**

Points will be deducted for incomplete question responses and solutions that are partially functional. Consult individual assignment for details of point allocation for each problem.

**Extra credit:**

Extra credit options might be available in this class. All and any possible extra credit options will be announced in class and posted in canvas system if and when they become available.

**Homework assignment due date:**

Submission is allowed till 11:59 pm on due date.

**Late assignments:**

10% of the assignment grade will be subtracted for each 1 week of late submission. Even one day late will count as the whole 1 week late. 8 days late submission will count as 2 weeks late, and so on.

**Makeup Exams:**

You must submit only your own work on exams. Makeup exams will only be given in cases of illness (documented by a doctor) or in cases of documentable, extreme emergency.

**Grading scale:**

Point % Range	Letter Grade	Point % Range	Letter Grade
97.0 - 100	A+	72.0 - 76.99	C
93.0 - 96.99	A	70.0 - 71.99	C-

90.0 - 92.99	A-	67.0 - 69.99	D+
87.0 - 89.99	B+	62.0 - 66.99	D
82.0 - 86.99	B	60.0 - 61.99	D-
80.0 - 81.99	B-	<60.0	F
77.0 - 79.99	C+		

Note that “All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades.” See [University Policy F13-1](http://www.sjsu.edu/senate/docs/F13-1.pdf) at <http://www.sjsu.edu/senate/docs/F13-1.pdf> for more details.

### **Classroom Protocol (aka how to succeed in this class)**

1. Attend all sessions. From past semesters, data shows that there is a positive correlation between attendance and your overall grade.
2. Come to class on time. Students entering the classroom late disrupt the lecture and / or the students already in class who may be engaged in lab or discussion.
3. A laptop/tablet is required in this class. Bring your device to lectures in order to be able to participate in in-class quizzes and activities.
4. If you miss a lecture you are still responsible for any material discussed or assignments given. A large portion of each class will be used for hands-on lab / discussion. All students are expected to participate in class activities. Students who are often absent will find themselves at a disadvantage during the tests.
5. No audio / video recording or photography in the classroom without prior permission of instructor. Instructor may provide review videos and/or flipped classroom.
6. No personal discussion or cell phone activity during class time. Please set the cell phone on silent/vibrate mode.
7. Email to be sent to the instructor's SJSU email ID ([yulia.newton@gmail.edu](mailto:yulia.newton@gmail.edu) or [yulia.newton@sjsu.edu](mailto:yulia.newton@sjsu.edu)) only. I check email periodically during the day but much less during weekends. Please do not expect quick turnaround time during weekends.
8. Start on your homework early and stay on top of them. Some assignments take way more time than you expect. Don't let your initial impression fool you.
9. Start forming study/project groups NOW. It makes it easier to work with the group for the final project. Your project partners are highly important to your success so choose them wisely.
10. Be prepared to learn A LOT. Some of this may require you to self-study certain topics. I will guide you through this journey but the onus of getting the best of this class lies on you.
11. If you are stuck or don't understand something, ASK. Come to office hours. If office hours don't work for you please email, ask on piazza, ask me right after class. I cannot help you if you don't ask for it.

Have fun learning!

### **University Policies**

Per [University Policy S16-9](http://www.sjsu.edu/senate/docs/S16-9.pdf) (<http://www.sjsu.edu/senate/docs/S16-9.pdf>), relevant information to all courses, such as academic integrity, accommodations, dropping and adding, consent for recording of class, etc. is available on Office of Graduate and Undergraduate Programs' [Syllabus Information web page](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>”.

## Important dates

- August 19 – first day of instructions
- August 31 – last day to drop a class without W grade
- September 8 – last day to add courses via MySJSU; last day to submit audit/CR-NC option request
- September 27 – midterm exam #1 online (Canvas, no class meeting)
- November 1 – midterm exam #2 online (Canvas, no class meeting)
- November 23 - November 25 – Thanksgiving (no class meetings)
- December 6 – last day of instructions
- December 8 – Final exam online (Canvas)
- December 12 – all late work is due

# CS151 / Object Oriented Design and Programming, Fall 2022

## Course Schedule

Course Schedule (subject to change)

Week	Date	Topics, Readings, Assignments, Deadlines	Additional Notes
1	8/23/2022	Intro to CS152, logistics	Attendance quiz due on 8/24/22
1	8/25/2022	The basics ( <i>bits, bytes, data types, etc.</i> )	
2	8/30/2022	The basics ( <i>bits, bytes, data types, etc.</i> )	
2	9/1/2022	Computer architecture	
3	9/6/2022	Computer architecture	
3	9/8/2022	Programming languages and paradigms ( <i>basics, Turing completeness, compiled vs. interpreted</i> )	
4	9/13/2022	Programming languages and paradigms ( <i>compilers and compiled languages, interpreters and interpreted languages</i> )	
4	9/15/2022	Programming languages and paradigms ( <i>other language classifications, intro to major paradigms, paradigm vs. language, execution model</i> )	
5	9/20/2022	Programming languages and paradigms ( <i>imperative vs. declarative</i> )	
5	9/22/2022	Catch up, review for midterm, or head start on the next lecture module	
6	9/27/2022	<b>Midterm #1 online (Canvas, no class meeting)</b>	
6	9/29/2022	Imperative programming paradigm (Procedural, Object-oriented, Parallel), <i>Procedural</i>	
7	10/4/2022	Imperative programming paradigm (Procedural, Object-oriented, Parallel), <i>Object oriented</i>	
7	10/6/2022	Imperative programming paradigm (Procedural, Object-oriented, Parallel), <i>OO and parallel</i>	
8	10/11/2022	Introduction to Python	Homework #1 assigned

Week	Date	Topics, Readings, Assignments, Deadlines	Additional Notes
8	10/13/2022	Introduction to Python	
9	10/18/2022	Declarative programming paradigm, logic programming	
9	10/20/2022	Introduction to Prolog	Homework #2 assigned
10	10/25/2022	Introduction to Prolog	Homework #1 due
10	10/27/2022	Catch up, review for midterm, or head start on the next lecture module	
11	11/1/2022	Midterm #2 online (Canvas, no class meeting)	
11	11/3/2022	Declarative programming paradigm, functional programming	
12	11/8/2022	Declarative programming paradigm, functional programming	
12	11/10/2022	Lambda calculus	Homework #2 due
13	11/15/2022	Functional programming in Python	Homework #3 assigned
13	11/17/2022	Functional programming in Python	
14	11/22/2022	Introduction to JavaScript	Homework #4 assigned
14	11/24/2022	Thanksgiving - no instructions	
15	11/29/2022	Introduction to JavaScript, introduction to Scheme	Homework #3 due
15	12/1/2022	Introduction to Scheme	Homework #5 assigned
16	12/6/2022	Declarative programming paradigm, dataflow and database programming, more in-depth on recursion	Homework #4 due on 12/6/22 Homework #5 due on 12/9/22

Week	Date	Topics, Readings, Assignments, Deadlines	Additional Notes
Final	12/8/2022	Final exam online (Canvas)	All late work must be submitted by 12/12/22