COMP 454: Analysis of Algorithms
Spring 2023

THIS IS A DRAFT SYLLABUS WHICH MAY BE UPDATED THROUGHOUT THE COURSE
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Instructor

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Course Information

COMP 454
Lecture time & place: Wednesdays 6:00-7:15, location: SIE1422
Course web page: http://prof.msoltys.com/?page_id=6646

Course Description

This course is an introduction to the theory of computation, from the point of view of languages over finite alphabets. We are going to start with Regular Languages, and the equivalence of several definitions: Finite Automata (deterministic and non-deterministic) and Regular Expressions (and applications to text search). The Pumping Lemma, and other approaches to showing that languages are not regular. We will continue with Context-free languages, and again the equivalence of several definitions: Context-free grammars and Push-Down Automata. We will finish with a version of the Pumping Lemma for Context-free languages. The final topic will be the Church-Turing thesis, and decidability.

Prerequisite: MATH 300 and Python programming language

Student Learning Outcomes (SLOs)

Upon a successful completion of the course you will be able to:

1. Describe sets of strings with different computational models.

2. Understand the computational power of different computational models.

3. Understands the limits of computability.

Course Outline

Topics in order:

1. Regular languages [1st month]

2. Context-free grammars [2nd month]

3. Turing machines [3rd month]

Textbook

We are going to use chapter 8 of the following book (PDF to be provided by the instructor): 3rd edition of *An Introduction to the Analysis of Algorithms*, by Michael Soltys, published by World Scientific (ISBN: 978-981-3235-90-8). See web page: http://www.msoltys.com/book, for additional material related to the textbook: slides, GitHub repository with solutions to programming problems and an errata sheet for the 3rd edition.

Grading

5 assignments, worth 10% each, and 10 quizzes worth 5% each.

1. First, it is part of solution development to have a back and forth between the instructor and the students, in order to understand fully the requirements and specifications. Thus, you should ask in class if anything about the assignment is not clear, as usually there are many implicit assumptions that must be made explicit.

2. Second, a programming problem solution will consist of Python code, well documented with comments, as well as a PDF submission explaining your solution and providing background. The PDF should contain at the top the names of the group members, and the assignment number and/or title. Please submit the two files separately (do not zip), so that they can be viewed directly in Canvas.

3. Third, working successfully in a group is part of the assignment; team members bring different talents, abilities and styles. It is normal to have frictions; learn to communicate with each other in order to resolve those frictions. This aspect of the assignment will not be graded directly, but it will be graded indirectly, in that if your team works well together, the final product will be better.

Grade determination

From	To	Letter Grade	From	To	Letter Grade
97	100	A +	77	79.99	C+
94	96.99	A	74	76.99	C
90	93.99	A-	70	73.99	C-
87	89.99	B+	67	69.99	D+
84	86.99	B	64	66.99	D
80	83.99	B-	60	63.99	D-
			0	59.99	F

Policies

1. **Academic Dishonesty:** By enrolling at CSU Channel Islands, students are responsible for upholding the University's policies and the Student Conduct Code. Academic integrity and scholarship are values of the institution that ensure respect for the academic reputation of the University, students, faculty, and staff. Cheating, plagiarism, unauthorized collaboration with another student, knowingly furnishing false information to the University, buying, selling or stealing any material for an examination, or substituting for another person may be considered violations of the Student Conduct Code (located at http://www.csuci.edu/campuslife/student-conduct/academic-dishonesty.htm). If a student is found responsible for committing an act of academic dishonesty in this course, the student may receive academic penalties including a failing grade on an assignment or in the course, and a disciplinary referral will be made and submitted to the Dean of Students office. For additional information, please see the faculty (located at https://senate.csuci.edu/policies/2013-2014/sp-13-06-policy-on-academic-dishonesty-rev-oct2016.pdf), also in the CI Catalog.

   The assignments will be written in groups. Each group has to work independently of the other groups; verbal discussions of problems among groups are allowed, but you should not show written notes, and you should not leave such discussions with written notes. Please speak to the instructor if these expectations are not clear.

2. **Disability Statement:** If you are a student with a disability requesting reasonable accommodations in this course, please visit Disability Accommodations and Support Services (DASS) located on the second floor of Arroyo Hall, or call 805-437-3331. All requests for reasonable accommodations require registration with DASS in advance of need: https://www.csuci.edu/dass/students/apply-for-services.htm. Faculty, students and DASS will work together regarding classroom accommodations. You are encouraged to discuss approved accommodations with your faculty.

3. **Course Policies Subject to Change:** It is the student's responsibility to check the course's web page frequently to stay abreast of the course, and for corrections or updates to the syllabus. Any changes will be posted there.