Greensheet

CS 154: Formal Languages and Computability
Spring 2016

San José State University
Department of Computer Science

Instructor Info

Name	**Ahmad Yazdankhah**	My name is difficult to pronounce!
Office	DH 282	It is a shared office and usually I don't use it!
Email	ahmad.yazdankhah@sjsu.edu	Please don't use my personal email.
Website	Under construction!	Our official educational web tools is Canvas.
Phone	(408) 924-5060	Email is the best way to communicate!
Office Hours	TR 1915 – 2000; MW 1915 – 2030	By appointment

Class Info

	Section 02	**Section 03**
Meeting time	TR 1630-1745	TR 1800-1915
Classroom	MacQuarrie Hall 422	MacQuarrie Hall 422
Course #	27506	27507
Final exam	Friday, May 20 @ 1445-1700	Thursday, May 19 @ 1715-1930
	MacQuarrie Hall 422	MacQuarrie Hall 422

Important Dates of Semester

Description	**Day**	**Month**	**Day #**	**Comment**
First day of instruction	Thursday	January	28	For MW classes, Monday February 1st
Last day to drop	Tuesday	February	09	
Last day to add	Tuesday	February	16	
Daylight saving time	Sunday	March	13	
Start of Spring Break	Monday	March	28	Until Friday, April 1st
Holiday	Thursday	March	31	Cesar Chavez Day
Last day of instruction	Monday	May	16	For TR classes, last day is Thursday May 12th

Course Brief Info

Catalog Description

Finite automata, context-free languages, Turing machines, computability.

Prerequisites

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

The Department of Computer Science strictly enforces prerequisites. If you are not already pre-enrolled, you must come to the first class meeting and pick up an Add-Form from the instructor. If applicable, show the instructor your card that indicates you're a graduating senior. It will be the instructor's and the department decision whether or not to send you an add-code by email.

Any student who does not show up during the first two class meetings may be dropped by the instructor.

Required Text

Peter Linz, "An Introduction to Formal Languages and Automata," 5th edition, Jones & Bartlett Learning

ISBN-13: 978-1449615529

Further Readings

The references at the end of each lecture note.

Course Detail Info

Course Learning Outcomes

1. Construct and use regular expressions and finite automata.
2. Turn a non-deterministic finite automaton into a deterministic one.
3. Minimize a deterministic finite automaton.
4. Construct and use context-free grammars and pushdown automata.
5. Construct and use simple Turing machines.
6. Describe the properties of various automata and languages.
7. Use pumping lemma technique to show non-membership in a language category.
8. Describe closure properties of languages, and state minimization of automata.
9. Describe decidability and classify basic problems as decidable or not.

Student Learning Outcomes

Upon successful completion of this course, students should be able to:

1. Construct deterministic and non-deterministic machines for various languages.
2. Describe a language in terms of a regular expression.
3. Find a regular expression for a language described by a finite automaton and conversely.

4. Write a grammar for a language.
5. Construct a deterministic finite automaton from a non-deterministic one.
6. Minimize a deterministic automaton.
7. Use a pumping lemma technique to show that some languages are not regular and/or not context-free
8. Use closure properties to simplify proofs of non-regularity of languages.
9. Construct a pushdown automaton accepting a given language.
10. Construct a Turing machine accepting simple languages.

Exams

Every week, there would be a short quiz and there would also be two midterms, and a final exam. All examinations could be partially closed book (concepts) and partially open book (practical).

Instant messaging, e-mails, texting, tweeting, and any other type of communications with anyone else during the exams are strictly forbidden.

Grading Policy

Assignments	40%
Quizzes	15%
Mid #1	10%
Mid #2	15%
Final	20%
Total	**100%**

Nominal Grading Scale

From	To	Grade
97	100	A+
92	96.99	A
90	91.99	A-
88	89.99	B+
82	87.99	B
80	81.99	B-
78	79.99	C+
72	77.99	C
70	71.99	C-
68	69.99	D+
62	67.99	D
60	61.99	D-
0	59.99	F

Your final grade can be adjusted depending on your level and quality of participation in the class activities and on your team members' assessments (if any) of your performance.

To practice time management, late submissions will lose 20% of the assignment total score and an additional 20% for each 24 hours after the due date.

Note that "All students have the right, within a reasonable time, to know their academic scores, to review their grade-dependent work, and to be provided with explanations for the determination of their course grades." See University Policy F13-1 for more details at http://www.sjsu.edu/senate/docs/F13-1.pdf for more details.

Workload

Success in this course is based on the expectation that students will spend, at least 6 – 10 hours per week for working on the homework, team works, and the programming assignments.

SJSU classes are designed such that in order to be successful, it is expected that students will spend a minimum of forty-five hours for each unit of credit (normally three hours per unit per week), including preparing for class, participating in course activities, completing assignments, and so on. More details about student workload can be found in University Policy S12-3 at http://www.sjsu.edu/senate/docs/S12-3.pdf.

Classroom Protocol

- Be on time! Coming late is disruptive.
- My classes are always interactive. So, participate in the class' activities as much as you can.
- Ask good questions and answer to the questions (in class and in the forum) as much as you can and get extra credit for them!
- Your cell phone should be in silent mode and should not be used during the lectures.
- Wireless laptop is required and it should remain closed until I inform you that it is needed for a particular activity.

Attendance is recommended, but is not mandatory, except for exam dates. Let's make a comfortable and respectful environment for presenting any ideas.

NOTE that 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. Attendance per se shall not be used as a criterion for grading."

University Policies

General Expectations, Rights and Responsibilities of the Student

As members of the academic community, students accept both the rights and responsibilities incumbent upon all members of the institution. Students are encouraged to familiarize themselves with SJSU's policies and practices pertaining to the procedures to follow if and when questions or concerns about a class arises. See University Policy S90–5 at http://www.sjsu.edu/senate/docs/S90-5.pdf. More detailed information on a variety of related topics is available in the SJSU catalog, at http://info.sjsu.edu/web-dbgen/narr/catalog/rec-12234.12506.html. In general, it is recommended that students begin by seeking clarification or discussing concerns with their instructor. If such conversation is not possible, or if it does not serve to address the issue, it is recommended that the student contact the Department Chair as a next step.

Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester's Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/latedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

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 and the following items to be included in the syllabus:

- "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."
  - It is suggested that the greensheet include the instructor's process for granting permission, whether in writing or orally and whether for the whole semester or on a class by class basis.
  - In classes where active participation of students or guests may be on the recording, permission of those students or guests should be obtained as well.
- "Course material developed by the instructor is the intellectual property of the instructor and 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."

Academic integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Course Schedule for TR Class Meetings

Note: this is a tentative schedule and is subject to change but with fair notice.

#	Day	Topics	Readings	Homework Due	Exams
1	01/28	Greensheet in detail; A big picture of the course; My background;			
2	02/02	Mathematical preliminaries	1.1		
3	02/04	Basic concepts and applications	1.2, 1.3	HW 1	
4	02/09	Deterministic finite automata (DFA)	2.1		Quiz 1
5	02/11	Nondeterministic finite accepter (NFA)	2.2	HW 2	
6	02/16	Equivalence of dfa and nfa; Reductions	2.3, 2.4		Quiz 2
7	02/18	Regular expressions and regular languages	3.1, 3.2	HW 3	
8	02/23	Regular grammars	3.3		Quiz 3
9	02/25	Review for mid 1		HW 4	
10	03/01	Midterm 1	End of Chap 3		Midterm 1
11	03/03	Closure of regular languages	4.1	HW 5	
12	03/08	Identifying Nonregular languages	4.2, 4.3		Quiz 4
13	03/10	Context-free grammars	5.1	HW 6	
14	03/15	Parsing and ambiguity	5.2, 5.3		Quiz 5
15	03/17	Transforming grammars	6.1	HW 7	
16	03/22	Normal forms	6.2, 6.3		Quiz 6
17	03/24	Nondeterministic pushdown automata (PDA); Context free Languages	7.1, 7.2	HW 8	
18	03/29	Spring Break			
19	03/31	Spring Break			
20	04/05	Deterministic PDA and deterministic Context free Languages	7.3		Quiz 7
21	04/07	Review for mid 2		HW 9	
22	04/12	Midterm 2	End of Chap 7		Midterm 2
23	04/14	Turing machines	9.1	HW 10	
24	04/19	Combining Turing machines; Turing thesis	9.2, 9.3		Quiz 8
25	04/21	Other models of Turing machines (1)	10.1, 10.2	HW 11	
26	04/26	Other models of Turing machines (2)	10.3, 10.4, 10.5		Quiz 9
27	04/28	Limits of algorithmic computations; Undecidable problems	12.1, 12.2	HW 12	
28	05/03	Other models of computation	13.1		Quiz 10
29	05/05	Rewriting systems	13.3	HW 13	
30	05/10	Introduction to complexity	14.1, 14.2		
31	05/12	2nd students' feedback about the course; Wrapping up the semester; where we are; what would be the next step? Review for final			

Final exam	**Section 02 (TR 1630-1745)**	**Section 03 (TR 1800-1915)**
Date and Time	Friday, May 20 @ 1445-1700	Thursday, May 19 @ 1715-1930
Venue	MacQuarrie Hall 422	MacQuarrie Hall 422