KENNESAW STATE UNIVERSITY

SYLLABUS
COLLEGE OF COMPUTING AND SOFTWARE ENGINEERING
Department of Computer Science
CS 6041/W01– Theory of Computation
Summer 2025

Course Information

Class meeting time: *Online; D2L*
Modality and Location: *Online; D2L*
Syllabus can be found in D2L or course website.

Instructor Information

Name: Dr. Kun Suo
Email: ksuo@kennesaw.edu (D2L email system)
Office Location: J-3230
Office phone: (470) 578-2524
Office Hours: M/W 4pm-5pm. MS teams, and by appointment
Preferred method of communication: email
Teaching/Lab Assistant: TBD

Course Description

CS 6041: Theory of Computation
3 Class Hours 0 Laboratory Hours 3 Credit Hours
Prerequisite: Coursework in Discrete Math or CS 5070 as determined by program admission

A study of topics from theoretical computer science that includes automata and languages, computability theory, and complexity theory.

Course Materials

Required Texts or Technology Resources -

Introduction to the Theory of Computation, 3rd edition
Michael Sipser
ISBN-13: 978-1-133-18779-0
ISBN-10: 1-133-18779-X

Recommended Texts:

None.

Course Learning Outcomes

Upon completion of this course, student will be able to

1. Explain the basic concepts, describe the basic properties, design and describe the strings recognized by:
   a. regular languages (regular expressions, finite state automata)
   b. context free languages (context-free grammars, push-down automata)
   c. unrestricted languages (Turing machines)
2. Demonstrate understanding of undecidable and intractable (P and NP) classes of problems
3. Prove theorems about automata, languages, decidability and problem classes
4. Read and analyze research papers on Computational Theory and its applications

Course Requirements and Assignments

Course Topics and Outline

- Deterministic finite automata and Nondeterministic finite automata
- Regular expression and Regular language
- Non-regular language
- Context free language and Pushdown Automata
- Non-Context free language
- Turing machine
- Decidability, Reducibility and Complexity

There will be 3 homework and 3 exams include. Please check the course schedule, D2L, and course website for more details.

Evaluation and Grading Policies

Homework, quizzes, project, and exams will be given numerical scores. These scores will be averaged at the end of the semester using the following weighting:

Item	Points, percentage or measurement
Homework	40%
Exam 1	20%
Exam 2	20%
Exam 3	20%

Homework Submission: Copying or paraphrasing codes from other sources or other students will be considered a violation of the Student Code of Conduct. Due dates for homework assignments will be specified on the homework themselves. No late submission is accepted.

Letter grades will be determined by ranking the numerical averages of all students in the class. Cut-off points for grades will depend on the performance of the class as a whole; however, they will be no higher than 90 (A), 80 (B), 70 (C), and 60 (D).

Your final weight average will be used to determine your final letter grade using the table below:

Grade	Points, percentage or measurement
A	90-100
B	80-89
C	70-79
D	60-69
F	0-59

I will round up grades if they are > or = .5 or above, for example, an 89.6 is an A, but 79.2 is a C.

Early Alerts/Progress Reports: *This class is participating in Early Alerts, which faculty will submit during the first few weeks of class. These reports notify advisors and student success coaches to a range of things like missing class, missing assignments, if you might need to visit tutoring, or could benefit from help with time management or study skills. These are not recorded as grades and are meant to provide you with some additional resources to ensure you can be successful in your class. If you receive notification of an early alert, please take advantage of these resources.*

Midterm Grades: *A midterm grade may be assigned by the midterm grade due date identified on the academic calendar. This midterm grade is for assessing mid-semester performance at least one week prior to the last day to withdraw without academic penalty. You may view your midterm grade in Owl Express. Note that only your final grade will be officially recorded on your academic transcript.*

Course Policies

Attendance Policy
Regular attendance is expected; please notify me in advance if you will be unable to attend because of business travel or other valid reason. If a student misses 2 or more than 2 classes, the student's final grade may be decreased.

Instructional Continuity Plan
Kennesaw State University (KSU) may decide to close campuses, operate on a delayed schedule, or transition to remote instruction for inclement weather or in case of emergency.

The University will announce campus closures, delayed schedules, or remote instruction through KSU Alerts sent to your cell number on file and to your university email account. In addition, announcements will be posted on KSU's home page: www.kennesaw.edu.

Our class continuity plan includes:

1. Communication: Please check D2L Brightspace or e-mail for necessary instructions.
2. Virtual Classes: If in-person classes are not possible, we may transition to virtual classes using MS Teams.
3. Assignments and Assessments: Deadlines for assignments and assessments may be adjusted to accommodate the emergency situation.

We understand that emergencies create unique challenges. If you need additional support during an emergency, reach out via Brightspace or e-mail. The university also offers resources such as counseling and academic support, which can be accessed remotely.

Policy on the Usage of Artificial Intelligence

AI Use Allowed, but Not Required:

In this class, you are welcome to use AI for any purpose. However, you should note that all AI generative tools still tend to make up incorrect facts and fake citations, code generation models tend to produce inaccurate outputs, and image/art generation tools can produce copied work or offensive products. You will be responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or an AI tool. If you use an AI tool, its contribution must be credited in your submission. The use of an AI tool without acknowledgement is cheating and constitutes a violation of the KSU Code of Academic Integrity.

Course Withdrawal

Check the eCore calendar for the late registration/add period and the drop period of the session you are enrolled in.

Students may withdraw from one or more courses up to one week prior to the last day of class. Summer withdrawal dates vary according to the part of term in which the student is enrolled. As of fall 2004, students will be allowed a maximum of eight total withdrawals if they enter KSU as a freshman. Transfer students will be allowed one withdrawal per fifteen credit hours attempted, for a maximum of eight. Students who choose to pursue a second degree at KSU will be allowed two additional withdrawals and consult with the Registrar's Office. Students who entered KSU before fall 2004 will be allowed one withdrawal per fifteen credit hours attempted for a maximum of eight after the institution of this policy. As part of the consolidation process between Kennesaw State University and Southern Polytechnic State University, SPSU students will have eight withdrawals available beginning Fall Semester 2015.

Students who exceed the maximum number of withdrawals will receive a grade of 'WF' for any subsequent withdrawals. To completely or partially withdraw from classes at KSU, a student must withdraw online through Owl Express.

Students who officially withdraw from courses before the last day to withdraw without academic penalty will receive a grade of 'W' and receive no credit. Students who officially withdraw after the last day to withdraw without academic penalty and before the last week of classes during the semester or who have exceeded the maximum number of withdrawals will receive a grade of 'WF,' which will be counted as an 'F' in the calculation of their grade point average.

The only exceptions to these withdrawal regulations will be for instances involving unusual circumstances, which must be fully documented. Students may appeal to the Academic Standing Committee for consideration of unusual circumstances. Exact withdrawal dates are published in the official academic calendar. Students will receive refunds only when they withdraw from ALL their classes and only by the schedule outlined in the University System refund policy.

Student Course Evaluation

A standard questionnaire (described below) will be administered during the last two weeks of the semester in all classes. Additional questions developed by the college or instructor(s) may be included as well. It is important that each student provide meaningful feedback to the instructor(s) so that changes can be made in the course to continually improve its effectiveness. We value student feedback about the course, our teaching styles, and course materials, so as to improve our teaching and your learning. At a minimum, the following two questions will be asked: 1) Identify the aspects of the course that most contributed to your learning (include examples of specific materials, exercises and/or the faculty member's approach to teaching and mentoring), and 2) Identify the aspects of the course, if any, that might be improved (include examples of specific materials, exercises and/or the faculty member's approach to teaching and mentoring).

Acquiring Final Grades

In an effort to better utilize our technology resources, Kennesaw State University has instituted the reporting of end of term grades by phone. This is in addition to the web version of grades, which has been in effect for several terms. Students may call 770-420-4315 and select Option Number 4 to secure their end of term grades. With this new development, printed grade reports will not be mailed at the end of the term. Students needing verification of grades or enrollment should request either an official transcript or an enrollment verification through the Office of the Registrar.

Department or College Policies

Feedback in a Timely Manner: The instructor will ONLY reply to e-mails that are sent using D2L email system. Please allow your instructor 24-48 hours before replying back to your email.

Quiz/Exam Policy: Two exams will be given throughout the semester. Students who are late to class on a day when an exam is administered will not be given extra time to complete the exam. Makeup exams **WILL NOT** be given.

Electronic Devices and Classroom Behavior Policy: In order to minimize the level of distraction, all beepers and cellular phones must be on quiet mode during class meeting times. Students who wish to use a computer/PDA for note taking need prior approval of the instructor since key clicks and other noises can distract other students. Recording of lectures by any method requires prior approval of the instructor. Students using a laptop in class should not check their email, browse the web, or in other way detract from the focus of the class.

Students are reminded to conduct themselves in accordance with the Student Code of Conduct (KSU Student Code of Conduct, Section III), as published in the Undergraduate and Graduate Catalogs. Every KSU student is responsible for upholding the provision. Students who are in violation of KSU policy will be asked to leave the classroom and may be subject to disciplinary action by the University.

Tutoring: The College of Computing and Software Engineering offers some tutoring services for certain courses. If this applies to your course, you may want to include this resource for your students. Tutoring info can be found here: http://ccse.kennesaw.edu/ccselabs/ccse-tutoring.php

Assistance out of Class: You may seek assistance outside of class from the instructor. When you seek help it is important that you bring the necessary materials with you so that we can effectively advise you. If you are seeking help with classroom work bring your text and your classroom notes. If you are seeking help with pencil and paper exercises bring your text, your classroom notes, and whatever attempts you have made with the exercises. If you are seeking help with a program, make sure you bring your code with the most current versions of files. Bring paper listings of these files. If you were getting error messages, record them as accurately as you can. Again, bring your most current versions of your work. The ability to help you is GREATLY reduced without the current versions.

Campus Policy:
Confidentiality and Privacy Statement (FERPA):
Kennesaw State University adheres to the Family Educational Rights & Privacy Act of 1974 - FERPA. See the following link for more information:
http://usg.edu/information_technology_handbook/section9/tech/9.5_privacy_and_security

University - Student Rights & Responsibilities:
Students of Kennesaw State University are entitled to an environment that is conducive to learning and individual growth. To this end, students enrolling at Kennesaw State University assume a responsibility to abide by the policies and regulations expressed in this section. By doing so, students may fulfill their responsibilities and enjoy the exercise of their own rights while also respecting the rights of others.

http://catalog.kennesaw.edu/content.php?catoid=27&navoid=2263

Ethics Statement:
All students are responsible for knowing the information, policies and procedures outlined in the Kennesaw State University Codes of Conduct. The KSU Codes of Conduct include: the general Student Code of Conduct, the Residential Code of Conduct, and the Code of Academic Integrity. Kennesaw State University reserves the right to make changes to this code as necessary and once those changes are posted online, they are in effect. Students are encouraged to check online for the updated versions of all policies.
http://scai.kennesaw.edu/codes.php

Sexual Misconduct Policy:
Kennesaw State University is committed to providing programs, activities, and educational environment free from all forms of sex discrimination. For more information click here. KSU issues this statement of policy to inform the community of the University's comprehensive plan addressing sexual misconduct, educational programs, and procedures that address sexual assault, domestic violence, dating violence, and stalking, whether the incident occurs on or off campus. This policy generally covers faculty, students, and staff of the University, as well as third parties. Third parties include but are not limited to guests, vendors, contractors, retirees, and alumni.
http://scai.kennesaw.edu/procedures/sexual-misconduct.php

Course Accessibility Statement (ADA Statement):
http://catalog.kennesaw.edu/content.php?catoid=27&navoid=2263&hl=FERPA&returnto=search#ADA

Academic Integrity:
Every KSU student is responsible for upholding all provisions of the Student Code of Conduct, as published in the Undergraduate and Graduate Catalogs. The Code of Conduct includes the following:

- Section II of the Student Code of Conduct addresses the University's policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to University materials, misrepresentation/falsification of University records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the University Judiciary Program, which includes either an "informal" resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct's minimum one semester suspension requirement.
- Students involved in off-campus activities shall not act in a disorderly or disruptive fashion, nor shall they conduct any dangerous activity.
- Students involved in off-campus activities shall not take, damage or destroy or attempt to take, damage or destroy property of another.

Institutional Syllabus Policies, Procedures, and Resources

Federal, BOR, & KSU Required Syllabus Policies and Student Resources

Course Schedule

Week/Date	Topic	Chapters	Assignment
1	Introduction and overview	0	
	Deterministic finite automata	1.1	

2	Nondeterministic finite automata	1.2	
3	Regular expression and Regular language	1.3	
	Non-regular language	1.4	HW1
4	Exam 1		
	Context free language	2.1	
5	Pushdown Automata	2.2	
	Non-Context free language	2.3	HW2
6	Exam 2		
7	Turing machine	3	
	Decidability	4	
8	Reducibility	5	
	Complexity and NP-completeness	7	HW 3
9	Exam 3		