San José State University
College of Science/Department of Compute Science
CS 154_s4: Formal Languages and Computability

Instructor(s):	Dr. Chung-Wen (Albert) Tsao
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Office Hours:	M/W 9:15 - 10:15am
Class Days/Time:	MW 13:30 - 14:45 PM
Classroom:	DH 250

Prerequisites: Math 42   Discrete Mathematics   Grade C- or better
CS 46B   Introduction to Data Structure   Grade C- or better

Class Meeting Dates: Jan 23, 2020 - May 11, 2020

Course Description
Finite automata, context-free languages, Turing machines, computability. Units: 3

Faculty Web Page and MYSJSU Messaging
Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on MySJSU Canvas. You are responsible for regularly checking with the email system through MySJSU at http://my.sjsu.edu to learn of any updates.

Course Learning Outcomes (CLO)
Upon successful completion of this course, students would be able to:
1. Understand the high-level building blocks of computer science.
2. Analyze and design deterministic and non-deterministic machines for various formal languages.
3. Describe regular languages in terms of regular expressions and vice versa.
4. Analyze and design pushdown automata for some formal languages.
5. Analyze and design Turing machines for some formal languages.
6. Describe the properties of various automata and formal languages.
7. Construct different type of grammars (regular, context-free, etc.) for some formal languages.
8. Use the pumping lemma to prove that some formal languages are not regular.
9. Describe decidability and classify problems as decidable or undecidable.
10. Describe computability and complexity of problems.
11. Categorize languages based on their complexities.
12. Be familiar with some open-questions in computer science.

Required Text: *Introduction to the Theory of Computation* (Third Edition), by Michael Sipser.
Optional Text: *Limits of Computation: An Introduction to the Undecidable and the Intractable*, by Edna E. Reiter, Clayton Matthew Johnson.

Other technology requirements / equipment / material
You will be **required** to bring a wireless laptop to classes for pop quizzes.

Assignments: There will be at least *eight* assignments in total. A randomly selected subset will be graded for each assignment.
- **Late assignments will NOT be accepted for any reason.**
- All homework must clearly indicate each student's name, course, and assignment number.
- Students are allowed (and actively encouraged) to form study groups.
- You may discuss solutions but you MUST write up the answers independently.
- If you use a website or reference book, you must cite it.
- If there are multiple similar submissions not exhibiting independent thought, or with words obviously lifted from a book or website, all such submissions will receive scores of 0.

Pop Quizzes: Unannounced quizzes may be given anytime during class. The purpose of pop quizzes is to encourage you to study and review the concepts and materials we discussed in the previous lecture. These will generally be problems covered in the previous lecture.

Exams: There will be two midterm examinations, and a cumulative final exam. Question types on the midterm and final exams may include multiple-choice, true/false, short-answer, and proof.

- Exam may NOT be taken before or after the scheduled time for any reason.
- No make-up exam for anyone with any reason.
- Books, notes, computers, translating devices, and cell phones will not be allowed during exams.
- All exams will remain with the instructor.

Grading:
- Pop Quizzes   (10%)
- Midterm exam 1   (20%)
- Midterm exam 2   (20%)
- Homework   (25%)
- Final exam   (25%)

Exam scores may be curved only if the average is below 65%
Final grades will not be adjusted in any way - so an 89.9% is still a B+.
No incomplete grades will be given.

The grading scale is as follows:

A+ beyond 92.5%	A 92.5%	A- 90.0%
B+ 87.5%	B 82.5%	B- 80.0%
C+ 77.5%	C 72.5%	C- 70.0%
D+ 67.5%	D 60.0%	F below 60.0%

Classroom Protocol and Other Notes
- **Absences in attending the first two lectures will be dropped out from the class.**
- **No late assignments will be accepted without advanced arrangement with the instructor.**
- **No incomplete grades will be given.**
- **No exam may be taken before or after the scheduled time for any reason**.
- **There is no make-up quiz, assignment, project, or midterm/final exam.**
- **No extra credit will be assigned. Grades will not be adjusted in any way.**
- Do not ask for special treatment. The rules for this course apply to everyone equally.

- Cheating will not be tolerable; a ZERO will be given to any cheated assignment/exams, and it will be reported to the Department and the University.
- Do NOT share/post online any course materials, PPT slides, or homework solutions.
- Audio or video recording of the lectures are NOT allowed.
- Use of electronic devices during exams is NOT allowed.
- You are required to check Canvas for reading/assignments.
- The information on this syllabus is subject to change; changes, if any, will be carefully explained in class, and it is your responsibility to become aware of them.
- Once the class starts, use Canvas Inbox to email me for a faster response. I check the Canvas Inbox emails much more often than my school emails.

Attendance

University policy F69-24 at http://www.sjsu.edu/senate/docs/F69-24.pdf states that students should attend all meetings of their classes, not only because they are responsible for material discussed therein, but because active participation is frequently essential to insure maximum benefit for all members of the class.

Consent for Recording of Class and Public Sharing of Instructor Material:

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor's permission to record the course: Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor's permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material. Course material cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.

University Policies

Per University Policy S16-9, university-wide policy information relevant to all courses, such as academic integrity, accommodations, etc. will be available on Office of Graduate and Undergraduate Programs' Syllabus Information web page at http://www.sjsu.edu/gup/syllabusinfo/". Make sure to review these policies and resources.

Tentative Course Schedule (This schedule is subject to change with fair notice via Canvas)

Week	Date	Topics	Chapter	Assignments *(Due dates posted in Canvas)*
1	Jan 27,29	Syllabus, Introduction	0	HW #1 Assigned
2	Feb 03,05	Finite Automata, DFA, NFA	1	
3	Feb 10,12	Regular Expressions, Regular Languages	1	HW #2 Assigned
4	Feb 17,19	Pumping Lemma	1	
5	Feb 24,26	Context-free Grammars,	2	HW #3 Assigned
6	Mar 02,04	Review, Midterm Exam I	0-1	
7	Mar 09,11	Push-down Automa	2	

8	Mar 16,18	Pumping Lemma, Context-free Languages	2	HW #4 Assigned
9	Mar 23,25	Turing Mahines	3	
10	Mar 30, Apr 01	Spring Break (March 30-April 3)		
11	Apr 06,08	Nondeterministic Turing Machines	3	HW #5 Assigned
12	Apr 13,15	Review, Midterm Exam II	0-3	
13	Apr 20,22	Decidable and Acceptable Languages	3	HW #6 Assigned
14	Apr 27,29	Decidability, Undecidability	4	
15	May 04, 06	Reducibility	5	HW #7 Assigned
16	May 11	Undecidable Problems, Review	5	HW #8 Assigned
17	May 18	Final Exam	0-5	1215-1430, Monday, May 18

SJSU ACADEMIC YEAR CALENDAR 2019/20