

Greensheet

CS 154: Formal Languages and Computability
Fall 2016, Sections 01, 02

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! I usually use MH 210.
Email	ahmad.yazdankhah@sjsu.edu	Please don't use my personal email.
Website	Under construction!	Our official educational web tools is Canvas at https://sjsu.instructure.com/
Phone	(408) 924-5060	Email is the best way to communicate!
Office Hours	MW 1915 – 2145	By appointment please!

Class Info

	Section 01	Section 02
Meeting time	TR 4:30pm – 5:45pm	TR 6:00pm – 7:15pm
Classroom	Duncan Hall 450	Duncan Hall 450
Course Number	48239	48240

General Events of Semester

Description	Day	Month	Day #	Comment
First day of instruction	Wednesday	August	24	For TR classes, Thursday August 25 th
Holiday	Monday	September	5	Labor day
Last day to drop	Tuesday	September	6	
Last day to add	Tuesday	September	13	
Daylight saving time	Sunday	November	6	
Last day to withdraw	Thursday	November	17	
Holiday	Wednesday, Thursday & Friday	November	23, 24, 25	Thanksgiving
Last day of instruction	Monday	December	12	For TR classes, last day is Thursday December

For academic events of this semester, please refer to the course syllabus at the end of this greensheet.

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 (CLO)

1. The basic concepts and applications of formal languages, grammars, and automata
2. Different type of automata machines such as: finite accepters, pushdown, and Turing machines
3. Different classes of formal languages
4. The concepts of deterministic and nondeterministic automata
5. The concepts of regular languages, regular expressions, regular grammars, their properties, and the relationship between them
6. The concept and application of context-free grammars
7. The basic concepts of computability and complexity

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 regular language in terms of regular expression and vice versa
3. Construct a regular expression for a language described by a finite automaton and conversely

4. Construct a grammar for a language
5. Construct a pushdown automaton for a language
6. Construct and use context-free grammars
7. Construct and use Turing machines
8. Turn a non-deterministic finite automaton into a deterministic one
9. Minimize a deterministic automaton
10. Use the pumping lemma technique to show that some languages are not regular or not context-free
11. Describe the properties of various automata and languages
12. Describe decidability and classify basic problems as decidable or undecidable
13. Describe computability and complexity of problems

Examinations and Evaluations

- Every week, there would be a short quiz and there would also be two midterms, and a final exam.
- All examinations will cover from the beginning of the semester.
- All examinations could be partially closed book (concepts) and partially open book (practical topics).

Grading Information

Assignments	20%
Project	10%
Quizzes	30%
Midterm #1	8%
Midterm #2	12%
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

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

Final Grade

Your final grade can be adjusted depending upon:

- Your level and quality of participation in the class activities
- Your team members' assessments (if any) of your performance

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](http://www.sjsu.edu/senate/docs/S12-3.pdf) 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.**
- Instant messaging, e-mails, texting, tweeting, and any other kind of communications with anyone else during the exams are strictly forbidden.
- Attendance is recommended, but is not mandatory, except for exam dates.
 - NOTE that [University policy F69-24](http://www.sjsu.edu/senate/docs/F69-24.pdf) 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.**”

Consent for Recording of Class and Public Sharing of Instructor's Material

- 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.

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](http://www.sjsu.edu/gup/syllabusinfo/) at <http://www.sjsu.edu/gup/syllabusinfo/>”

Course Schedule

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

#	Day	Topics	Readings	Homework	Exams
1	08/25	Greensheet in detail; A big picture of the course; My background;			
2	08/30	Mathematical preliminaries;	1.1		
3	09/01	Formal Languages (part 1); Checking prerequisites;	1.2	HW 1	
4	09/06	Formal Languages (part 2); Deterministic finite automata (part 1); Finalizing enrollments;	1.3, 2.1		Quiz 1
5	09/08	Deterministic finite automata (part 2);	2.1	HW 2	
6	09/13	Deterministic finite automata (part 3); Regular languages;	2.4		Quiz 2
7	09/15	Nondeterministic finite acceptor (part 1);	2.2	HW 3	
8	09/20	Nondeterministic finite acceptor (part 2);	2.2		Quiz 3
9	09/22	Equivalence of DFA's and NFA's;	2.3	HW 4	
10	09/27	Midterm 1	All Above		Midterm 1
11	09/29	Midterm 1 solution; Properties of regular languages	4.1	HW 5	
12	10/04	Pushdown automata (part 1);	7.1, 7.2		Quiz 4
13	10/06	Pushdown automata (part 2);	7.3	HW 6	
14	10/11	Turing machines (part 1);	9.1		Quiz 5
15	10/13	Turing machines (part 2);	9.2, 9.3	Term project	
16	10/18	Turing machines (part 3);	10.1, 10.2		Quiz 6
17	10/20	Turing machines (part 4);	10.3, 10.4	HW 7	
18	10/25	Non-regular languages; Pumping lemma (part 1);	4.3		Quiz 7
19	10/27	Pumping lemma (part 2);	4.3		
20	11/01	Midterm 2	All Above		Midterm 2
21	11/03	Midterm 2 solution; Regular expressions (part 1);	3.1	HW 8	
22	11/08	Regular expressions (part 2);	3.2		Quiz 8
23	11/10	Regular expressions (part 3);	3.2	HW 9	
24	11/15	Grammars (part 1);	1.2, 3.3		Quiz 9
25	11/17	Grammars (part 2);	3.3, 5.1	HW 10	
26	11/22	Grammars (part 3);	5.2, 5.3		Quiz 10
27	11/24	Holiday: Thanksgiving	-	-	-
28	11/29	Limits of algorithmic computation	12.1, 12.2		Quiz 11
29	12/01	Introduction to complexity (part 1);	14.1, 14.2		
30	12/06	Introduction to complexity (part 2);	14.4, 14.5		Quiz 12
31	12/08	Wrapping up the semester; where we are and what would be the next step? Review for final			

Final exam	Section 01 (TR 4:30pm – 5:45pm)	Section 02 (TR 6:00pm – 7:15pm)
Date and Time	Monday, December 19 @ 2:45pm – 5:00pm	Thursday, December 15 @ 5:15pm – 7:30pm
Venue	Duncan Hall 450	Duncan Hall 450