CS 3112 Analysis of Algorithms
Syllabus
Fall 2018

Lectures: Tuesdays and Thursdays: 3:10 - 4:00 pm
Lab: Tuesdays and Thursdays: 2:00 -3:10 pm

Instructor: Behzad Parviz
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Office Hours: Tuesdays and Thursdays: 11:00 am - 12:15 pm

Course Description: Methods for the design and analysis of correct and efficient computer algorithms; applications to classical problems of searching, sorting, graph optimization and combinatorial optimization.

Course Goals: At the end of the course, students are able to
1 Analyze the correctness and computational complexity of computer algorithms.
2 Design (specify and implement) efficient advanced Data Structures.
3 Know advanced design techniques and their nontrivial application to classic problems of searching, sorting, graph optimization and combinatorial optimization.

These course goals contribute to the success of Student Learning Outcomes 1.a, 1.d, 1.e, 5, and 6.

Prerequisites: CS 2013, CS 2148, Math 2120, and Math 2740

Textbook(s): Introduction to Algorithms (3rd Edition). By: Cormen, Leiserson, Rivest and Chapters 1 - 12 will be covered. Some sections will not be covered.

4 Jon Kleinberg, Eva Tardos. Algorithmic Design. Addison-Wesley, 2005
**Topics:**

1. **Mathematical Foundations:** Summation Formulas, Logarithms, Induction, Lower and Upper bounds, Asymptotic Notation, Recurrence Relations, Master Theorem, Loop Invariants.
2. **Analysis of the Correctness and of the Computational Complexity of Computer Algorithms.**
3. **Advanced Data Structures:** Binary Search Trees, Balanced Trees, Heaps, Indirect Heaps, Priority Queues, Dictionaries, Hash Tables, Union-Find.
4. **Graph Algorithms and Searching and Sorting Algorithms.**
5. **Design Techniques:** Divide and Conquer, Greedy and Dynamic Programming.

**Grading Policy:**

Homework (20 Points), Two Midterm Exams (each 20 Points), Final Exam (40 Points), Attendance 5 Points; Total 105 Points

- A Score \( \geq 90 \)
- B Score 80 - 89
- C Score 70 - 79
- D Score 60 - 69
- F Score 0 - 59

**Academic Integrity:**

Students are allowed and encouraged to discuss reading materials with each other. However, homework assignments must be solved and written individually. If you obtain a solution with help then you should acknowledge your source in the paper and then write independently your own solution. *Cheating will not be tolerated. Cheating on any assignment or exam will be taken seriously. All parties involved will receive a grade of F for the course and be reported to the Academic Senate.*

**General Policies:**

1. **Makeup Exams:** No.  **Late Homework:** No.
2. **Homework Assignments:** Homework assignments should be written or typed neatly on standard sized paper (8.5 x 11 inch), possibly in black or blue ink (please do not use red) and submitted at the due date (no electronic submissions accepted unless stated otherwise in class). Each page should be numbered. Late submissions will not be accepted.

**Final Exam:**

TBA

Reasonable accommodation will be provided to any student who is registered with the Office of Students with Disabilities and requests needed accommodation.

**Academic honesty statement:** Students are expected to do their own work and to abide by the University Policy on academic honesty, which is stated in the Schedule of Classes. Copying the work of others, cheating on exams, and similar violations will be reported to the University Discipline Officer, who has the authority to take disciplinary actions against students who
violate the standards of academic honesty.

Student responsibilities: Students are responsible for being aware of all announcements that are made in class, such as changes in exam dates, due dates of homework and papers, and cancellation of class due to instructor’s absence. Students are responsible for announcements made on days that they are absent.

Students must check their CSULA email account regularly for information from the instructor and the Department. Failure to do so may result in missed deadlines or other consequences that might adversely affect students. Note that you can forward this email account to any other account of your choosing.

NO MAKE-UP EXAMS, NO LATE HOMEWORK, AND NO INCOMPLETES!!!