

**Class Hours:** T/TH 1:00 – 2:15 PM (Pacific Time)

<https://cpp.zoom.us/j/87216358413>

**Instructional Mode:** Fully Synchronous Online class

- Lectures will be recorded and made available on Blackboard

### **Instructor Information**

- [Dr. Daisy Sang](#)
- E-mail Address: [fcsang@cpp.edu](mailto:fcsang@cpp.edu)
- Zoom office Hours:
  - T/TH 9:30 – 10:00 AM <https://cpp.zoom.us/j/82764424290>
  - (Pacific Time) T/TH 2:30 – 3:00 PM
  - <https://cpp.zoom.us/j/88663081722> (Pacific Time) T/TH 5:00 – 6:00 PM
  - <https://cpp.zoom.us/j/87376643152> (Pacific Time)

### **Course Description**

This course studies various methods for specifying formal languages, including finite state automata, regular expressions, context-free grammars, and pushdown automata. In addition, closure properties, pumping lemmas, and normal forms will also be covered.

- Prerequisite: CS 2400 Data Structures with a grade of C or better, or consent of instructor.
- Textbook: Peter Linz, Introduction to Formal Languages and Automata, 6th Edition, Jones and Bartlett, 2016.
- Grading Policy:
  - In-Class Exercises (10%)
  - Homework (20%)
  - Midterm #1 (20%)
  - Midterm #2 (20%)
  - Final exam (30%)

### **Class Policies**

1. Class attendance and participation is an integral component to complete this course satisfactorily. If you miss a class, please watch the class video or contact a fellow classmate to get updated about the

materials covered in class. Lectures and demonstrations will not be repeated during office hours.

2. In-class exercises: All in-class exercises are due at 11:59 PM on Friday of that week the exercise is assigned. Please note that in-class exercises will not be graded, but participation points will be given for turning them in on time before due date. No credit for late submissions.
3. Homework: All homework assignments are due at 1:00 PM on the specified day. Homework solutions will be discussed in class, so late homework will not be accepted. If you cannot complete an assignment by the due date, please submit whatever you have completed for partial credit.
4. Exams: The exam dates are listed below in class schedule. Please mark your calendar now. **Make up for the exams are only provided in case of a documented emergency.**
5. Collaboration policy: Discussing and exchanging ideas are encouraged. You may help each other with your strategy for how to solve a problem. However, copying from outside sources (e.g. other students, Internet, etc.) on any material to be graded is not permitted and will be considered cheating. Cheating may result in failure of the assignment/exam and/or failure of the class. The University's policy on Academic Integrity will be enforced.
6. Email policy: You are required to check your Cal Poly email account and Blackboard every day for important course announcements.
7. If a class meeting needs to be shut down due to network failure or zoombombing, the class will reconvene in 10 minutes.
8. How to be successful in this class:

- Be mindful of your weekly effort. Do not procrastinate. There are deadlines associated with each assignment. Please do not wait until the last day to start.
- If you have any course related questions, please let me know asap. Since we are remote, you will need to exercise more personal initiative than if we were meeting face to face. You can contact me through email or attend zoom meetings during office hours. You can also connect with the rest of the class on discussion board.

## **Course Outline**

1. General Introduction  
Strings, Alphabets, and Languages Formal Language Theory
2. Finite State Automata (FSA) and Regular Expressions (RE)  
Basic Definitions Nondeterministic Finite State Automata Finite State Automata with  $\epsilon$ -moves  
Equivalence of FSA and REs
3. Properties of Regular Languages (RL)  
Non-Regular Languages Pumping Lemma for Regular Languages Closure Properties of Regular Languages Decision Properties of Regular Languages
4. Context-Free Grammars (CFG) and Pushdown Automata (PDA)  
Basic Definitions Right-Linear Grammars and Regular Languages Parsing and Ambiguity Equivalence of PDA and CFGs Deterministic Pushdown Automata Deterministic Context-Free Languages
5. Properties of Context-Free Languages (CFL)  
Normal Forms for Context-Free Grammars Non-Context-Free Languages Closure Properties of Context-Free Languages Decision Properties of Context-Free Languages

## **Class Schedule**

- Topics may be adjusted as we go.
- Exam dates will not change.

Week	Date	Topics
1	1/26	<b>Introduction</b>
	1/28	FSA
2	2/2	FSA
	2/4	NFSA
3	2/9	NFSA
	2/11	Convert NFSA to its equivalent DFSA
4	2/16	NFSA with e-moves
	2/18	NFSA with e-moves
5	2/23	NFSA with e-moves to its equivalent NFSA without e-moves
	2/25	Midterm #1 (1:00-2:15 PM)
6	3/2	RE
	3/4	RE
7	3/9	Equivalence of RE and FSA
	3/11	Equivalence of RE and FSA
8	3/16	Pumping Lemma for non-regular languages
	3/18	Pumping Lemma examples
9	3/23	Closure properties of RLs and decision algorithms
	3/25	Midterm #2 (1:00-2:15 PM)
	3/30	Spring Break
	4/1	
10	4/6	CFG
	4/8	CFG
11	4/13	RLG, Equivalence of RLs and RLLs
	4/15	Ambiguous CFG
12	4/20	Proper form CFG, CNF CFG
	4/22	PDA
13	4/27	PDA

	4/29	PDA
14	5/4	DPDA
	5/6	Equivalence of CFGs and PDAs
15	5/11	Non-context-free languages
	5/13	Closure properties of CFLs and decision algorithms
16	5/18 (TU)	Final exam (1:00-2:50 PM)