



Course Syllabus

CS 390: Introduction to Theoretical Computer Science

Course Information

Item	Details
Credits	3 credit hours
Semester	Fall 2026, 8B (the second 8-week session)
Delivery Mode	Synchronous Online (8-week accelerated course)
Instructor	Dr. Lusi Li
Email	lusili@cs.odu.edu
Office	ECSB 3214
Office Hours	Zoom: Wednesday, 12:00-1:00 PM
Prerequisites	A grade of C or better in CS 381 and in any one of CS 250, CS 251, CS 253, or ECE 250. Students should also be familiar with standard Internet-based tools, including email and web browsers.

Welcome to CS 390

In this course, we will explore the foundations of computing and learn how to think carefully about problems, algorithms, computation, and their limitations. Some topics may feel abstract at first, but we will work through them step by step and connect them to ideas you already know from computer science.

The goal is for you to leave this course not only knowing the models, but also understanding the reasoning behind them.

About Me

I am Dr. Lusi Li, an Assistant Professor in the Department of Computer Science at Old Dominion University. My research interests include Artificial Intelligence (AI), machine learning, multimodal learning, trustworthy and secure AI, and their applications. Teaching, research, and student mentorship are central to my academic work.

1. Course Overview

Catalog Description

Elementary study of theoretical aspects of computer science. Topics in formal languages and automata theory are covered including regular languages, regular expressions, finite automata, context-free languages, pushdown automata, grammar, Turing machines, and unsolvable problems.

Course Format

This is a synchronous online, accelerated eight-week course. Scheduled live meetings will be used for explanation, worked examples, problem solving, and questions. Canvas will serve as the central location for announcements, course materials, quizzes, assessments, and due dates. Because the course moves quickly and the topics build on one another, consistent weekly engagement is important.

Course Learning Objectives

O1: Demonstrate knowledge of the primary mathematical models of computation (automata) that underpin Computer Science.

O2: Demonstrate knowledge of formal languages and their relationship to automata.

O3: Construct, work with, analyze, and prove properties of basic forms of automata and formal languages.

O4: Explain and discuss relationships between automata/formal languages and practical issues in programming languages and software development.

2. Required Materials and Technology

Required Textbook

Hopcroft, John E.; Motwani, Rajeev; and Ullman, Jeffrey D. Introduction to Automata Theory, Languages, and Computation, 3rd ed. Addison-Wesley Longman Publishing Co., 2006. ISBN 0321462254.

Technology	Requirement
Hardware	Computer or laptop with reliable Internet access; microphone; speakers or headphones; webcam for synchronous online meetings.
Software	Modern web browser; Microsoft 365 or equivalent for viewing/creating documents; Adobe Acrobat Reader or another PDF reader.
Course Systems	Canvas LMS and the university-supported platform used for synchronous class meetings.
Specialized Software	No specialized automata software is required for this course unless announced for a specific activity.

3. How the Course Works

A typical module follows a predictable rhythm so you can plan your work in advance:

- Attend the scheduled synchronous session and engage with worked examples and problem-solving activities.
- Review assigned readings, course notes, examples, and recordings/materials posted in Canvas.
- Practice constructing and analyzing automata and formal languages before attempting graded work
- Complete the weekly quiz by the posted deadline (generally Sunday at 11:59 PM; Module 8 follows the shorter final-week schedule).
- Complete checkpoint assessments and exams in the modules shown in the course schedule.

4. Student Support and Success

Please reach out before a small question becomes a larger obstacle. Theoretical computer science is cumulative: a concept that is unclear in one module can make the next module harder. Asking questions, revisiting examples, and using office hours are part of successful learning in this course.

Critical Reading and Practice

CS 390 is theory-intensive and requires careful reading of definitions, examples, proofs, and problem-solving techniques. Do not rely only on lecture explanations. Read course notes and examples before or after class, work problems by hand, and compare your reasoning with the formal definitions used in the course. Regular review is especially important in an accelerated format.

Office Hours and Getting Help

Zoom office hours: Wednesday, 12:00-1:00 PM.

If the time does not work with your schedule, please email me. I will do my best to help you identify an appropriate way to get support.

Communication

Clear communication is an important part of your success in this course. If you are unsure about a concept, assignment instruction, or course expectation, please ask. You can communicate through email, Canvas discussions, announcements, and office hours.

Communication	Guideline
Email subject line	Include “CS 390” in the subject line so I can identify course messages quickly.
Preferred email	Use your ODU email for individual questions or private matters.
Response time	I aim to respond within 24 hours Monday-Friday and within 48 hours on weekends and holidays.
Canvas Discussions	Use for general course questions that may benefit the whole class.
Private matters	Questions about grades, accommodations, or your individual work should be sent privately by email or discussed during office hours.

Asking Effective Questions

When requesting help, include enough context for me to understand where you are in the problem. When appropriate, tell me:

- what you are working on
- what you have already tried
- where you became confused or stuck
- the result, error, or unexpected outcome you received
- the specific concept or step you would like help

The more specific your question is, the more effectively I can guide you. You are encouraged to ask questions early rather than waiting until an assessment is approaching.

Instructor and Student Expectations

	Expectations
What you can expect from me	Accurate course content; clear assignment guidance; availability for questions; meaningful and timely feedback; fair and transparent evaluation; and support in preparing for assessments.
What I expect from you	Regular engagement; timely completion of readings and assignments; respectful and professional communication; adherence to the ODU Honor Pledge; and thoughtful participation in the learning process.

5. Assessment and Grading

Assessments are designed to build your understanding progressively across the eight modules. The course grade is based on the following categories:

Graded Category	Weight
Weekly Quizzes	50%
Checkpoint Assessments	5%
Midterm Exam	15%
Final Exam	30%
Total	100%

Assessment Overview

Assessment	Weight	Timing	Purpose and Expectations
Weekly Quizzes	50%	Modules 1-8; generally Sunday, 11:59 PM	Reinforce weekly concepts in automata theory and formal languages. Questions may include conceptual understanding, DFA/NFA construction, language recognition, regular expressions, and related problem solving.
Checkpoint Assessments	5%	Checkpoint 1: Module 3 Checkpoint 2: Module 5	Assess cumulative understanding at key transition points. You may construct automata, perform conversions, analyze languages, and provide mathematical or proof-based reasoning.
Midterm Exam	15%	Module 4	Covers Modules 1-4, including finite automata, formal languages, conversions, and

Assessment	Weight	Timing	Purpose and Expectations
			regular expressions. Clear reasoning and constructions are expected.
Final Exam	30%	Module 8	Comprehensive assessment with emphasis on context-free grammars, pushdown automata, Turing machines, decidability, and synthesis across course topics.

All graded work is submitted through Canvas unless otherwise specified. Participation and self-assessment activities may be provided throughout the course as ungraded practice and preparation.

What Strong Work Looks Like

- correct application of theoretical concepts;
- accurate construction and analysis of computational models;
- correct conversions such as NFA $\rightarrow$ DFA and regular expressions $\leftrightarrow$ automata; • appropriate mathematical notation;
- clear intermediate steps when requested;
- logical and rigorous reasoning; and
- work that reflects your own understanding.

Grade-Point Scale

ODU uses a plus/minus 4-point grade system. The official grade-point values are:

Letter Grade	Points	Letter Grade	Points
A	4.0	C	2.0
A-	3.7	C-	1.7
B+	3.3	D+	1.3
B	3.0	D	1.0
B-	2.7	D-	0.7
C+	2.3	F	0.0

Scores on assignments and exams are first converted to percentages. The course uses the following conversion anchors for individual graded items; intermediate values between anchors may result in intermediate 4-point values.

Individual item grades may range as high as 4.5.

Raw Percentage Anchor	4-Point Value
100%	4.5
$\geq 92\%$	4.0
$\geq 76\%$	3.0
$\geq 60\%$	2.0
$\geq 44\%$	1.0
$\leq 27\%$	0.0

Submission and Late Work

Assessment	Late Work Policy
Weekly Quizzes	Late submissions are generally not accepted. The lowest quiz score

Assessment	Late Work Policy
	will be dropped.
Checkpoint Assessments	A 10% deduction per day may be applied for late submissions, up to 48 hours after the deadline.
Midterm & Final Exams	Late or make-up exams are permitted only in accordance with course and university policies or in cases of documented emergencies.
Practice/Self-Assessments	These activities are intended to support learning; specific deadlines will be listed in Canvas when applicable.

If an unusual circumstance may affect your ability to meet a deadline, contact me as early as possible. When a conflict is foreseeable, communication before the deadline gives us the best chance to identify an appropriate course-consistent solution.

Incomplete Grades

A grade of “I” may be assigned only upon instructor approval of a student request and only in exceptional circumstances beyond the student’s control. University deadlines and procedures govern completion of an Incomplete grade.

ODU information on Incomplete, Withdrawal, and Z grades: <https://www.odu.edu/academics/academic-records/grades/incompletes-withdraws-zgrades>

6. Course Policies

Attendance and Participation

Because CS 390 is synchronous and accelerated, regular attendance at scheduled online meetings is strongly encouraged. Live sessions are used for worked examples, explanations, and problem solving that support the quizzes and exams. If you miss a meeting, you are responsible for reviewing the material and announcements in Canvas and completing all work by the posted deadlines. If circumstances are affecting your participation, communicate with me as early as possible so I can help you understand your options within course and university policy.

Exam Proctoring

The midterm and final exams will be proctored. Students are responsible for arranging the required proctoring option at least one week before each exam. Weekly quizzes are not proctored.

ODU Smart Proctoring information: <https://online.odu.edu/academics/exams-and-proctors/smarterproctoring>

Academic Integrity and Collaboration

Everything submitted for grading must represent your own work unless collaboration is explicitly permitted for a specific activity. You are encouraged to discuss general course concepts, study strategies, definitions, and examples with classmates. However, sharing, posting, requesting, or discussing specific solutions to graded activities is not permitted unless the assessment instructions explicitly allow collaboration.

Assessment instructions will state what resources are permitted. Do not consult another person during an exam or quiz unless the instructions explicitly permit collaboration. When an assessment permits the use of external sources, acknowledge and cite those sources appropriately. Students who provide prohibited assistance to others may also be in violation of the academic integrity policy.

Using External Resources

- If you use another person’s ideas, proof strategy, argument, or explanation in work where external sources are permitted, cite the source in a way that allows it to be identified.
- If you use exact wording from a source, place the wording in quotation marks and cite the source.
- You are responsible for checking that any borrowed idea is relevant to the actual question and mathematically correct.
- If an external source uses notation or definitions different from those used in this course, translate the material into the notation and conventions used in CS 390.

Artificial Intelligence (AI) Usage

This course emphasizes independent problem solving, formal reasoning, and proof-writing. You may use AI-based tools such as ChatGPT as study aids unless a specific assignment, quiz, or exam states otherwise. Examples of appropriate study uses include requesting an alternative explanation, generating additional practice, or checking your understanding of a concept.

If AI contributes ideas, explanations, examples, proofs, or arguments to submitted work where such use is permitted, acknowledge that use appropriately. You remain responsible for verifying mathematical correctness, logical validity, relevance, and consistency with the notation and definitions used in this course. AI-generated content can be incorrect or misleading; copying a generated solution without understanding it does not demonstrate the learning outcomes of this course.

For quizzes and exams, follow the resource rules provided with that specific assessment.

Technology Issues

Plan to begin online assessments early enough to allow time for routine technical issues. If a significant technology problem prevents you from accessing or submitting required work, document the problem when possible and contact me promptly by ODU email.

Course Changes

The course schedule and activities may be adjusted when needed to support learning or respond to university circumstances. Any changes will be communicated through Canvas Announcements. Students are responsible for checking Canvas and ODU email regularly.

7. University Policies and Student Rights

Code of Student Conduct and Academic Integrity

The [Office of Student Conduct & Academic Integrity \(OSCAI\)](#) oversees the student conduct system. ODU expects students and student organizations to uphold standards of personal and academic integrity, fairness, respect, community, and responsibility.

Honor Pledge

"I pledge to support the honor system of Old Dominion University. I will refrain from any form of academic dishonesty or deception, such as cheating or plagiarism. I am aware that as a member of the academic community it is my responsibility to turn in all suspected violations of the Honor Code. I will report to a hearing if summoned."

Discrimination Policy

Old Dominion University is committed to a work and educational environment free from harassment and discrimination and to an environment that respects the dignity and worth of every member of the university community. [ODU Discrimination Policy](#)

Diversity and Inclusion

ODU values the diversity of the Monarch community and is committed to student engagement, inclusion, cultural understanding, and student success. [Office of Intercultural Relations](#)

Educational Accessibility and Accommodations

Old Dominion University is committed to ensuring equal access to all qualified students with disabilities in accordance with the Americans with Disabilities Act. The Office of Educational Accessibility (OEA) is the campus office that works with students who have disabilities to provide and/or arrange reasonable accommodations.

If you experience a disability which will impact on your ability to access any aspect of my class, please present me with an accommodation letter from OEA so that we can work together to ensure that appropriate accommodation is available to you.

If you feel that you will experience barriers to your ability to learn and/or testing in my class but do not have an accommodation letter, please consider scheduling an appointment with OEA to determine if academic accommodation is necessary.

The Office of Educational Accessibility is located at 1021 Student Success Center, and their phone number is (757)683-4655. Additional information is available at the OEA website: [Office of Educational Accessibility \(OEA\)](#) works with students to determine and arrange reasonable accommodations. Students are encouraged to provide their OEA Accommodation Letter to the instructor early in the semester so approved accommodation can be implemented in a timely manner. [Accommodations for Students with Disabilities policy](#)

University Email Policy

ODU email is an official means of university communication. Students are responsible for activating and regularly checking their ODU email account so they remain current with academic and administrative communication.

[Student Email Standard](#) | [Student Computing](#)

Withdrawal

This syllabus describes the course requirements and policies. Review the course expectations early. If you determine that the course does not fit your academic needs or circumstances, consult the university deadlines and withdrawal procedures. [ODU Academic Calendar / Schedule information](#) | [Office of the University Registrar](#)

Privacy of Student Information

Old Dominion University is committed to ethical handling and protection of student information, including responsibilities under FERPA. [Privacy of Student Information](#) | [ODU Code of Ethics](#)

Mental Health and Counseling Services:

College can be exciting and rewarding, but it can also bring periods of stress, uncertainty, and personal or academic challenges. Seeking support is a strength and an important part of taking care of yourself and your success.

ODU's Office of Counseling Services provides free and confidential mental health services to registered students, including individual and group counseling, psychiatric services, crisis intervention, workshops, and other support. Both in-person and virtual appointments are available, including same-day/next-day appointments through the Monarch Wellness Portal.

Helpful ODU resources:

[ODU Counseling Services](#) — information about counseling and mental-health support.

[Make a Counseling Appointment](#) — instructions for scheduling an in-person or virtual appointment.

[Urgent/Crisis Mental Health Support](#) — ODU's current emergency and crisis-support information.

[Student Health Services](#) — medical and health services for current ODU students.

Counseling Services: Student Recreation and Well-Being Center, 4700 Powhatan Ave., Suite 2403 | 757-683-4401. For urgent mental-health support, students can call 757-683-4401 and select Option 2 to connect with a crisis counselor 24/7.

Caregiver Responsibilities Policy:

I have great respect for students who are balancing their pursuit of education with the responsibilities of caring for children or other family members. If you run into challenges that require you to miss a class, or if your caregiving responsibilities interfere with your ability to engage in remote learning, please contact me. There may be some instances of flexibility we can offer to support your learning.

Academic Support & Learning Resources:

Need help? Start early. Ask questions. Use your resources. Successful students are not students who never need help, they are students who learn when, where, and how to seek it.

If you are having difficulty with an assignment, managing your time, developing effective study habits, conducting research, writing, understanding course expectations, or planning your next academic step, please reach out. You are encouraged to ask questions during class, during office hours, or by email. I am happy to help you identify an appropriate next step and connect you with available university resources.

ODU provides several academic support resources that can help you throughout your first year:

[Academic Success Center](#): Academic success support, mentoring, tutoring connections, advising resources, and assistance with developing strategies for university success.

[ODU Tutoring Services](#): ODU provides free tutoring opportunities through multiple campus tutoring centers and online services. Students can search by course to identify currently available support.

[Computer Science Undergraduate Resource Center \(CSURC\)](#): Provides tutoring and academic support for students enrolled in several undergraduate Computer Science courses. Students are encouraged to use this resource early not only when they begin having trouble.

[University Libraries & Research Help](#): Librarians and library resources can support research questions, search strategies, finding and evaluating sources, and information-literacy activities.

[Writing Center](#): Students can receive support with brainstorming, organization, drafting, revision, and developing effective academic writing strategies.

[Academic Advising](#): Advisors can help students understand degree requirements, registration, academic planning, goals, and important academic decisions.

[ePortfolio Support](#): Students can receive assistance developing and refining their ePortfolio, including organizing content and communicating their learning, experiences, skills, and professional identity.

8. Course Schedule

The schedule below is the planned sequence for 8B, Fall 2026. Always check Canvas for the most current instructions and assessment availability windows. Questions are welcome. Please ask early, practice consistently, and use the support available to you throughout the course.

Module	Dates	Topics	Assessments	Due
Module 1	Oct 19-Oct 25	Foundations & Mathematical Readiness Sets, relations, functions, notation, course tools	Quiz 1: Foundations & Math Review	Oct 25, 11:59 PM
Module 2	Oct 26-Nov 1	Deterministic Finite Automata (DFA) Formal definition, design, basic problems	Quiz 2: DFA Design & Analysis	Nov 1, 11:59 PM
Module 3	Nov 2-Nov 8	NFA + DFA Equivalence NFA concepts, subset construction, equivalence proofs	Quiz 3: NFA & Conversion Checkpoint 1: Automata Review	Nov 8, 11:59 PM
Module 4	Nov 9-Nov 15	Regular Expressions & Conversions Regex, automata conversion, pattern representation	Quiz 4: Regular Expressions	Nov 15, 11:59 PM
Midterm Exam	Nov 13-15	(Modules 1-4)		Nov 15, 11:59 PM
Module 5	Nov 15-Nov 22	Regular Languages & Equivalence Closure properties, $DFA \rightleftharpoons NFA$ $\rightleftharpoons$ RegEx equivalence	Quiz 5: Regular Languages Checkpoint 2: Cumulative Regular Languages	Nov 22, 11:59 PM
Module 6	Nov 25-Nov 29	Context-Free Grammars (CFGs) Grammar rules, derivations, parse trees	Quiz 6: CFGs	Nov 29, 11:59 PM
Module 7	Nov 29-Dec 9	Pushdown Automata (PDA) + CFL Properties PDA design, $CFG \leftrightarrow PDA$, pumping lemma, closure	Quiz 7: PDA Quiz 7: CFL Properties Quiz 8: Turing machines	Dec 9, 11:59 PM
Module 8	Dec 7-Dec 10	Turing Machines, Decidability & Church-Turing TM models, undecidability, real-world connections	Quiz 8: Decidability	Dec 10, 11:59 PM
Final Exam	Dec 8-10	Comprehensive		Dec 10, 11:59 PM