

# CSE 340 Programming Languages

Spring 2022

## Catalogue Description

Formal syntactic and semantic descriptions, compilation and implementation issues, and theoretical foundations for several programming paradigms.

**Prerequisites:** Computer Systems Engineer BSE or Computer Science BS major; CSE 310 with C or better; CSE 230 or EEE 230 with C or better OR CSE graduate student.

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## Staff and Logistics

*Lectures, recitations, office hours and lab hours are all posted on Canvas.*

### **Instructor: Georgios Fainekos**

Email: [fainekos@asu.edu](mailto:fainekos@asu.edu)

Lectures: Tuesday & Thursday 3pm to 4:15pm in [CDN 60](#)

Zoom link for lectures: <https://asu.zoom.us/j/86405110988>

Office hours (online only): M & F 8:30-9:30am

Zoom link for office hours: <https://asu.zoom.us/my/fainekos>

### **Graduate student assistants:**

1. Jacob Anderson
  - Responsibilities: Recitations, office hours, project submissions and project grading issues
  - Office hours: See Canvas
  - Email: [jwande18@asu.edu](mailto:jwande18@asu.edu)
2. Karan Barhanpur
  - Responsibilities: Recitations, office hours, homework assignments
  - Office hours: See Canvas
  - Email: [kbarhanp@asu.edu](mailto:kbarhanp@asu.edu)

### **Undergraduate student assistants:**

Responsibilities: Project lab hours and small group mentoring

For days and hours see Canvas.

## Lecture delivery modality

**This is an in-person class.** However, the lecture will be broadcasted synchronously on Zoom for students who may need to quarantine/isolate. Links to the recorded lectures will also be posted on Canvas.

**Important:** Zoom links and recordings are only provided for your convenience and they are not officially supported or required by ASU. This means that if there are any technical difficulties priority will be given to the in-person class and recordings or synchronous broadcasting may not be available. In such a case, please ask your classmates for notes.

## Electronic communication policy

For this class, we will be using Ed Discussion for class participation and communication. Any question which is not of personal nature should be posted to Ed Discussion. If you have a question about the course, then I can guarantee that other students have the same question as well. We reduce everyone's effort if we engage in class-wide discussions as opposed to individual emails. You can also post anonymously.

Ed Discussion assesses engagement in both the synchronous and asynchronous class discussions. Hence, try to engage in the discussions as much as possible. I use the activity data and points at the end of the semester to assign course participation points as bonus points.

If you **MUST** send an email to me, TAs or UGTAs, then follow these guidelines:

- If you need to contact me, then use the Canvas messaging system. I receive hundreds of emails per day and the only way to prioritize classroom communications is to login to Canvas and review the inbox.
- If you must send me an email, then the subject should contain the prefix "[CSE340 S22]" followed by the actual topic. **You must ALWAYS use your ASU email address.** I do not respond to non-ASU emails. It is advisable to use the same subject prefix when contacting the TA.
- **I do not respond to emails or to on-line discussions over the weekend.**
- **We will be responding to any questions on Ed Discussion after 1 business day.** This will let your classmates enough time to attempt to answer your question for class participation credit.
- Before sending an email or message, please follow the excellent advice here:  
<http://www.wikihow.com/Email-a-Professor>

## Textbook

Not required, but it is recommended for those who are interested in programming languages. It provides a nice overview of design choices and historical developments.

Author: Kenneth C. Louden and Kenneth A. Lambert

Title: Programming Languages: Principles and Practice, 3rd edition.

Second edition can also be used and is much cheaper.

ISBN: 9781111529413

## List of Topics

1. Syntax Analysis
2. Lambda Calculus
3. Basic Semantics
4. Type Systems
5. Abstract Data Types and Modules
6. Expressions and Statements
7. Procedures and the Runtime Environment

## Objectives and Learning Outcomes (ABET Syllabus)

To provide students with an understanding of the principles underlying the design and implementation of programming languages

- Students can understand the basics of recursive descent parsing.
- Students can describe program execution using box and circle diagrams.
- Students can understand static scoping.
- Students can understand parameter-passing mechanisms and their implementation.
- Students can understand the advantage of object-oriented design and behavior.
- Students can think functionally when creating functional programs.
- Students can think declaratively when creating declarative programs.

## Assignments, Workload and Grading

### Homework

There will be 5 graded homework assignments during the semester worth 12.5% of the total course grade. Each homework assignment is worth 2.5% of the total grade.

All homework assignments are due electronically at the end of the day.

**Late homework submission policy:** 0.8% penalty per late hour. Hence, you receive a 0 grade after about 5 days.

### Programming Assignments

Quoting from Dr. Bazzi's syllabus: "There are 4 programming assignments. All the assignments are demanding and require a lot of time. Unlike other courses, in this course, reading and understanding the requirements requires significant effort. In the past, students spent anywhere from 25 to 40 hours or more per programming assignment. You cannot afford starting late on any programming assignment."

**Late programming assignments submission policy:** There is a 10% penalty per day for late submission for programming assignments, up to a maximum of seven days. The number of days is rounded up to the nearest integer. No submissions are accepted after 7 days from the due date.

### Expected Workload

Quoting from Dr. Bazzi's syllabus with reference to the projects: "This is a demanding class and requires consistent effort on your part:

1. You will be reading and interpreting long specification documents for the projects and you will be designing solutions to satisfy the specifications. This is different from what most of you have been exposed to so far.
2. You will be writing thousands of lines of code in this class and you will have to read a lot of code that I or the TAs wrote. This is different from what most of you have been exposed to so far.
3. You will have to handle non-trivial abstract concepts, new programming paradigms and complex implementation issues. This requires consistent effort on your part. If you put the effort, you will learn a lot and succeed in this class. It is really worth it. If you do not put the effort, you cannot succeed in this class."

## Grading

The grading philosophy is based on the principle of constant improvement. In other words, you will be given the opportunity to demonstrate your knowledge of the material multiple times. As long as your new grade is improved, the old grade will be overwritten. In order for this grading philosophy to work, a minimum absolute effort is enforced throughout the semester. That is, failure to demonstrate a minimum level of performance throughout the term will invalidate the option where better more recent grades overwrite older worse grades.

The final grade will be based on

- 2 midterm exams: 30% (15% each)
  - If your final exam score is higher than a midterm score and your midterm score is at least 45%, then the final exam score is going to replace the midterm score.
- 5 homework assignments: 12.5% (2.5% each)
  - For the homework assignments, your worst score will be overwritten by your best score as long as you receive at least 65% on the worst homework.
- 4 programming assignments: 40% total (10% each)
  - For the programming assignments, all scores will be used as assigned. For the programming assignments you are given test cases and sufficient time to delivery code that can receive full points.
- 1 comprehensive final exam: 17.5%

## Bonus points

Bonus points will be given for course participation. **Bonus points:** up to +2%.

Take class participation seriously! It can make the difference between passing or failing the class, or between getting an A- or A. The class participation bonus points are only applied when you are within two percentage points of moving to the next letter grade. The max value of +2% is given to the top contributors (in class and/or Ed Discussion). Students who have consistent presence on Ed Discussion will receive at least 1% bonus. I reserve the right to give additional bonus points to top contributors, top endorsed students responses by instructors, etc.

**Class participation involves the following:**

- Contributing to both on-line and in-class discussions. This should be an activity throughout the semester. This measure is both subjective (me observing the class) and absolute (Ed Discussion data).
- Correcting your instructor and/or TA during lecture! Best way to get noticed in a positive way. If you correct me, then I know you pay attention and that you care about the course.
- Helping others figure out fallacies in their line of thought when attempting to solve a problem on Ed Discussion or during class.

**An additional +1.5% will be awarded if you attend at least 10 recitations. Attendance will be taken.**

## Warning

**I do not normalize the final grades!** I put a lot of effort in making sure that the exams are of reasonable difficulty. I reserve the right to adjust the final grades downward, e.g., in the case cheating is detected, or upward, e.g., in the case of noticeable and meaningful class participation or exceptional project work.

### Letter grade range

A+ = (100%,infinity), A = [95%,100%], A- = [90%,95%), B+ = [85%,90%), B = [80%,85%), B- = [75%,80%), C+ = [70%,75%), C = [65%,70%), D = [55%,65%), E = [0%,55%)

Remark: Canvas cannot support the complex grading scheme of the course. Hence, any letter grade you see on Canvas is just an approximation of your grade. The actual letter grades will be computed at the end of the semester.

### Incomplete grades

- **I grade:** Typically, an incomplete grade may be assigned when students are facing extreme adversities and were performing satisfactorily until the occurrence of the adversities. Therefore, an I grade requires multiple levels of approval. If you are experiencing such (documented) adversities, then you can request an incomplete grade by:
  1. Sending me an email to confirm that this is a valid option for you.
  2. Make a plan with precise dates on when you plan to submit any unfinished work and give a period in the summer when you will be available to take the exams. If there are several students facing such adversities, then we will have to schedule a common date for all.
  3. Fill the form: <https://students.asu.edu/forms/incomplete-grade-request>
  4. Send the form to me by 4/23/2020 (end-of-day) so I can approve it and forward it to advising for further department approvals.

### Grade Appeal Policy

Any regrading appeal request must be initiated within one week of receiving back your graded work by submitting a regrade request on GradeScope. If the issue is not resolved within a week, then you can email the TA and cc the instructor. Alternatively, within the first week, you can also visit the instructor during office hours or by appointment, or the TA during recitations or office hours. **We will not entertain any appeal right before, during or right after the class/recitation time since appeals are a time-consuming process.**

General guidelines:

1. If you need to understand the technical reasons on why points were reduced on homework problems, then please see the TA first. If you are not satisfied with the answer, then make an appointment with the instructor.
2. If you need to understand the technical reasons on why points were reduced on exams, then you may visit the instructor first.
3. For all other issues, please contact the instructor first.

### Important Dates

The following are the **fixed dates and times** for the exams which will not change. Please plan your activities around the exam schedule. Whether the exams will be in-person or online will be decided later.

1. Midterm 1: Tuesday, February 22, 3:00 – 4:15 PM
2. Midterm 2: Tuesday, April 12, 3:00 – 4:15 PM

3. Final Exam: Tuesday, May 3, 2:30 - 4:20 PM

The following are the **tentative dates** for the homework assignments and the programming projects. The dates are tentative in case we go slower through the schedule.

1. HW1: Tuesday February 1; end-of-day
2. Project 1: Friday February 11; end-of-day
3. HW2: Thursday February 17; end-of-day
4. Project 2: Friday March 4; end-of-day
5. HW3: Tuesday March 22; end-of-day
6. Project 3: Friday April 1; end-of-day
7. HW4: Thursday April 7; end-of-day
8. Project 4: Friday April 22; end-of-day
9. HW5: Tuesday April 26; end-of-day

## Attendance Policy & Makeup Exam Policy

**I do not have an attendance policy. Come to class only if you like.** Most (if not all) of the material will be available on-line. In theory, we only have to see each other during the exams (not even that if we will have online exams!). However, if you skip classes, you do miss the chance for class-participation bonus. Likewise, if you do not attend the recitations you may miss the attendance bonus.

Students with excused absences related to:

- religious observances/practices that are in accord with [ACD 304–04, “Accommodation for Religious Practices”](#)
- university sanctioned events/activities that are in accord with [ACD 304–02, “Missed Classes Due to University-Sanctioned Activities”](#)
- missed class due to military line-of-duty activities that are in accord with [ACD 304–11, “Missed Class Due to Military Line-of-Duty Activities,”](#) and SSM 201–18, “Accommodating Active Duty Military”.
- professional, or medical, or personal emergency reasons **with a confirmation letter from the Dean of Students office**. I have no intention of reviewing doctor notes.

will receive alternative arrangements for any examination or other graded work affected by such absences, or other medical or personal emergency reasons.

## Academic Integrity

Students in this class must adhere to ASU’s academic integrity policy, which can be found at <https://provost.asu.edu/academic-integrity/policy>). Students are responsible for reviewing this policy and understanding each of the areas in which academic dishonesty can occur. In addition, all engineering students are expected to adhere to both the ASU Academic Integrity Honor Code and the Fulton Schools of Engineering Honor Code. All academic integrity violations will be reported to the Fulton Schools of Engineering Academic Integrity Office (AIO). The AIO maintains record of all violations and has access to academic integrity violations committed in all other ASU college/schools.

Your work for this course must be the result of your own individual effort or - when permitted - the result of your group. Having said that, you are allowed to discuss problems with the instructor, the TA, or your classmates through Ed Discussion, but you must never copy others' solutions or use other students' electronic files.

**Copying (or slightly changing) solutions from online sources, other books, or your classmates is easily detectable. If such copying is detected, then the typical sanctions for these violations include:**

1. zero grade is applied to the respective assignment,
2. at least a -10% to the final grade, and
3. a formal report will be filed!

Do not forget that if you can find an answer online, then so can we!

**The best way to prepare for the midterms and the exams is to do the homework and projects according to the rules above!**

## Class evaluations and feedback

I take very seriously class evaluations and feedback. During the semester, I will be posting surveys on Canvas for feedback on both the course organization and the course content. I will appreciate it if you respond to these surveys. Ideally, the changes I implement will help you better succeed in the course.

As an example, in 2012, there were on-line quizzes before each class according to the JITT teaching philosophy which were required to be taken before the class starts. Student feedback stated that the idea of pre-class quizzes was great, but too stressful. Thus, since 2013, I kept the on-line quizzes, but you are allowed to take them at any point in time and for an unlimited time of attempts.

Finally, it is extremely important that you respond in the final anonymous survey solicited by the university at the end of the school year. The overall feedback helps me make changes for the next year.

## Honors Contract and Letters of Recommendation

If you plan to ask me for a letter of recommendation for graduate studies, then you must receive A or above. If you would like to do an honors project, then please contact me through email. Honors project are separate from any coursework.

## Grievances

If any issues arise with the course during the semester, then please follow these steps:

1. Meet/contact the instructor during office hours or by making an appointment or through email
2. If not satisfied with the proposed solution, then please make an appointment with the advising office
3. If not satisfied with the proposed solution, then make an appointment with the SCIDSE director

## Classroom and Online Behavior

**[Until further notified, per ASU policy, faculty, staff, students and visitors, are required to wear face coverings in classrooms, labs, offices and community spaces.]**



The use of recording devices is not permitted during class. This is a requirement primarily for pedagogical reasons. Many of my lectures are interactive. As a consequence, I will NOT correct mistakes immediately during a lecture - even for a long time. I am a firm believer that mastery comes by making mistakes. Hence, if you do partial recordings, e.g., take photos, and you do not pay attention to the lecture flow, you may end up with the wrong conclusions.

**Any violent or threatening conduct by an ASU student in this class will be reported to the ASU Police Department and the Office of the Dean of Students.**

If you are attending online, please make sure that your microphone is muted during the lecture. If you want to ask a question, then use the raise hand button, or type your question in the chat window. Needless to say avoid unnecessary annotations. If instances of disruptive screen annotations occur, I will have to disable the tool which is unfortunate since it is very useful when asking questions.

Policy against threatening behavior, per the Student Services Manual, SSM 104–02

Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services. Interfering with the peaceful conduct of university-related business or activities or remaining on campus grounds after a request to leave may be considered a crime. All incidents and allegations of violent or threatening conduct by an ASU student (whether on- or off-campus) must be reported to the ASU Police Department (ASU PD) and the Office of the Dean of Students.

## Accessibility Accommodations

Suitable accommodations will be made for students who need accessibility accommodations. Students needing accommodations must register with the ASU Student Accessibility and Inclusive Learning Services. Students should communicate the need for an accommodation in sufficient time for it to be properly arranged. See ACD 304-08 Classroom and Testing Accommodations for Students with Disabilities.

## Title IX

Title IX is a federal law that provides that no person be excluded on the basis of sex from participation in, be denied benefits of, or be subjected to discrimination under any education program or activity. Both Title IX and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>.

As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling> is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, <https://goto.asuonline.asu.edu/success/online-resources.html>.

## Copyright

All course content and materials, including lectures (Zoom recorded lectures included), are copyrighted materials and students may not share outside the class, upload to online websites not approved by the instructor, sell, or distribute course content or notes taken during the conduct of the course (see ACD 304–06, “Commercial Note Taking Services” and ABOR Policy 5-308 F.14 for more information).

You must refrain from uploading to any course shell, discussion board, or website used by the course instructor or other course forum, material that is not the student's original work, unless the students first comply with all applicable copyright laws; faculty members reserve the right to delete materials on the grounds of suspected copyright infringement.

## Subject to Change Notice

Reasonable effort will be made to follow the syllabus, but the syllabus can be modified if circumstances warrant it. If there are changes, you will be notified of the changes ahead of time. Changes will not be made to the grading scheme in a way that can reduce anyone's grade.