

# Com S 3310, F25

Instructor: Pavan Aduri ([pavan@cs.iastate.edu](mailto:pavan@cs.iastate.edu))

*Catalogue Description:* Models of computation: finite state automata, pushdown automata and Turing machines. Study of grammars and their relation to automata. Limits of digital computation, unsolvability and Church-Turing thesis. Relations between classes of languages.

*Pre-requisites:* Com S 2280 and Com S 2300 or CPRE 3100.

*Tentative Topics.*

## 1. Finite Automata

- Deterministic Finite Automata
- Nondeterministic Finite Automata
- Regular Expressions
- Closure properties of Regular languages
- Pumping Lemma

## 2. Pushdown Automata

- Pushdown Automata
- Nondeterministic Finite Automata
- Context Free Grammars
- Pumping Lemma for CFG

## 3. Turing Machines

- Computability and Church-Turing Hypothesis
- Universal Turing Machine
- Turing Decidable and Acceptability
- Undecidability and Halting Problem
- Reductions.

## Meeting Times.

- Lectures: MWF, 1:10–2:00 PM; Gillman 1104.
- Recitation: F, 2:15–3:05 PM; Pearson 2115.

**There is no recitation during the first week of classes.**

## Staff

- Instructor: Pavan Aduri. [pavan@cs.iastate.edu](mailto:pavan@cs.iastate.edu). Office Hours: TBA
- Teaching Assistants.
  - Michael Chen. [mqychen@iastate.edu](mailto:mqychen@iastate.edu). Office Hours: TBA.
  - Xiaoyuan Li. [forbesii@iastate.edu](mailto:forbesii@iastate.edu). Office Hours: TBA.
  - Erik Rauer. [etrauer@iastate.edu](mailto:etrauer@iastate.edu). Office Hours: TBA.

**Text Book.** There is no required textbook, students are expected to take notes during the lectures. I will follow Dr. Gianfranco Ciardo's notes which is available via Canvas. In addition, I will provide my own lecture notes. Lecture notes are typically posted within one week of the lecture.

**Assessments.** Your grade depends on Quizzes, Homeworks and Exams.

*Quiz.* There will be 7 in-class quizzes. Quizzes are worth 15% of the final grade. Quizzes are held on the following days: Sep 5, Sep 19, Oct 3, Oct 10, Oct 24, Nov 7, Nov 19. Two least scoring quizzes are dropped while calculating the final grade. I may choose to give an extra credit quiz in December.

*Homeworks.* There will be 6-7 Homeworks. Homeworks are worth 30% of the grade. Unless otherwise specified late HW's are not accepted. A HW might be due during the dead/prep week.

*Exams.* There are two mid-term exams and 1 final exam. The final exam is cumulative. Midterms exams are worth 15% each, and the final exam is worth 25%. In-class midterm exams are given on Oct 6 and Nov 17.

*Letter Grades:* 88% or above will be A or A-. 75% or above is B+, B, B-, 63% or above is C+, C, C-, 55% or above is D and below 55% is F.

**Gen-AI Policy.** You may use Gen-AI tools to assist with your learning. While you may use Gen-AI tools to help with HW's, the final solutions must reflect your own understanding and thinking process. If you use Gen-AI to assist with HW's, you must acknowledge the usage of Gen-AI. Failure to acknowledge will be considered academic dishonesty. Unless carefully used, reliance on Gen-AI tools might give an illusion of understanding of the material. You should be aware that Gen-AI could provide incorrect information and solutions.

## ISU Syllabus Statements

Below are the required and recommended ISU's syllabus statements. These can also be found via the Syllabus Statements option on your left-hand Canvas course navigation.

**Academic Dishonesty Policy.** The class will follow Iowa State University's policy on academic dishonesty. Anyone suspected of academic dishonesty will be reported to the Dean of Students Office. Please see

<http://www.dso.iastate.edu/ja/academic/misconduct.html>

**Free Expression.** Iowa State University supports and upholds the First Amendment protection of freedom of speech and the principle of academic freedom in order to foster a learning environment where open inquiry and the vigorous debate of a diversity of ideas are encouraged. Students will not be penalized for the content or viewpoints of their speech as long as student expression in a class context is germane to the subject matter of the class and conveyed in an appropriate manner.

No employee, student, applicant, or campus visitor is compelled to disclose their pronouns. Anyone may voluntarily disclose their own pronouns.

**Accessibility Statement.** Iowa State University is committed to supporting students with disabilities. Promoting these values entails providing reasonable accommodations where barriers exist to students' full participation in higher education. Students in need of accommodations or who experience accessibility-related barriers to learning should work with Student Accessibility Services (SAS) to identify resources and support available to them. Staff at SAS collaborate with students and campus partners to coordinate accommodations and to further the academic excellence of students with disabilities. Information about SAS is available online at [www.sas.dso.iastate.edu](http://www.sas.dso.iastate.edu), by email at [accessibility@iastate.edu](mailto:accessibility@iastate.edu), or by phone at 515-294-7220.

**DeadWeek.** This class follows the Iowa State University DeadWeek policy as noted in section 10.6.4 of the Faculty Handbook. A HW or a PA might be due during the dead week.

**Non Discrimination Statement.** Iowa State University does not discriminate on the basis of race, color, age, ethnicity, religion, national origin, pregnancy, sexual orientation, genetic information, sex, marital status, disability, or status as a U.S. Veteran. Inquiries regarding non-discrimination policies may be directed to Office of Equal Opportunity, 2680 Beardshear Hall, 515 Morrill Road, Ames, Iowa 50011, Tel. 515-294-7612, email [eooffice@iastate.edu](mailto:eooffice@iastate.edu).

**Mental Health and Wellbeing Resources.** We're committed to your success and wellbeing at Iowa State. As a Cyclone, you can access 24/7 resources, services, and people dedicated to helping you achieve your goals and be your best in and out of the classroom. Whether you need academic support or just someone to talk to, we're here for you at Cyclone Support ([cyclonesupport.iastate.edu](http://cyclonesupport.iastate.edu)). If you are struggling emotionally and need support, there's confidential help available 24/7/365. You can call or text 988 or use the chat at [988lifeline.org](http://988lifeline.org).

**Statement on Prep Week.** This class follows the Iowa State University Prep Week policy, as noted in the ISU Policy Library and the Senior Vice President and Provost's website. A HW could be due during the prep week.

**Religious Accommodation.** Iowa State University welcomes a broad spectrum of religious beliefs and practices, recognizing the contributions differing experiences and viewpoints can bring to the community. There may be times when an academic requirement conflicts with religious observances and practices. If that happens, students may request the reasonable accommodation for religious practices. In all cases, you must put your request in writing. The instructor will review the situation in an effort to provide a reasonable accommodation when possible to do so without fundamentally altering a course. For students, you should first discuss the conflict and your requested accommodation with your professor at the earliest possible time. You or your instructor

may also seek assistance from the Dean of Students Office at 515-294-1020 or the Office of Equal Opportunity at 515-294-7612.