San José State University
Department of Computer Science
CS 152, Programming Language Paradigms, Section 80, Fall 2023

Instructor(s):	Tazmina Sharmin
Email:	tazmina.sharmin@sjsu.edu
Office Hours:	Tuesday 10:15 - 10:45 am
	Thursday 10:15 - 10:30 am
Class Days/Time:	Tuesday 9 - 10:15 am | Thursday 9 - 10: 15 am
Classroom:	Online via Zoom
Prerequisites:	CS 151 or CMPE 135 (with a grade of "C-" or better)

Course Description

Programming language syntax and semantics. Data types and type checking. Scope, bindings, and environments, compilers and interpreters, lambda calculus, recursion. Imperative vs. declarative languages. Functional and logic programming paradigms, and comparison to other paradigms. Hands-on introduction to Python, Prolog, and Scheme.

Course Format

The course will be conducted online over Zoom. All instruction will be delivered online, and all homework assignments and exams will be turned in electronically. All students must have access to a personal computer and have reliable Internet access in order to participate in this course.

Canvas Course Site

Course materials such as syllabus, lecture notes, assignments and exams can be found on the Canvas Leaning Management System course website at http://sjsu.instructure.com/. You are responsible for regularly checking with Canvas to learn of any updates.

Course Goals

Upon successful completion of this course, students will be able to understand programming language design. 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:

1. Understand the concepts and terms used to describe languages that support the imperative, functional, object-oriented, and logic programming paradigms.
2. Acquire a high-level view of programming language concepts
3. Solve problems using the functional paradigm.

4. Solve problems using the object[1]-oriented paradigm.
5. Solve problems using the logic programming paradigm.
6. Critically evaluate what paradigm and language are best suited for a new problem.

Textbook

This class does not require a mandatory textbook. Google is your friend!

Optional textbook (I will not be teaching by them but may use some reference from these books):

1. (TYSiFD) Dorai Sitaram. Teach Yourself Scheme in Fixnum Days. 2015. Available online for free at https://ds26gte.github.io/tyscheme/.
2. • (TAoP) Sterling and Shapiro. The Art of Prolog, Second Edition: Advanced Programming Techniques, 1993. Available online at The Art of Prolog; click on "Open Access" and then click "View on MIT Press Direct" in order to download a free copy of the book.

   Additional Readings TBD.

We will be using Python, Prolog, and Scheme in this class. Appropriate environments will need to be installed. I will outline a few options in my slides and notes 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

"Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus."

There will be 3-4 homework assignments. Homework assignments will be posted and submitted on Canvas. For full credit, they must be submitted by the posted due date and time. All assignments will be individual work. You may not share or copy code or answers from fellow students or from the web. If someone else copies your work, with or without your permission, you will be held responsible.

There will be one team project. You may choose to work by yourself or with a partner. For a team project, the work must be done by both team members and both team members will receive the same grade. There is a final and a midterm. The final exam is worth 20% of the total grade for the class.

Grading Information

Assignments: 30%
Project: 20%
Midterm: 20%
Final: 20%

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[1]

Late Work

Late assignments will not be accepted.

Grade Scale

The letter grade will be determined based on the following scale:
A+ = 98% - 100%
A = 92% - 97%
A- = 90% - 91%
B+ = 87% - 89%
B = 83% - 86%
B- = 80% - 82%
C+ = 77% - 79%
C = 73% - 76%
C- = 70% - 72%
D = 60% - 69%
F = below 59

Classroom Protocol

- During live Zoom lectures, please keep your microphones muted during instruction, except when I am taking questions or while I am hosting a discussion.
- Please be respectful in all communication in this course. This includes the lectures and all online communication.
- Please keep up with all communication in this course, whether it is through email or through Canvas.
- Limit your distractions/avoid multitasking. You can make it easier to focus on the meeting by turning off notifications, closing or minimizing running apps, and putting your smartphone away (unless you are using it to access Zoom).
- Attendance is not mandatory and it does not form any part of your grade. But students are highly encouraged to participate at each class lecture. There will be no make-ups for missed midterm or assignments, unless any special arrangements are made with the instructor beforehand or there is an emergency. The student is responsible for any material he/she may have missed.
- Email to be sent to the instructor's SJSU email ID (tazmina.sharmin@sjsu.edu) only. I check email periodically during the day but much less during weekends. Please do not expect quick turnaround time during weekends.
- Start on your homework early and stay on top of them. Some assignments take way more time than you expect.
- Attend all sessions. From past semesters, data shows that there is a positive correlation between attendance and your overall grade.
- 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.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/ . Make sure to review these policies and resources.

Important dates:

August 21 – First day of instructions

August 31 - Last Day to submit prerequisite proofs

September 15 – Last Day to Drop Classes without a "W" Grade and Last Day to Add Classes via MySJSU

December 6 - Last Day of Instruction

December 14 - Final Exam

CS 152 Programming Paradigms, Spring 2023, Course Schedule

Please note that I reserve the right to change the course schedule. I will communicate all changes to the course schedule via Canvas and email.

Week	Date	Topics
1	08/21//2023	Course introduction & Logistics
1	08/23/2023	N/A
2	08/29/2023	Introduction to Programming Language Paradigms
2	08/31/2023	Imperative and Procedural Programming
3	09/05/2023	OOP
3	09/07/2023	OOP Inheritance
4	09/12/2023	OOP Composition & Abstraction
4	09/14/2023	Declarative Programming
4	09/19/2023	Functional Programming
5	09/21/2023	Functional Programming in Scheme 01

5	09/26/2023	Functional Programming in Scheme 02
6	09/28/2023	Programming Language Syntax
6	10/03/2023	Parsing and Abstract Syntax Tree
7	10/05/2023	Bottom up Parsing and Ambiguity
7	10/10/2023	Parsing with ANTLR
8	10/12/2023	ANTLR Setup
8	10/17/2023	Midterm Review
9	10/19/2023	Midterm
9	10/24/2023	Prolog 01
10	10/26/2023	Prolog 02
10	10/31/2023	Prolog 03
11	11/02/2023	Prolog 04
11	11/07/2023	Type Systems
13	11/09/2023	Topic TBD
13	11/14/2023	Topic TBD
14	11/16/2023	Topic TBD
14	11/21/2023	Topic TBD
15	11/23/2023	Project Presentations
15	11/28/2023	Project Presentations
16	11/30/2023	Project Presentations
16	12/05/2023	Final review
18	12/14/2023	Final Exam (Time: 07:15 - 09:30 am)