

**San José State
University
College of Science/Department of Computer
Science
CS152, Programming Paradigms,
Sections 3 & 4, Fall Semester, 2016**

Course and Contact Information

Instructor:	Jon Pearce
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Office Hours:	Tuesday & Thursday, 1400 - 1500
Class Days/Time:	section 3 : TR 9:00 – 10:15 section 4 : TR 10:30 – 11:45
Classroom:	233 MacQuarrie Hall
Prerequisites:	C- or better in CS 46B and CS 151

Course Description

Catalog 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.

Section Description

After an overview of the major concepts of programming language syntax and semantics, the Prolog language will be briefly covered to acquaint students with the Logic Programming Paradigm. Next, the Scala language will be covered in depth. Scala is growing in popularity; it provides a nice introduction to the Functional Programming Paradigm as well as a 21st Century look at the Object-Oriented Paradigm. The second half of the course introduces Jedi, a simple but powerful experimental language. Using Scala as a meta-language, students will write parsers and reference interpreters for various subsets of Jedi.

Course Learning Outcomes (CLO)

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

1. Have a basic knowledge of the history of programming languages
2. Have a basic knowledge of the procedural, object-oriented, functional, and logic programming paradigms
3. Understand 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, by hand or with a parser generator
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

Required Texts/Readings

Textbook

Lecture note and other materials will be posted at CS152 Course Website:

<http://www.cs.sjsu.edu/faculty/pearce/modules/courses/fl6/cs152/index.htm>

Other Readings

David Watt, Programming Language Concepts and Paradigms, Prentice Hall, 1990

Friedman, Wand and Haynes, *Essentials of Programming Languages*, 2nd ed., MIT Press 2001

Lohr, *Go To: The Story of the Math Majors, Bridge Players, Engineers, Chess Wizards, Maverick Scientists and*

Iconoclasts--The Programmers Who Created the Software Revolution.

Other equipment / material requirements (include if applicable)

Students should bring laptops to class. The following software should be installed:

- Scala Eclipse
- SWI Prolog
- Star UML 2

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](http://www.sjsu.edu/senate/docs/S12-3.pdf) at <http://www.sjsu.edu/senate/docs/S12-3.pdf>.

Many of the assignments require students to implement parsers and reference interpreters in Java or Scala for various experimental languages. No prior knowledge of Scala will be assumed. Several weeks will be spent introducing students to Scala, a language which supports multiple paradigms. Thus, students will gain experience with different programming paradigms while learning programming language concepts through the reference interpreters they will write. These assignments enable the following CLOs: 2, 3, 5, 6, 7, 8, 9, 10, and

11. The actual assignments and their due dates are posted below. Assignment weights are proportional to the maximum number of possible points assigned to each assignment. These points can be found on Canvas.

Grading Policy

Grades will be determined by programming assignments and in-class labs (50%), one midterm (20%), and a final exam (30%).

Assuming a standard distribution of point totals I will use the following scale for assigning final grades:

A	90% - 100%
B	80% - 89%
C	70% - 79%
D	60% - 69%
F	0% - 59%

Classroom Protocol

Students should bring laptops to class and be prepared to work together on in-class labs.

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](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>

Course Schedule

The tentative course schedule below is subject to change. Notification of changes will be made in class.

Week	Tuesday	Topics	Thursday	Topics
1			25-Aug	Syllabus overview
2	30-Aug	Concepts	1-Sep	Concepts
3	6-Sep	Concepts	8-Sep	Concepts
4	13-Sep	Prolog	15-Sep	Prolog
5	20-Sep	Prolog	22-Sep	Prolog
6	27-Sep	Scala	29-Sep	Scala
7	4-Oct	Scala	6-Oct	Scala
8	11-Oct	Midterm Review	13-Oct	Midterm
9	18-Oct	Scala	20-Oct	Scala
10	25-Oct	Jedi 1.0	27-Oct	Jedi 1.0
11	1-Nov	Jedi 1.0	3-Nov	Jedi 1.0
12	8-Nov	Jedi 2.0	10-Nov	Jedi 2.0
13	15-Nov	Jedi 2.0	17-Nov	Jedi 2.0
14	22-Nov	Jedi 3.0	24-Nov	Thanksgiving
15	29-Nov	Jedi 3.0	1-Dec	Jedi 3.0
16	6-Dec	Jedi 4.0	8-Dec	Final Review

Final Exams			
Section	Day	Date	Time
Sec 3	Friday	16-Dec	0715-0930
Sec 4	Thursday	15-Dec	0945-1200

