

**ICSI 311****Principles of Programming Languages****(Fall 2022)****Class Meeting Time: Wed/Fri 11:40-1:10****Location: LC5****INSTRUCTOR**

Instructor's name	Michael Phipps
Instructor's title	Lecturer
Office location	UAB440
Office hours	TBA
E-mail address	mhipps@albany.edu

**TEACHING ASSISTANTS (AND LAB/DISCUSSION SCHEDULE, if any)**

TA's / Peer educators	
TA's office location	
TA's office hours (if any)	
TA's email addresses	

**REQUIRED TEXTBOOK**

Introduction to Compilers and Language Design. Second Edition  
Douglas Thain, University of Notre Dame  
<http://compilerbook.org>

This book is OPTIONAL – there will be no class assignments from it.  
Programming Language Pragmatics  
Michael L. Scott  
Morgan Kaufmann ISBN: 978-0124104099

**COURSE DESCRIPTION / OVERVIEW**

Introduction to the design and implementation of programming languages, including language features, paradigms, and design decisions. Briefly covers functional and logical programming paradigms and reinforces object-oriented concepts. Discusses interpreters, compilers, transpilers and virtual machines, including lexical analysis, parsing, semantic analysis, optimization, code generation. Introduction to automata and state machines.

## PREREQUISITES/COREQUISITES

Grade of C or better required in ICSI 210 and ICSI 213.

## STUDENT LEARNING OBJECTIVES / OUTCOMES

At the completion of this course, the student will:

1. Be familiar with how compilers and interpreters work at a high level
2. Be familiar with techniques for lexical analysis and parsing
3. Be familiar with simple optimization techniques used by compilers
4. Improve their skills in debugging programs.
5. Be able to create small programs in Scheme
6. Be able to use recursion and state machines to solve appropriate problems
7. Be able to evaluate and compare programming languages using appropriate vocabulary and methodology

## COURSE WEBSITE AND BLACKBOARD

Blackboard will be used to provide essential course materials, the most current syllabus, and assignment documents and no separate course website will be maintained.

Occasionally, BlackBoard will decide not to accept assignment submissions. If this happens, please email a copy of your submission to all the TA's and me. The date on the email will serve as proof of submission.

## ASSESSMENT AND POLICIES

**No late assignments will be accepted.**

**Academic dishonesty will result in a 0 for the assignment for the first infraction. An 'E' for the course will result from the second infraction. VAIRs will be filed in all cases.**

**You have one week (7 days) from when an assignment is graded to dispute the grade.**

**You are responsible for the content and timeliness of your submissions.**

**Submitting the wrong file, file type or version of the file is not a valid reason to be allowed to resubmit.**

**Code that doesn't compile/parse is an automatic 0.**

Exams: There will be a final exam for this class.

Project / Labs / Assignment: Projects will be assigned and will be conducted out of class. They will be graded on a 100-point scale and will be totaled together to account for 85% of the final grade.

Final Project: A final project will not be required.

### Grading

A final grade will be determined as a weighted average of the following assignments:

- Programming Projects/Assignments (85%)
- Attendance and participation in discussion (5%)
- Final Exam (10%)

### Grading Scale

A: 100-95 points A-: 94-90 points  
B+: 89-87 points B: 84-86 points B-: 80-83 points  
C+: 79-76 points C: 75-70 points  
D: 69-60 points  
E: 59 points and below

Students must complete all requirements in order to pass the course. A grade of incomplete will be given only when circumstances beyond the student's control cause a substantial amount of course work to be unfinished by the end of the semester. Whenever possible, the student is expected to make extra efforts to prevent this situation from occurring. The instructor will be the sole judge of whether an incomplete is warranted. Final grades are computed based on the above formulas and are NOT negotiable. Per department policy, "...students may not submit additional work or be re-examined for the purpose of improving their grades once the course has been completed and final grades assigned." purpose of improving their grades once the course has been completed and final grades assigned."

### ATTENDANCE/LATENESS/USE OF COMPUTERS IN CLASS

Students are expected to attend every class and to arrive on time. Please DO NOT disrupt the class by entering late or leaving early. Computers may be used during class for note taking as long as the use is not disruptive or distracting. **Other electronic devices should be put away during class.**

Also see [http://www.albany.edu/health\\_center/medicaexcuse.shtml](http://www.albany.edu/health_center/medicaexcuse.shtml).

### RESPONSIBLE COMPUTING

Students are required to read the University at Albany Policy for the Responsible Use of Information Technology ([https://www.albany.edu/its/its\\_policies.htm](https://www.albany.edu/its/its_policies.htm)). Students will be expected to apply the policies discussed in this document to all computing and electronic communications in the course.

### STUDENTS WITH DISABILITIES

Reasonable accommodations will be provided for students with documented physical, sensory, systemic, cognitive, learning, and psychiatric disabilities. If you believe you have a disability requiring accommodation in this class, please notify the Director of the Disability Resource Center (Campus Center 130, 442-5490). That office will provide the course instructor with verification of your disability and will recommend appropriate accommodations. For further information refer to the University's Disclosure Statement regarding Reasonable

Accommodation found at the bottom of the document at the following website: <http://www.albany.edu/disability/docs/RAP.doc>. This website can be reached by following the link under “Reasonable Accommodation Policy” at the following webpage <http://www.albany.edu/disability/faculty-staff.shtml>.

## **ACADEMIC HONESTY AND OVERALL REGULATIONS**

Every student has the responsibility to become familiar with the standards of academic integrity at the University. Faculty members must specify in their syllabi information about academic integrity and may refer students to this policy for more information. Nonetheless, student claims of ignorance, unintentional error, or personal or academic pressures cannot be excuses for violation of academic integrity. Students are responsible for familiarizing themselves with the standards and behaving accordingly, and UAlbany faculty are responsible for teaching, modeling and upholding them. Anything less undermines the worth and value of our intellectual work, and the reputation and credibility of the University at Albany degree. Plagiarism and other acts of academic dishonesty will be punished. Read the Standards of Academic Integrity and policies in the University Bulletin ([https://www.albany.edu/undergraduate\\_bulletin/regulations.html](https://www.albany.edu/undergraduate_bulletin/regulations.html)).

### **Mental Health**

The University at Albany recognizes the importance of our students' mental health and encourages faculty to include the following statement on each course syllabus in order to provide resources and destigmatize mental health issues:

*As a student there may be times when personal stressors interfere with your academic performance and/or negatively impact your daily life. The University at Albany Counseling and Psychological Services (CAPS) provides free, confidential services including individual and group psychological counseling and evaluation for emotional, social and academic concerns. Given the COVID pandemic, students may consult with CAPS staff remotely by telephone, email or Zoom appointments regarding issues that impact them or someone they care about. For questions or to make an appointment, call (518) 442-5800 or email [consultation@albany.edu](mailto:consultation@albany.edu). Visit [www.albany.edu/caps/](http://www.albany.edu/caps/) for hours of operation and additional information.*

***If your life or someone else's life is in danger, please call 911. If you are in a crisis and need help right away, please call the National Suicide Prevention Lifeline at 1-800-273-TALK (8255).***

***Students dealing with heightened feelings of sadness or hopelessness, increased anxiety, or thoughts of suicide may also text "GOT5" to 741741 (Crisis Text Line).***

**CAUTION AND A STRONG WORD OF WARNING!!!! Plagiarism and other acts of academic dishonesty will be punished. Students are expected to submit original work. While you may discuss a problem with another student, the work you submit must be your own. Any student who submits copied work or any student that provides work for copying will a 0 for the first assignment, and any subsequent infraction will result in an 'E' for the class. As per college policy, cheating activity, including cheating in exams, quizzes, projects, etc., WILL be written up in a Violation of Academic Integrity Report (VAIR) reported to the college administration, which includes the Computer Science Chair, the College of Engineering and Applied Sciences Dean, and the Vice Provost of Undergraduate Studies. This will become a part of your permanent record. Multiple incidents will result in**

*being expelled from the college.*

Class	Topics	Assessment	Readings
Week of 8/22	Course Introduction State machines		Chapters 1,2,3.3-3.4,3.6
Week of 8/29	Procedural Programming Lexical Analysis	Test cases in project language	Chapters 3.7-3.8
Week of 9/5	OOP Parsing Theory	The Lexer	Chapters 4.1-4.2
Week of 9/12	Object Oriented Design Parsing	The Parser	Chapters 4.3.4
Week of 9/19	Data Types Language Evaluation	Add Function Declarations	Chapters 6.1, Skim remainder of 6
Week of 9/26	ObjectiveC/SmallTalk Semantic Analysis	Comments and Assignment	Chapter 7
Week of 10/3	Design Patterns Optimizations	More Statements	Chapters 12.1-12.3
Week of 10/10	C# Transpilers, Interpreters, VMs	More Functions	Chapters 8.1-8.5
Week of 10/17	JavaScript Code Generation	Calling Functions in the interpreter	
Week of 10/24	Fourth and Fifth Generation Libraries, Linkers & Loaders	Adding other statements	
Week of 10/31	Prolog Recursion	Adding more data types	<a href="http://learnprolognow.com/">http://learnprolognow.com/</a> Chapters 1-3
Week of 11/7	Functional Programming Scheme – Friend or Foe		
Week of 11/14	Debugging For Fun & Profit Language Design Decisions	Scheme	<a href="http://htdp.org/2022-2-9/Book/part_prologue.html">http://htdp.org/2022-2-9/Book/part_prologue.html</a>
Week of 11/28	Python		

#### COURSE OUTLINE AND READINGS:

The following schedule of lecture topics and reading assignments is preliminary and may be changed as the semester progresses. The final schedule and specific assignments will be discussed in class.