Course Information
Credit Hours: 3
Semester: Spring 2020
Meeting times and location: MWF, 10:10–11:00, via Zoom.
Meeting ID: 884-504-286
URL: https://wsu.zoom.us/j/884504286

Course website: https://scads.eecs.wsu.edu/index.php/automata-s2020
The course website will be used to post this syllabus and related resources. Additionally, we will continue to use the online portal OSBLE+ (https://plus.osble.org) for posting lecture material, assignments, announcements, and messages.

Instructor Information
Instructor: Assefaw Gebremedhin
Office: EME B43
Email: assefaw DOT gebremedhin AT wsu DOT edu
Homepage: www.eecs.wsu.edu/~assefaw
Office hours (via Zoom): Wednesdays 1:30–2:30pm, or by appointment.
Meeting ID: 920-272-738
URL: https://wsu.zoom.us/j/920272738

Teaching Assistant: James Halvorsen
Email: james DOT Halvorsen AT wsu DOT edu
Office Hours (via Zoom): Mondays 2–3pm and Thursdays 4–5pm
Mondays: Meeting ID: 917-724-620
Mondays: URL: https://wsu.zoom.us/j/917724620
Thursdays: Meeting ID: 279-876-224
Thursdays: URL: https://wsu.zoom.us/j/279876224

Course Objectives
- Introduce concepts in automata theory and theory of computation
- Identify different formal language classes and their relationships
- Design grammars and recognizers for different formal languages
- Prove or disprove theorems in automata theory using its properties
- Determine the decidability and intractability of computational problems

Prerequisites
- CptS 122/132
- Math 216
Textbook

Main textbook:


The following book is a good additional reference:


Grading and course policies

- 8 homeworks (60%) – best 7 out of 8 will be used toward final grade
- 2 midterms (20%)
- 1 final exam (20%)

Homework policy:

- Update: as of 03/20/2020, we have completed five of the eight planned homeworks. For the remaining three homeworks, submission will be done online via OSBLE+. You can either type up your solution or you may hand-write your solution and take picture and upload the file. Submissions will happen by the due date and time specified in the homework prompt.
- All homeworks must be done individually.
- No late submissions (without permission) are allowed.

Exam policy:

- Closed book, closed-notes, comprehensive
- Midterm exam dates will be announced in class and also updated in the syllabus as the exams approach.
- Update: as of 03/20/2020, we have completed one of two planned mid-term exams. For the second mid-term, the instructor is considering either an online or a take-home exam. This will be decided soon. The final exam will likely be an online exam. Decisions and updates will be communicated to students in good time via OSBLE post/email.

Final letter grades will be given according to the following ranges:

A (93–100%), A- (90–92.99%), B+ (87–89.99%), B (83–86.99%), B- (80–82.99%), C+ (77–79.99%), C (70–76.99%), C- (67–69.99%), D (60–66.99%), F (less than 60%).

Learning Outcomes

At the conclusion of this course students will:

- Have acquired a fundamental understanding of the core concepts in automata theory and formal languages
- Be able to design grammars and automata (recognizers) for different language classes
- Be able to identify formal language classes and prove language membership properties
- Be able to prove and disprove theorems establishing key properties of formal languages and automata
- Have acquired a fundamental understanding of core concepts relating to the theory of computation and computational models including decidability and intractability
Topics
Here is a tentative outline of topics. Most of the topics map to roughly a week.

1. Introduction to automata theory
2. Finite Automata (DFA and NFA)
3. Regular expressions and languages
4. Properties of regular languages: pumping lemma, closure properties, equivalence and mini-
mization of automata
5. Context-free grammars and languages
6. Pushdown Automata
7. Properties of context-free languages
8. Turing machines and extensions
9. Undecidability, diagonalization, problem reduction
10. Intractable problems: P and NP, NP-completeness

Policies

Conduct
Students are expected to maintain a professional and respectful classroom environment even as we conduct things online.

Correspondence
All class related correspondence with the instructor will continue to be made via OSBLE+. I will check messages sent to my inbox on a regular basis, and will do my best to respond promptly.

Academic Integrity
Academic integrity is the cornerstone of higher education. As such, all members of the university community share responsibility for maintaining and promoting the principles of integrity in all activities, including academic integrity and honest scholarship. Academic integrity will be strongly enforced in this course. Any student who violates the University’s standard of conduct relating to academic integrity will receive an F as a final grade in this course, will not have the option to withdraw from the course and will be reported to the Office of Student Standards and Accountability. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). You can learn more about Academic Integrity on the WSU campus at http://conduct.wsu.edu. Please also read this link carefully: EECS Academic Integrity Policy (http://www.eecs.wsu.edu/~schneidj/Misc/academic-integrity.html). Use these resources to ensure that you do not inadvertently violate WSU’s standard of conduct.

Safety on Campus
Washington State University is committed to enhancing the safety of the students, faculty, staff, and visitors. It is highly recommended that you review the Campus Safety Plan (http://safetyplan.wsu.edu/) and visit the Office of Emergency Management web site (http://oem.wsu.edu/) for a comprehensive listing of university policies, procedures, statistics, and information related to campus safety, emergency management, and the health and welfare of
the campus community. **Update:** For latest updates on COVID-19, visit the site [https://wsu.edu/covid-19/](https://wsu.edu/covid-19/)

### WSU Classroom Safety

Classroom and campus safety are of paramount importance at Washington State University, and are the shared responsibility of the entire campus population. WSU urges students to follow the “Alert, Assess, Act” protocol for all types of emergencies and “Run, Hide, Fight” response for an active shooter incident. Remain ALERT (through direct observation or emergency notification), ASSESS your specific situation, and act in most appropriate way to assure your own safety (and the safety of others if you are able). Please sign up for emergency alerts on your account at MyWSU. For more information on this subject, campus safety and related topics, please view the FBI’s Run, Hide, Fight video ([https://www.fbi.gov/about-us/cirg/active-shooter-and-mass-casualty-incidents/run-hide-fight-video](https://www.fbi.gov/about-us/cirg/active-shooter-and-mass-casualty-incidents/run-hide-fight-video)) and visit the WSU safety portal ([https://faculty.wsu.edu/classroom-safety](https://faculty.wsu.edu/classroom-safety)).

### Students with Disabilities

Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations must be approved through the Access Center. For more information, consult the webpage [http://accesscenter.wsu.edu](http://accesscenter.wsu.edu) or email at Access.Center@wsu.edu.

### Important Dates and Deadlines

Students are encouraged to refer to the academic calendar often to be aware of critical deadlines throughout the semester. The academic calendar can be found at [http://registrar.wsu.edu/academic-calendar](http://registrar.wsu.edu/academic-calendar).

### Weather Policy

For emergency weather closure policy, consult: [http://alert.wsu.edu](http://alert.wsu.edu).

### Changes

This syllabus is subject to change. Updates will be posted on the course website.