

CPSC 3400: Languages and Computation

Winter 2018 - Section 1

The policies and schedule contained in this document are subject to change.

Course Description:

Common features, organization and tradeoffs of modern programming languages including semantics, garbage collection and memory management, and type systems. Theoretical foundations of languages and computation including regular expressions, language classification, grammars, and finite state automata. Programming using scripting languages and functional languages.

Instructor Information:

Eric Larson

Office: Engineering 528

Office Phone: 206-296-5513

Email: elarson@seattleu.edu

Office Hours: 1:15-2:00pm MWF, 9:30-11:30am Tuesday, or by appointment

- Please use SU email over Canvas email (the latter is hard to read on a mobile device).
- Please place 'CPSC 3400' somewhere in the subject for quicker replies.
- If requesting an appointment via email, please suggest a couple of times in the email.
- Changes to office hours will be posted on Canvas.
- Voice mail not checked regularly.

Course Information:

- *Credits:* 5
- *Location:* Engineering 312
- *Class Times:* 10:55am-12:20pm on Mon, Wed, and Fri
- *Prerequisite:* C or better in CPSC 2430 and CPSC 2600 (MATH 3000 can be used in place of CPSC 2600).

This is a required course for students in the following programs:

- BSCS in computer science (general option, business specialization, math specialization).
- BA in computer science

This course can satisfy program electives in the following programs:

- BSEE in electrical engineering with a computer engineering specialization (double check with your advisor)
- Minor in computer science

Important Dates:

Monday, January 8	First day of class
Monday, January 15	No class – Martin Luther King Jr. Day
Monday, February 12	Exam 1
Monday, February 29	No class – Presidents' Day
Friday, February 23	Last day to withdraw
Monday, March 19	Last day of class
Tuesday, March 20	Exam 2 (12:00-1:50pm)

Tentative Schedule of Topics:

- Introduction
- Python Programming
- Variable Semantics
- Scope
- Control Semantics
- Type Semantics
- Functional Programming
- Regular Languages and Finite State Automata
- Regular Expressions
- Grammars and Turing Machines
- Compilation

Course Objectives:

At the end of this course, the student should be able to:

- Write moderately-sized programs in Python and a functional programming language.
- Write regular expressions and model them using finite state automata.
- Understand the need for different programming languages and different programming paradigms.
- Understand theoretical models of computation and their limitations.
- Understand and describe common features of programming languages such as syntax, semantics, binding, type systems, and exceptions.
- Understand the differences between functional and imperative programming.
- Trace garbage collection algorithms and understand the challenges associated with reclaiming dynamic memory.

Class Website:

The class website can be found in Canvas (<https://seattleu.instructure.com/>).

Textbooks:

Learning Python (5th Edition)
Publisher: O'Reilly

Mark Lutz
ISBN: 978-1-4493-5573-9

Introduction to Programming Languages WikiBook
https://en.wikibooks.org/wiki/Introduction_to_Programming_Languages/Print_version

Additional readings, all free from the Internet, will be posted on the class website.

Grading:

Homework Assignments 50 %

There will be eight homework assignments (roughly one per week). The first four assignments will involve Python programming. The next two assignments will involve F# programming. The final two assignments will have a mix of activities. Each homework will be weighted equally (50 points each). A separate document describes the programming assignment expectations and how they will be graded. Individual assignments often have additional expectations and grading criteria. All homework will be submitted electronically via Linux on cs1.

Exams 50 % (2 exams – 25% each)

There will be two exams. The first exam will be given on May 1 and covers the first half of the course. The second exam will be given during on June 7 during the scheduled final exam period (2:00-3:50pm) and covers the second half of the course. The exams are closed book and closed notes except for one 8.5" x 11" sheet of *handwritten* notes (both sides).

Class participation and attendance is not required but may impact the grade if the student is near a boundary.

The following grade scale will be used:

100	93	90	87	83	80	77	73	70	67	63	60	0
A	A–	B+	B	B–	C+	C	C–	D+	D	D–	F	

At the discretion of the instructor, the course grading scale may be curved but only to reduce the requirement to receive a particular grade. For example, the requirement to receive an A may be lowered from 93% but cannot be raised to some number higher than 93%.

No extra credit will be given.

Non-graded Exercises:

Most units contain additional exercises that are not graded. While the exercises are not to be turned in, students are expected to complete these exercises. Solutions will be provided on the course website so students can check their work.

STUDENT EXPECTATIONS

Assumed Knowledge Expectations:

It is assumed that you are familiar with the following subjects:

- Programming in a high-level object-oriented language (C++, Java, or C#): creation of moderately-sized programs
- Data Structures: arrays, linked lists, trees, and graphs
- Discrete Mathematics: basic proof techniques, sets, and functions
- Rudimentary understanding of the software development and design process

Workload Expectations:

Students are expected to keep up with the course material. This includes completion of the reading assignments that are posted in the lecture notes. Unless noted otherwise, you are responsible for all assigned material even if a topic was not covered during lecture.

As this is a five credit class, students should plan to spend at least ten hours per week outside of class. Students who need to learn or review the assumed knowledge topics above will need to spend even more time.

Students are also responsible for turning in homework in a timely fashion (refer to the Late Homework Policy later in this document) and, unless noted otherwise, to complete assignments individually (refer to the Academic Integrity Policy later in this document).

Class Conduct Expectations:

You are responsible for treating other students with respect and to minimize disruptions to the classroom. Examples of classroom disruptions include, but are not limited to: ringing cell phones, using cell phones and laptops in a distracting manner, arriving to class late, and leaving/reentering the classroom.

Class Announcement and Email Expectations:

Students are expected to keep up-to-date on class announcements made outside of class on a *daily* basis. All class announcements will be made on the course website via Canvas. By default, Canvas will instantly send these announcements to your SU email address. If desired, you may change the settings on Canvas to send these announcements to an alternative email address and/or to social media accounts.

It is also important to check your SU email account on a daily basis as private emails initiated by the instructor could be sent to the student's SU email address. Also, important university announcements (such as the school closing due to inclement weather) are made in this fashion.

Attendance Expectations:

Attendance is strongly encouraged but does not directly impact your final grade. You are responsible for learning the material they missed from not attending a class on their own.

In the event of an extended absence such as a prolonged illness, it is your responsibility to make up the missing material and catch-up with the remainder of the class as soon as possible. In this situation, to the best of your abilities, keep in contact with me during the absence and schedule a meeting with me once you are back. If an absence causes you to miss several class periods and assignments that make it very difficult for you to catch-up, you will unfortunately have to withdraw from the course.

In accordance with university policy, incomplete grades (I) are only given if an unexpected extended absence occurs at the end of the quarter.

On exam days, attendance is required. Failure to appear for an exam will result in a score of zero for that exam. Makeup exams will be given only in extraordinary circumstances and may be given in an oral format.

Academic Resources:

If you need additional help with the course material, the following resources are available to assist that include the following:

- Communicating with the instructor via email or during office hours
- Links provided on the course webpage.
- Learning Commons (<http://www.seattleu.edu/learningcommons/>) on the 2nd Floor of Lemieux Library provides research services and learning assistance programs.
- Internet (make sure the sources are reputable and that you are not violating the Academic Integrity Policy).

If you have difficulty finding help on a particular topic, please contact the instructor.

COURSE POLICIES

Canceled Class Policy:

If a class is canceled (likely due to inclement weather or instructor illness), the instructor has the right to make up lost class content in an online format.

Lecture Recording Policy:

Lectures are copyright of the instructor. As a student enrolled in the course, you have permission to record audio of the lectures for your personal use only, provided it is not obtrusive to the instructor and/or other students in the class. Recordings may not be publicly disseminated (such as posting on the Internet). For lectures not taught by the instructor, permission to record audio must be explicitly obtained by the guest lecturer.

Videotaping of lectures in any form is prohibited.

Late Homework Policy:

Late homework is not accepted. It is imperative that you start your assignments early. Each assignment will indicate a due date and due time (the due time is often the beginning of class). Assignments turned in after the due time on the due date will receive a zero. Extensions to the due date will only be given in extraordinary situations and are not given for technical problems such as undecipherable error messages and computer failures. If you are having difficulties completing the assignment, it is imperative that you see me *before* the due date.

Electronic Submission Policy:

All homework assignments will be submitted electronically. While a solution can be submitted multiple times, only the last submission will be graded as previous submissions are overwritten. Be sure to test your solutions as assignments will only be graded once after the due date. Details on how to submit your program will be given with each assignment.

Low Grade Policy:

Students will be able to monitor their grades via Canvas. If you need guidance on how to improve your academic performance, contact the instructor. The instructor may trigger an academic alert for students with low grades. The academic alert system will notify that student's academic advisor. If you are in this situation, you are strongly encouraged to meet with your advisor.

Grading Dispute Policy:

If you feel something was graded incorrectly or a math error occurred when tabulating the total score of an exam or assignment, please contact me. Grading disputes will only be accepted for one week that starts when the exam or assignment grade was first available to the student.

For a dispute regarding the final grade, please consult the Academic Grading Grievance Policy (2004-7).

Disabilities Policy:

If you have, or think you may have, a disability (including an ‘invisible disability’ such as a learning disability, a chronic health problem, or a mental health condition) that interferes with your performance as a student in this class, you are encouraged to arrange support services and/or accommodations through Disabilities Services staff in the Learning Center, Loyola 100, (206) 296-5740. Disability-based adjustments to course expectations can be arranged only through this process.

Academic Integrity Policy:

Students, unless specifically stated otherwise, are required to do all work in this course individually. Submitted work must be original work done by the student. However, you may use class material without citation. Class material includes information (including examples and code) that was presented in class, discussed during office hours, that appears in the textbook or lecture notes, or was provided by me (or any guest instructor). The use of external sources such as other books, open source, or the Internet must be approved by the instructor and must be cited before submitting the assignment.

If you are in doubt whether a particular activity may be considered cheating, ask the instructor. In addition, you are encouraged to consult the Academic Integrity Tutorial available on SU Online.

Any evidence of plagiarism, collaboration, or other cheating will result in a zero for all parties concerned for the assignment or exam in question. In addition, all academic integrity violations will be reported according to the Seattle University Academic Integrity Policy. That process may enforce additional penalties and/or disciplinary action. Please consult the Academic Integrity Policy (2011-3) for further information.