

**CSCI-570: Analysis of Algorithms**

**Units:**

**Fall 2017—Vary—Vary:**

IMPORTANT:

The general formula for contact hours is as follows:

**Courses must meet for a minimum of one 50 minute session per unit per week over a fifteen-week semester. Standard fall and spring sessions require a final summative experience during the University scheduled final exam day and time.**

(Please refer to the *Contact Hours Reference,* located at [arr.usc.edu/services/curriculum/resources.html](http://arr.usc.edu/services/curriculum/resources.html).)

**Location:** http://www-bcf.usc.edu/~adamchik/570/

**Instructor:**

**Office:** Prof. Victor Adamchik

**Office Hours:** TBA

**Contact Info:** adamchik@usc.edu

**Teaching Assistant:**

**Office:**

**Office Hours:**

**Contact Info:**

**IT Help:**

**Hours of Service:**

**Contact Info:**

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**Course Description**

Explores fundamental algorithm design techniques such as greedy, divide and conquer, dynamic programming, the network flow for efficient algorithm construction. Examples include sorting, searching , string, graph, approximation, and linear programming algorithms.

**Learning Objectives**

Understanding of the design and analysis on algorithms for a variety of problems

Develop skills to reason about and prove properties of algorithms such as their correctness and running time.

Use the concept of approximation to find efficient algorithms for hard problems.

Use the theory of NP-completeness and other lower bounding techniques to argue for the difficulty of some problems.

**Prerequisite(s):** TBA

**Co-Requisite(s):** TBA

**Concurrent Enrollment:** TBA

**Recommended Preparation**: TBA

**Course Notes**

Final grades for the course will be determined by a curve. We will compute the letter grade cutoffs by setting the mean score to be equal a B-.

**Technological Proficiency and Hardware/Software Required**

NA.

**Required Readings and Supplementary Materials**

*Algorithm Design* by Jon Kleinberg and Eva Tardos

**Description and Assessment of Assignments**

There will be weekly homework assignments. We want you to submit your homework solutions via Desire2learn: http://courses.uscden.net. Homework assignments are assigned on a weekly basis. Homework assignments are collected, graded and returned to students but homework grades do not count towards final grades as indicated in the grading breakdown. Students are highly encouraged to submit homework assignments for grading since this provides them an opportunity to receive feedback on their work before exams. Also, homework assignments contain questions from previous exams and help familiarize students with the types of questions they can expect on exams. No late homework will be accepted unless approval is granted from the instructor in advance

**Grading Scale**

Final grades for the course will be determined by a curve.

**Assignment Rubrics**

**Assignment Submission Policy**

We want you to submit your homework solutions via Desire2learn: http://courses.uscden.net..

**Grading Timeline**

**Additional Policies**

No late homework will be accepted unless approval is granted from the instructor in advance.

**Course Schedule: A Weekly Breakdown**

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|  | **Topics/Daily Activities** | **Readings and Homework**  | **Deliverable/ Due Dates** |
| Week 1 | **intro, stable matching** | **Reading: chapter 1Home assignment 1** |  |
| Week 2 | **Review of algorithm analysis and basic graph algorithms** | Reading: chapters 2, 3Home assignment 2 |  |
| Week 3 | **Heaps, Huffman code, MST, Union-Find** | Reading: chapters 4Home assignment 3 |  |
| Week 4 | **amortized cost, shortest path** | Reading: chapters 4**Home assignment 4** |  |
| Week 5 | **divide and conquer, master theorem** | Reading: chapters 5**Home assignment 5** |  |
| Week 6 | **Exam 1** |  |  |
| Week 7 | **Dynamic Programming** | Reading: chapters 6**Home assignment 6** |  |
| Week 8 | **Dynamic Programming** | Reading: chapters 6**Home assignment 7** |  |
| Week 9 | **Network Flow** | Reading: chapters 7**Home assignment 8** |  |
| Week 10 | **Network Flow** | Reading: chapters 7**Home assignment 9** |  |
| Week 11 | **Exam 2** |  |  |
| Week 12 | **NP-completeness** | Reading: chapters 8**Home assignment 10** |  |
| Week 13 | **NP-completeness** | Reading: chapters 8**Home assignment 11** |  |
| Week 14 | **Approximation Algorithms** | Reading: chapters 11**Home assignment 12** |  |
| Week 15 | **Exam 3** |  |  |
| FINAL |  |  | **There is no final exam**  |

**Statement on Academic Conduct and Support Systems**

**Academic Conduct:**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>.  Other forms of academic dishonesty are equally unacceptable.  See additional information in *SCampus*and university policies on scientific misconduct, [http://policy.usc.edu/scientific-misconduct](http://policy.usc.edu/scientific-misconduct/).

**Support Systems:**

*Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call*

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.<https://engemannshc.usc.edu/counseling/>

*National Suicide Prevention Lifeline - 1-800-273-8255*

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. [http://www.suicidepreventionlifeline.org](http://www.suicidepreventionlifeline.org/)

*Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call*

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

*Sexual Assault Resource Center*

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website:<http://sarc.usc.edu/>

*Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086*

Works with faculty, staff, visitors, applicants, and students around issues of protected class.<https://equity.usc.edu/>

*Bias Assessment Response and Support*

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response.<https://studentaffairs.usc.edu/bias-assessment-response-support/>

*The Office of Disability Services and Programs*

Provides certification for students with disabilities and helps arrange relevant accommodations. [http://dsp.usc.edu](http://dsp.usc.edu/)

*Student Support and Advocacy – (213) 821-4710*

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic.<https://studentaffairs.usc.edu/ssa/>

*Diversity at USC*

Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. <https://diversity.usc.edu/>

*USC Emergency Information*

Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible, <http://emergency.usc.edu>

*USC Department of Public Safety –* *213-740-4321 (UPC) and 323-442-1000 (HSC) for 24-hour emergency assistance or to report a crime*.

Provides overall safety to USC community. [http://dps.usc.edu](http://dps.usc.edu/)