

CSE 355: Introduction to Theoretical Computer Science

Syllabus

COURSE OVERVIEW

Instructor Information

Instructor: Dr. Gennaro De Luca

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Course Overview

CSE 355 is an introduction to formal language theory and automata; Turing machines, decidability/undecidability, recursive function theory, and introduction to complexity theory. It serves as the primary introduction to the theoretical concepts of computer science.

Recitations:

You have chosen one of the recitation sections to attend. These start during the second week of classes. You are welcome to attend a recitation section other than the one in which you are registered, and you are very welcome to attend more than one in a given week, provided that there is space in the room.

Recitations are conducted by a TA, and do not cover new material. Instead, they discuss material from the lectures, homework, quizzes, and tests --- but primarily they are opportunities for you to ask questions and get answers. If there is a specific topic that you want the TA to discuss in more detail in recitation, just let the TA know (in advance, if possible).

Credits

This is a three-credit course.

Enrollment Requirements:

Students are expected to have background in Data Structures and Algorithms (CSE 310), Mathematical Foundations (MAT 243).

Course Learning Outcomes

Students who successfully complete this course can:

1. formulate correct finite state machines to solve algorithmic problems.
2. formulate precise specifications of formal languages.
3. reason about the ability of machines to recognize formal languages.
4. reason about the relative computational power of machine models.
5. understand the concept of a universal computing device (the Church-Turing Thesis)
6. formally prove precise statements about properties of machines and languages.
7. understand (some) uses of finite state machine models in areas such as network protocols, mutual exclusion, logic programming, and circuit optimization and design.

Topics to be Covered

Sipser Chapter 0 (introduction and review) -- read on your own

Sipser Chapter 1

Sipser Chapter 2 (to end of Theorem 2.42)

Sipser Chapter 3

Sipser Chapter 4

Tentative Class Schedule

TBA

COURSE MATERIAL

Required books

Michael Sipser, Introduction to the Theory of Computation, Third Edition, Cengage Learning, 2012, (ISBN-13: 978-1133187790).

Required Course Material/Tools

Students are required to have a laptop or desktop computer with the minimum specifications required to run current versions of Microsoft Windows, macOS, or Linux.

COURSE POLICIES

Grading Scheme

- Homework: 0% of final grade. Homework exercises will be posted on a regular basis. These are not to be submitted and are not graded. However, they prepare you for the tests and quizzes, and form the basis for discussions in the recitation sections.
- 15 Quizzes: Best 10 count to form 20% of final grade. Quizzes will be short and time-limited (20 minutes each), with one opportunity to complete each. You cannot start the quiz, leave it, and return to it later; **do not start the quiz if you are unable to complete it in one sitting without navigating away to a different web page.**

All quizzes will consist of multiple-choice or true/false questions. Quiz submission will be due on SUNDAY at 6:00 p.m. of the week for which it is assigned, but it can be completed as early as the Thursday of that week. Solutions will be available within a day of the quiz due time. All quizzes concern material covered in lectures, recitations, and homework.

- Two Midterm Tests: 20% of final grade each. These will be IN CLASS IN PERSON.
- Final Exam: 40% of final grade. This will be IN PERSON, and there will be no online option to write it. **However, 20% of the final exam is to satisfy ABET accreditation requirements; this portion is given as an online quiz, the ABET Final Exam Questions, which is to be completed online in the four days prior to the end of the exam time.** Three online attempts are permitted.
- *The goal is to **learn** the material, and grades are meant to be reflective of how well you learned it. For this reason, the final exam is more heavily weighted, and is cumulative. For EACH midterm test, if your percentage grade on the final exam exceeds that on the midterm test **AND your grade on the midterm test is at least 35%**, the final exam grade **replaces** that midterm test grade in calculations of the final course grade. The final exam grade does **not replace** quiz grades.*

Grades may be scaled upwards, depending on the difficulty of the tests; they will never be scaled downwards!

Grade Scale

Grade	A+	A	A-	B+	B	B-	C+	C	D	E
% Upper Limit	100%	< 97.0%	< 94.0%	< 90.0%	< 87.0%	< 84.0%	< 80.0%	< 76.0%	< 70.0%	< 60.0%
% Lower Limit	to 97.0%	to 94.0%	to 90.0%	to 87.0%	to 84.0%	to 80.0%	to 76.0%	to 70.0%	to 60.0%	to 0.0%

Course Policies – Assignments and Grading

Attendance and Participation: It is highly recommended that you attend each class session. When you attend, please arrive on time, attend the full class period, and participate in the class activities. It is totally fine that participants (students) may need to occasionally miss a class session for personal reasons (e.g., religious holiday, family matter). In these situations, the student must contact the instructor to discuss alternative ways to grasp the information presented in the missed class session prior to the class.

Late Submission Policy: The due dates/times for all assignments are presented above on the class schedule. Please note the dates/times carefully because there will be no provision for late submissions, except for extraordinary circumstances. Late submissions will receive no credit.

Makeup Exam Policy: There will be no provision for make-up exams or assignments, except in extraordinary and documented circumstances.

Class Participation

There is an expectation that students will actively engage in discussions. This is their key opportunity to ensure that their understanding of an issue is accurate, but it is also an important opportunity to reinforce the understanding of others through constructive but sometimes critical discussions. This opportunity should not be utilized as a podium for endless chatter and opinions, but for respectful, inclusive, and active discourse.

Campus Resources

These resources can be used by on-campus and online students. There are many valuable resources on campus to help you achieve success both personally and academically. A few of these are listed here which are available on all campuses. You are able to interact with these services remotely:

- Writing centers – <https://tutoring.asu.edu/writing-centers>[Links to an external site.](#)
- Tutoring, student success centers: <https://tutoring.asu.edu/tutoring>[Links to an external site.](#)
- Counseling / consultation: <https://eoss.asu.edu/counseling>[Links to an external site.](#)
- Career services: <https://eoss.asu.edu/cs>[Links to an external site.](#)

Absence & Make-up Policies

Excused absences related to religious observances/practices in accord with [ACD 304-04](#), “Accommodation for Religious Practices.” Students may be excused for the observance of religious holidays. Students should notify the instructor at the beginning of the semester about the need to be absent from class due to religious observances. Students will be responsible for materials covered during their absence and should consult with the instructor to arrange reasonable accommodation for missed exams or other required assignments.

Excused absences related to university sanctioned activities in accord with [ACD 304-02](#), “Missed Classes Due to University-Sanctioned Activities.” Students required to miss classes due to university sanctioned activities will not be counted absent. However, absence from class or examinations due to university-sanctioned activities does not relieve students from responsibility for any part of the course work required during the period of the absence. Students should inform the instructor early in the semester of upcoming scheduled absences and immediately upon learning of unscheduled required class absences. Reasonable accommodation to make up missed exams or other required assignments will be made. Consult the instructor BEFORE the absence to arrange for this accommodation.

Line-of-duty absence and missed assignment policy: A student who is a member of the National Guard, Reserve, or other U.S. Armed Forces branch who misses classes, assignments or examinations due to line-of-duty responsibilities, shall have the opportunity to make up the coursework in accordance with [SSM 20-18 Accommodating Active Duty Military Personnel](#). This accommodation also applies to spouses who are the guardian of minor children during line-of-duty activities. This policy does not excuse students from course responsibilities during their absence. Students should first notify the Pat Tillman Veterans Center of their activation and then the instructor to discuss options.

UNIVERSITY POLICIES

Classroom Behavior

Cell phones and pagers must be turned off during class to avoid causing distractions. The use of recording devices is not permitted during class. 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. See [SSM 104-02Links to an external site.](#), "Handling Disruptive, Threatening, or Violent Individuals on Campus."

Academic Integrity & Copyright Laws

One of the core topics of this course is academic integrity. You will be discussing it further throughout the course. ASU expects and requires all its students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments. Fulton Schools of Engineering takes academic integrity VERY seriously. The Fulton Honor Code will be discussed during a future class.

Students in this class must adhere to ASU's academic integrity policy, which can be found at <https://provost.asu.edu/academic-integrity/policyLinks to an external site.>). 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 CodeLinks to an external site.](#) and the Fulton Schools of Engineering [Honor CodeLinks to an external site.](#). 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.

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 304-06Links to an external site.](#), "Commercial Note Taking Services" and ABOR Policy [5-308 F.14 \(Links to an external site.\)](#) 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.

Plagiarism

Although ASU encourages collaboration between students, and faculty, in the sharing of ideas and experiences, individual work needs to represent the student's original thought and be distinguishably different from other students' work. Copying from other people's work in part or in whole will result in a ZERO grade for the whole work. Recurring plagiarism will result in obtaining an XE and reporting each student's misconduct.

Threatening Behavior Policy

Students, faculty, staff, and other individuals do not have an unqualified right of access to university grounds, property, or services (see [SSM 104-02Links to an external site.](#)). 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.

Harassment and Sexual Discrimination

Arizona State University is committed to providing an environment free of discrimination, harassment, or retaliation for the entire university community, including all students, faculty members, staff employees, and guests. ASU expressly prohibits discrimination, harassment, and retaliation by employees, students, contractors, or agents of the university based on any protected status: race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, gender identity, and genetic information.

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>[Links to an external site.](#).

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>[Links to an external site.](#), 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>[Links to an external site.](#).

Mandated sexual harassment reporter: 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>[Links to an external site.](#), is available if you wish discuss any concerns confidentially and privately.

Disability Resources

Suitable accommodations will be made for students having disabilities. Students needing accommodations must register with the ASU Disabilities Resource Center and provide documentation of that registration to the instructor. Students should communicate the need for an accommodation in sufficient time for it to be properly arranged. See [ACD 304-08](#)[Links to an external site.](#) Classroom and Testing Accommodations for Students with Disabilities.

Students who have accommodations for this course are encouraged to communicate with me as soon as possible to make appropriate arrangements.

The Americans with Disabilities Act (ADA) is a federal antidiscrimination statute that provides comprehensive civil rights protection for persons with disabilities. One element of this legislation requires that all qualified students with documented disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities.

If you require accommodation, please contact the Disability Resource Center (DRC) at ASU Polytechnic located in Student Affairs Quad # 4 or call 480-727-1039 / TTY: 480-727-1009. Please note that students who may need accommodations must register with the ASU Disability Resource Center and provide documentation of that registration to the instructor. Eligibility and documentation policies online: <http://www.asu.edu/studentaffairs/ed/drc/>[Links to an external site.](#)

Technical Support

- This course uses Canvas to deliver content. It can be accessed through MyASU at <http://my.asu.edu> or the Canvas home page at <https://myasucourses.asu.edu>
- To monitor the status of campus networks and services, visit System Health Portal at <http://syshealth.asu.edu/>
- To contact the help desk call toll-free at 1-855-278-5080.