



COSC 444/541 Automata

Fall 2025 CRN: 12139/12140

Meetings: TR 01:00 PM - 02:50 PM in Pray-Harrold 514

Instructor: Dr. Yunting Yin

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Office Location: 511C Pray-Harrold

Office Hours: MW 2-4PM, TR 11AM-12PM, or by appointment

[Click here to schedule an appointment.](#)

This syllabus is subject to changes during the semester.

Course Description: This course offers an introduction to the mathematical foundations of computation – where computer scientists, mathematicians and linguists all meet for coffee. We will explore the theory of generative grammars and languages and along the way see how these ideas relate to computability. Students will study formal models of computation including finite automata, regular languages, context-free grammars, pushdown automata, and Turing machines. Emphasis will be placed on understanding the power and limitations of these models, proving properties about languages and machines, and analyzing how these concepts apply to programming languages and parsers. As an added bonus, we will discuss the theory of parsing.

Credit Hours: 4 for undergraduate, and 3 for graduate *

Prerequisites: COSC 311 and COSC 314

Class Meetings: Class sessions are Tuesdays and Thursdays 01:00 PM - 02:50 PM in Pray-Harrold 514. We will use this time for lessons, examples, and discussions.

Textbook: This course uses the following required textbook:

Peter Linz. *An Introduction to Formal Languages and Automata, 6th edition*. Jones Bartlett Learning, 2016. ISBN 9781284077247.

The eBook is available [at this link](#).

We will also use materials developed by EMU faculty such as slides, animations, and code shared in class.

Technology:

*Graduate students are expected to perform at an advanced level and complete additional work, as specified in the assessment section.

- **Canvas**
 - For best performance, Canvas should be used on the current or previous major release of Chrome, Firefox, Edge, or Safari. Since it is built on web standards, Canvas runs on Windows, Mac, Linux, iOS, Android, or any modern device with a compatible web browser. Your operating system should support these browsers and be kept up to date with the latest recommended updates.

Course Objectives: At the completion of this course, students will be able to:

- Define and analyze deterministic and non-deterministic finite state acceptors along with associated grammars, languages and expressions.
- Develop precise mathematical proofs to verify properties of formal languages and automata.
- Apply parsing techniques and understand ambiguity in grammars and languages.
- Describe and manipulate context-free grammars and pushdown automata.
- Explain the definition of Turing machines and describe their role as language accepters and transducers.

Grade Distribution: Students are able to check their grades on Canvas. Students should monitor their scores and notify the professor of any discrepancies.

Participation	10%
Quizzes	30%
Homework	30%
Project	30%

Letter Grade Distribution:

Final letter grades will be assigned at the discretion of the instructor, but here is a minimum guideline for letter grades:

≥ 93.00	A	73.00 - 76.99	C
90.00 - 92.99	A-	70.00 - 72.99	C-
87.00 - 89.99	B+	67.00 - 69.99	D+
83.00 - 86.99	B	63.00 - 66.99	D
80.00 - 82.99	B-	60.00 - 62.99	D-
77.00 - 79.99	C+	≤ 59.99	F

Assessment:

- **Participation:** Students are expected to participate in class discussions that focus around integrating material from the textbook and lecture. The primary way we measure this is by taking attendance. If there are other measures being used for participation on a given day, you will be notified that it is for a grade.
- **Quizzes:** There will be 3 quizzes or exams throughout the semester covering material from lectures.

- **Homework:** Regular homework assignments will be assigned to reinforce key concepts from class. Homework must be completed independently.
- **Project:** You will complete a team project that will be presented to the class at the end of semester. A list of suggested topics will be provided, but you are encouraged to propose your own ideas as well. Graduate students are expected to pursue projects that incorporate a research component or demonstrate greater technical or theoretical depth.

Course Policies:

- **General**
 - You are encouraged to discuss course materials with the professor, preferably during office hours, and also by email or any other platform provided by the University.
 - One of the keys to any good course is good communication between us. Generally, the sooner we can talk about any problems that arise (scheduling, homework assignments, exam issues, anything) the better. Don't hesitate to get in touch with me as soon as you have a concern so we can work through it. Feel free to contact me via email or in person during office hours, and try to send me an email with the subject to talk.
- **Attendance and Absences**
 - Students are responsible for all missed work, regardless of the reason for absence. It is also the absentee's responsibility to get all missing notes or materials.
- **Mobile/Cell Phone and Computer Use Policy:**
 - As a matter of courtesy to the instructor and other students in the class, it is highly recommended that you turn your mobile phones off or in silent mode during class time.
 - Students are allowed to use personal computers or tablets for class lecture purposes only.
 - Students are required to use the laboratory (iMac) computers for all laboratory activities.

Academic Honesty Policy:

- Academic dishonesty, including all forms of cheating, falsification, and/or plagiarism, will not be tolerated in this class.
- Each student is expected to submit individually prepared quizzes and homework.
- **AI Usage Policy:** Your work must reflect individual understanding and original thinking. The use of answers generated by AI tools for any graded work is not permitted.
- You may be referred to the Office of the Ombudsman for discipline that can result in either a suspension or permanent dismissal. The **EMU Student Handbook** contains detailed definitions of what constitutes academic dishonesty. If you are not sure about whether something you are doing would be considered academic dishonesty, consult with the course instructor.
Student Handbook Link: <https://www.emich.edu/studenthandbook/index.php>

Academic Accommodations:

- Eastern Michigan University is committed to providing equal opportunity for participation in all university programs, services and activities. Requests for accommodations by persons with disabilities may be made by contacting the Disability Resource Center (DRC), 246 Student Center, 734.487.2470 (tel:+1-734-487-2470). Once your eligibility for an accommodation has been determined, you will be issued a letter of accommodation (LOA). Please present your LOA to the instructor at the start of the academic semester or once it has been distributed to you by the DRC.
- You are expected to meet with the instructor at the start of the academic semester to discuss the implementation details of the accommodation.

Grade Reporting Policy:

- Grades posted on Canvas will be updated as soon as the grading is completed.
- Note that, if available and awarded, extra credit points will be recorded on Canvas but may not be reflected in your current grade.
- Please note that I cannot give out or discuss your grades over the phone or via email in compliance with the Family Educational Rights and Privacy Act of 1974 (FERPA). All grades will be posted and maintained on Canvas to ensure secure access and record-keeping.

University Course Policies: In addition to the articulated course specific policies and expectations, students are responsible for understanding all applicable University guidelines, policies, and procedures. The EMU Student Handbook is the primary resource provided to students to ensure that they have access to all university policies, support resources, and student's rights and responsibilities. Changes may be made to the EMU Student Handbook whenever necessary, and shall be effective immediately, and/or as of the date on which a policy is formally adopted, and/or on the date specified in the amendment. Please note: Electing not to access the link provided below does not absolve a student of responsibility. For questions about any university policy, procedure, practice, or resource, please contact the Office of the Ombuds:

- 248 Student Center
- 734.487.0074
- emu_ombuds@emich.edu
- www.emich.edu/ombuds

Title IX: Sexual violence and sexual harassment are contrary to our core values and have no place at Eastern Michigan. In accordance with Title IX and other laws, Eastern Michigan prohibits discrimination, including sex-based discrimination and discrimination towards pregnant/parenting students. If you or someone you know experiences sexual violence and/or harassment (regardless of whether it occurred on or off-campus) that limits the ability to participate in this course (or any other Eastern Michigan's program or activity), there are resources and options available. To learn more or to report an incident, please [visit the Sexual Misconduct Prevention and Response Office website](#). Please be aware that as an instructor, I am not a confidential resource, and I will need to report incidents of sexual misconduct to the Eastern Michigan's] Title IX Coordinator. You can

also contact Matthew Gregory, EMU's Title IX Coordinator, directly at mgregory@emich.edu, or 734.487.2202.

COVID Policy: To ensure the health and safety of all students and faculty, we adhere to EMU guidelines to prevent the spread of respiratory viruses. More details: <https://www.emich.edu/staying-healthy/index.php>.

Data for Research Disclosure: Any and all results of in-class and out-of-class assignments and examinations are data sources for research and may be used in published research. All such use will always be anonymous.

Additional Student Resources: A one-page guide with clickable links to student resources at EMU is provided at the end of this syllabus.

Student Resources

Academic Support

- [Holman Success Center](#)
- [Records & Registration \(Service EMU\)](#)
- [TRiO Student Support Services](#)
- [Office of the Ombuds](#)
- [University Writing Center](#)
- [Academic Projects Center](#)
- [Math Tutoring Center](#)
- [Dean of Students](#)

Financial & Career Support

- [University Advising and Career Development Center \(UACDC\)](#)
- [Career Closet](#)
- [Financial Aid \(Service EMU\)](#)
- [Handshake](#)

Health, Wellness & Safety Support

- [Disability Resource Center \(DRC\)](#)
- [Sexual Misconduct Prevention & Response Office](#)
- [Counseling and Psychological Services \(CAPS\)](#)
- [Rec/IM](#)
- [Eagle Nutrition Services](#)
- [Trinity Health IHA @ EMU](#)
- [Student Health Insurance](#)
- [Eagle Emergency Text Alerts](#)
- [Departmental of Public Safety \(EMU Police\)](#)
- [Student Eyes and Ears for University Safety \(SEEUS\)](#)

Resource & Accessibility Support

- [Student Emergency Fund](#)
- [Swoops Food Pantry](#)
- [E|Dining](#)
- [Children's Institute](#)
- [Housing & Residence Life](#)

Identity & Social Support

- [Campus Life](#)
- [Lesbian, Gay, Bisexual & Transgender Resource Center](#)
- [Center of Race & Ethnicity](#)
- [Women's Resource Center](#)
- [Brotherhood & Sisterhood Scholars](#)
- [Mentorship, Access and Guidance in College \(MAGIC\)](#)
- [Military & Veteran Services Resource Center](#)
- [Office for International Students & Scholars](#)
- [Fraternity & Sorority Life](#)