San José State University
Department of Computer Science
CS 152, Programming Paradigms, Sections 1 & 2, Spring 2021

Course and Contact Information

Instructor:	Rula Khayrallah
Office Location:	Not applicable in Spring 2021
Telephone:	Not applicable in Spring 2021
Email:	rula.khayrallah@sjsu.edu
Office Hours:	Monday 3-4 PM, Wednesday 4-5 PM, Thursday 3-4 PM
Class Days/Time:	Section 1: Monday/Wednesday 10:30AM - 11:45AM Section 2: Monday/Wednesday 1:30PM - 2:45PM
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. Functional and logic programming paradigms, and comparison to other paradigms. Extensive coverage of a functional language.

Course Format

The course will be conducted online over Zoom with synchronous lectures and interactive activities. We'll use iClicker to gather your feedback and check understanding during the lecture. iClicker helps me understand what you know, gives everyone a chance to participate, and allows you to review the material after class.

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:
1. Understand programming language design.
2. Achieve competence in a functional programming language.

Course Learning Outcomes

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

1. Recognize the history of programming languages.
2. Discuss and distinguish the procedural, object-oriented, functional, and logic programming paradigms.
3. Explain the roles of interpreters, compilers, and virtual machines.
4. Critique the design of a programming language.

5. Read and produce context-free grammars.
6. Write recursive-descent parsers for simple languages.
7. Understand variable scoping and lifetimes.
8. Write interpreters for simple languages that involve arithmetic expressions, bindings of values to names, and function calls.
9. Understand type systems.
10. Understand the implementation of procedure calls and stack frames.
11. Produce programs in a functional programming language in excess of 200 LOC.

Reference Textbooks (available online)

Teach Yourself Scheme in Fixnum Days, Dorai Sitaram: http://ds26gte.github.io/tyscheme/index.html
Learn You a Haskell for Great Good! by Miran Lipovača: http://learnyouahaskell.com/

Course Requirements and Assignments

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. A detailed grading rubric is provided for all programming assignments. Please make sure you read and follow the grading rubric to ensure full credit.
Some assignments will be individual work. Others will be team assignments. I will make it clear whether the assignment is an individual assignment or a team assignment.
All work submitted on individual assignments must be your own. You may not share or copy code or answers from fellow students or from the web. Infractions will be detected and will lead to an automatic 0 and a report to the Student Conduct and Ethical Development office. If someone else copies your work, with or without your permission, you will be held responsible.
For team assignments, teams will consist of two students. The work must be done by both team members and both team members will receive the same grade. Teams may not share or copy code from other teams or from the web. Both team members will receive a zero if that happens regardless of who copied or shared the work. Both team members will also be reported to the Student Conduct and Ethical Development office.

Exams

We'll have 3 online exams in the semester, the last being the final exam.
The first two exams are scheduled during our regular class time as follows:
Exam 1: Monday, February 22
Exam 2: Wednesday, March 24
The final exam is cumulative and is scheduled according to the SJSU Final Exam Schedule.
Final Exam Section 1: Tuesday, May 25, 9:45AM-12:00PM
Final Exam Section 2: Wednesday, May 19, 12:15PM-2:30PM

Proctoring Software and Exams

Exams will be proctored in this course through Respondus Monitor and LockDown Browser. If cheating is suspected the proctored videos may be used for further inspection and may become part of the student's disciplinary record. Note that the proctoring software does not determine whether academic misconduct occurred, but does determine whether something irregular occurred that may require further investigation. Students are encouraged to contact the instructor if unexpected interruptions (from a parent or roommate, for example) occur during an exam.

Academic Dishonesty

Students who are suspected of cheating will be referred to the Student Conduct and Ethical Development office and depending on the severity of the conduct, will receive a zero on the assignment or a grade of F in the course. Grade Forgiveness does not apply to courses for which the original grade was the result of a finding of academic dishonesty.

Class Participation

You are expected to attend all class meetings as you are responsible for all the material discussed. Since active participation is essential to ensure maximum benefit, we'll use iClicker to give everyone a chance to participate. The iClicker participation points may be used to give your final grade in the course a slight boost.

Workload

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.

Grading Information

Determination of Grades

The final grade in the course will be calculated based on the following percentages:
Homework Assignments: 40%
Exam 1: 15%
Exam 2: 15%
Final Exam: 30%

The iClicker participation points may be used to give your final grade a slight boost. Students with the highest scores will get 1 bonus point. Students who violate the academic integrity policy are not eligible.
No extra credit options will be given.

Late Work

Late assignments will be accepted with a 1-point penalty for each day or partial day late. Late days include weekend days. For example, an assignment due on Monday by 5 PM will incur a penalty of 1 point if submitted at 8AM on Tuesday. Everyone gets two free 'late days' for the semester. No submissions will be accepted more than 2 days late.

Grade Scale

The letter grade will be determined based on the following scale:

A+ = 98% - 100%	A = 93% - 97%	A- = 90% - 92%
B+ = 87% - 89%	B = 83% - 86%	B- = 80% - 82%
C+ = 77% - 79%	C = 73% - 76%	C- = 70% - 72%
D = 60% - 69%		
F = below 60		

Classroom Protocol

Please join the virtual class meeting on time and be ready to ask questions, contribute answers and participate in all class activities.

- To help keep background noise to a minimum, make sure you mute your microphone when you are not speaking.
- Be mindful of background noise and distractions: find a quiet place to "attend" class, to the greatest extent possible. Avoid activities that could create additional noise, such as shuffling papers, listening to music in the background, etc.
- Position your camera properly: be sure your webcam is in a stable position and focused at eye level.
- 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).
- If using a virtual background, it should be appropriate and professional and should NOT suggest or include content that is objectively offensive or demeaning.

Recording Zoom Classes

This course will be recorded for instructional purposes. The recordings will only be shared with students enrolled in the class through Canvas. If, however, you would prefer to remain anonymous during these recordings, then please speak with the instructor about possible accommodations (e.g., temporarily turning off identifying information from the Zoom session, including student name and picture, prior to recording).

Students are not allowed to record without instructor permission

Students are prohibited from recording class activities, distributing class recordings, or posting class recordings. Materials created by the instructor for the course (syllabi, lectures and 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.

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.

CS 152 Programming Paradigms, Spring 2021, Course Schedule

Please note that this schedule is subject to change with fair notice. Any changes will be announced in class and posted on the Canvas course site.

Tentative Course Schedule

Week	Date	Topics	Homework
1	Jan 27	Course logistics	HW 1 due Feb 1
2	Feb 1	Historical overview, computational paradigms	
2	Feb 3	Language design criteria, language definition	
3	Feb 8	Functional programming	HW 2 due Feb 15
3	Feb 10	Scheme basics	
4	Feb 15	Scheme: higher order functions, recursion and efficiency	HW 3 due Feb 23
4	Feb 17	Scheme: programming practice	
5	Feb 22	Exam 1	
5	Feb 24	Haskell basics	HW 4 due Mar 4
6	Mar 1	Haskell: pattern matching, bindings, lazy evaluation	
6	Mar 3	Haskell: typing and type classes	
7	Mar 8	Haskell programming practice	HW 5 due Mar 16
7	Mar 10	Language translation, lexical analysis, context-free grammars	
8	Mar 15	Ambiguity, associativity and precedence	
8	Mar 17	Recursive-descent parsing	HW 6 due Mar 25
9	Mar 22	Parsing techniques & tools	
9	Mar 24	Exam 2	
10	Mar 29	Spring recess	
10	Mar 31	Spring recess	
11	Apr 5	Attributes, bindings and scope	
11	Apr 7	Symbol tables and environments, name resolution	HW 7 due April 19
12	Apr 12	Procedures and procedure semantics	
12	Apr 14	Closures and dynamic environments	
13	Apr 19	Data types: type equivalence, type checking, type conversion	
13	Apr 21	Type inference	
14	Apr 26	The typing debate: static vs dynamic typing	
14	Apr 28	The logic paradigm	
15	May 3	Prolog	HW 8 due May 12
15	May 5	Prolog	
16	May 10	Control structures	
16	May 12	The object-oriented paradigm	
17	May 17	Review	
Final Exam	May 19	Section 2: 12:15PM-2:30PM	
	May 25	Section 1: 9:45AM-12:00PM	