CS 326: Programming Languages
Fall 1999
MW: 1:00 - 2:15
PE 104

Instructor: Dr. Sushil J. Louis
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Catalog description

CS 326 PROGRAMMING LANGUAGES, CONCEPTS AND IMPLEMENTATION (3+0) 3 credits

An overview of programming languages; features, structures, and implementation; examples taken from various programming paradigms. Introduction to formal specifications of languages. Prerequisite: CS 308.

Texts

- **Required:** Daniel P. Friedman, Mitchell Wand and Christopher T. Haynes *Essentials of Programming Languages*
- **Recommended:** Daniel P. Friedman and M. Fellieson *The little Schemer*

Office Hours

- **Sushil:** (SEM 233)
  - ⇝ 11:00 - 12:00 MW
  - ⇝ And by appointment (send email to sushil@cs.unr.edu to make an appointment)

Preliminary Topics

1. Why Study Programming Languages
2. Tools for Symbolic Programming (introduction to scheme)
3. Induction, Recursion, and scope
4. Abstraction
5. Interpreters
6. Parameter Passing

A more detailed syllabus and class notes are available from http://www.cs.unr.edu/~sushil and attached at the end of this handout.

Computer Usage

You will use your College of Engineering and CS Department accounts to do the assignments. If you do not have an account contact me immediately.

The class web page is at http://www.cs.unr.edu/∼sushil. Use the workstations in the College of Engineering lab or elsewhere to access these notes and for email communications. Many of our assignments will be done in the *scheme* programming language and instructions on invoking and using scheme will be provided.

Student Participation

Students are expected to attend all classes and read all of the assigned sections of the texts (I may go through the text in a different order). Often material will not be covered in both lectures and reading assignments. Therefore, both are required for a full understanding of the course content. Finally, completing homework is essential.

I encourage any student needing to request accommodations for a specific disability to please meet with me at your earliest convenience to ensure timely and appropriate accommodations.

Students are encouraged to study together and to help each other understand the course material. However, each student is expected to prepare their own assignments. When you hand–in work with your name on it you are stating that it is your own work and not the work of another person. As a reminder of UNR academic standards, page 60 of the current University Catalog includes the following: *Plagiarism is defined as submitting the language, ideas, thoughts or work of another as one's work; or assisting in the act of plagiarism by allowing one's work to be used in this fashion."* This means that if another student asks to borrow your work — **Say NO** — or you are participating in plagiarism. Academic dishonesty will not be tolerated in this class. Please read the section on **Academic Standards** on page 61 of the UNR 1999-2000 catalog or ask me for a copy.

Homework and Exams

There will be a number of assignments and they will count for 50% of your total grade for this course. Three (3) tests, each worth 10% will make up an additional 30%. The final exam on Thursday Dec 10^{th} from 9:45 to 11:45 a.m. in class will make up the remaining 20% of your grade. I hope to adhere to the following schedule, but please keep in mind that all dates are subject to change.

	When	percentage of grade
Tests	Sep 8, Oct 6, Nov 17, 10% each	(30% total)
Final	Monday Dec 13^{th}, Noon – 2:00 p.m	20%
Assignments		50%

No late assignments will be accepted since solutions will be posted after the due date. I will be using the *plus-minus* grading system. In other words, grades may include a + or – suffix (example: A, A–, B+, C–, C, etc.).

Instructions for turning in programming assignments will be posted on the class's web page. You will also turn in hardcopy which must contain a copy of the source as well as a "script" of your running the program and testing it on illustrative cases that clearly point out program strengths and weaknesses. Testing is important, learn to design good test inputs. *All* assignments must be turned in on the due date **at the beginning of class** inside a plain brown envelope with your name, course number, assignment number, and email address clearly marked on the outside and on the assignment media.

Communications

Whenever I need to communicate with the class as a whole I will use the class NewsBoard and/or email. You are expected to check your email and read the NewsBoard at least once a day.

Detailed Course Content

Course web page: http://www.cs.unr.edu/~sushil

- Introduction
  - Expressions
  - Data Types
  - Procedures
- Induction, Recursion, and Scope
  - Inductive data specification
  - Recursive program specification
  - Static variable properties
- Abstraction
  - Local Binding
  - Logical Connectives
  - Branching
  - Records
  - Data Abstraction
  - From procedural to data structure representations
- Reduction Rules and Imperative Programming
  - Reasoning about Procedures
  - Lambda Calculus
  - Reduction strategies
  - Defining recursive procedures in the λ calculus
  - Sequencing, Assignment, and Sharing
- Interpreters
  - A simple interpreter
  - Conditional Evaluation
  - Local Binding
  - Procedures
  - Variable Assignment
  - Recursion
  - Dynamic scope and Dynamic Assignment
- Parameter Passing
  - Adding Arrays
  - Call-by-Reference
  - Call-by-Value-Result and Call-by-Result
  - Expressed or Denoted Values
  - Call-by-Name and Call-by-Need
- OO Languages
  - Objects and Classes
  - Inheritance