CSCI 4325-01, CRN 12772
Automata, Formal Languages, and Computability

Instructor	Dr. Tim Wylie
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Office Hours	TR 10:00 a.m. – 12:00 p.m.
Schedule S01	Lecture: TR, 12:30 p.m. – 1:45 p.m., EIEAB 1.212
Final Exam S01	Dec. 10^{th} (R), 10:15 a.m. – 12:00 p.m., EIEAB 1.212
Textbook *(required)*	Introduction to the Theory of Computation (3^{rd} edition). Sipser, M., 2012. ISBN-13: 978-1133187790
(free)	Introduction to Theory of Computation. Maheshwari, A. and Smid, M., 2016. URL: http://cglab.ca/~michiel/TheoryOfComputation/
Course Website	academic.timwylie.com/26CSCI4325F/

CSCI 4325: Automata, Formal Languages, and Computability. The course presents formal computation models. Topics include finite state machine, pushdown state machine, Turing machine, halting problem, definition and properties of formal grammars and their languages as well as theory of computability and complexity including the complexity of optimization and approximation problems. Prerequisite: CSCI 3333 and CSCI 3336.

Course Overview

Organization. Parts of the course will be online. Class participitation will require the following online services and places that must be checked frequently.

- University email (utrgv.edu/mail)
- Course website
- Discord with the 4325 Discord channel
- Brightspace (for other syllabus information)

Each service serves a different purpose. The course website gives an overview of topics and major due dates, files, assignments, etc. The Discord server is an open forum for everyone to talk and connect. This is for discussing homework, corrections, clarifications, and for getting in touch with me. Zoom/Discord may be used for office hours and if we need to have some lectures online.

Grading. Attendance is required and part of the grade. If you miss class, there is no way to make it up. There will be daily/weekly quizzes during this course. There is no make-up quiz if you miss one. Students are expected to have assignments completed when specified. This may include selected readings from the textbook. The material in this course is naturally cumulative, with each week's topics building on all the prior material. Therefore, each exam will focus on the material covered since the previous exam, however, the student is expected to understand and apply all previous course material.

Grade Breakdown		**Final Grade**	
Quizzes	30%	90%–100%	A
Exams/Projects	70%	80%–89%	B
		70%–79%	C
Total possible score (max):	100%	60%–69%	D
		0%–59%	F

Note: Grades may be adjusted to reflect the overall performance of the class.

Course Schedule. This is a rough course schedule to give you an idea of topics and pacing. The actual course schedule is likely to change and will be kept up to date on the course website.
Week 1: Introduction, mathematical concepts
Weeks 2-4: Automata, Regular Languages
Weeks 5-6: Context-Free, Non-regular Languages
Weeks 6-7: Turing Machines, Decidability
Weeks 8-9: Computability Theory, Undecidable Languages
Weeks 10-11: Complexity Theory, Algorithms
Weeks 12-14: Complexity Classes, Reductions
Weeks 14-15: Space complexity. Topics of Interest
Week 16: Final

Late Work Policy. In-class exercises and quizzes will not be accepted late. Assignments must be turned in at the specified time on the given due date for full credit. Any assignment turned in late will receive 50% credit.

Make-up Policy. No make-up exams will be given except for university sanctioned excused absences. If you need to miss an exam, it is your responsibility to contact me before the exam, or as soon after the exam as possible. Missing an exam without an approved (by the university or me) excuse will result in a zero.

Learning Outcomes

Program/ABET Outcomes	Student Learning Outcomes	Assessment
(1) Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.	• What is computation? This question is related to various computation models and their similarities. • How are language definition and computability intertwined? This question is about the equivalence of language definition and computational capability.	• Exams

UTRGV Course Policies

For all UTRGV policies, please see the syllabus on Brightspace.