

Advanced Algorithms-78041-CS630-001

Fei Li*

- LECTURE TIME

August 27, 2018 - December 19, 2018: Tuesday: 7:20pm-10:00pm

- LOCATION

James Buchanan Hall D023

- COURSE WEBPAGE

GMU Blackboard CS630

- CREDIT

3

- TEXTBOOK

Algorithm Design, by Jon Kleinberg and Eva Tardos, 2006.

- PREREQUISITES

Grade of C or better in CS583

- OFFICE HOURS

2:00pm - 4:00pm, Mondays

- TA: TBD

- **email:** TBD

- **office:** TBD

- **office hours:** TBD

- GRADING POLICY:

- **assignments** (60%)

- **a final exam** (40%)

- [95, 100] : *A+*; [90, 94] : *A*; [85, 89] : *A-*; [80, 84] : *B+*; [75, 79] : *B*; [70, 74] : *B-*; [65, 69] : *C*; [0, 64] : *F*

- SYLLABUS (to be updated over time)

*Department of Computer Science, George Mason University. Email: lifei@cs.gmu.edu. Room 5326, Engineering Building

1	Introduction Greedy Algorithms	KT 4.7 (Clustering) KT 4.9 (Minimum-Cost Arborescences) KT Corresponding Exercises
2	Divide and Conquer	KT 5.4 (Finding the Closest Pair of Points) KT 5.5 (Integer Multiplication) KT Corresponding Exercises
3	Polynomials and the FFT (Divide and Conquer)	KT 5.6 (Convolutions and the Fast Fourier Transform) CLRS 30 (Polynomials and the FFT) KT and CLRS Corresponding Exercises
4	Network Flows	KT 7.3 (Choosing Good Augmenting Paths) KT 7.4 (The Preflow-Push Maximum-Flow Algorithm) KT 7.7 (Extensions to the Maximum-Flow Problem) CLRS 26.4 (Push-Relabel Algorithms) CLRS 26.5 (The Relabel-to-Front Algorithm) KT and CLRS Corresponding Exercises
5	Network Flows	KT 7.8 (Survey Design) KT 7.9 (Airline Scheduling) KT 7.10 (Image Segmentation) KT 7.11 (Project Selection) KT 7.12 (Baseball Elimination) KT 7.13 (Adding Costs to the Matching Problem) KT Corresponding Exercises
6	PSPACE	KT 9 (PSPACE: A Class of Problems Beyond NP) KT Corresponding Exercises
7	Extending the Limits of Tractability	KT 10 (Extending the Limits of Tractability) Corresponding Exercises
8	Approximation Algorithms	KT 11 (Approximation Algorithms) KT Corresponding Exercises
9	Approximation Algorithms	KT 11 (Approximation Algorithms) KT Corresponding Exercises
10	Local Search	KT 12 (Local Search) KT Corresponding Exercises
11	Local Search	KT 12 (Local Search) KT Corresponding Exercises
12	Randomized Algorithms	KT 13 (Randomized Algorithms) KT Corresponding Exercises
13	Randomized Algorithms	KT 13 (Randomized Algorithms) KT Corresponding Exercises
14	Randomized Algorithms	KT 13 (Randomized Algorithms) KT Corresponding Exercises

- POLICIES

Please note that all coursework is to be done independently. Plagiarizing the homework will be penalized by maximum negative credit and cheating on the exam will earn you an *F* in the course. See the GMU Honor Code System and Policies at George Mason University Honor

Code.

You are encouraged to discuss the material BEFORE you do the assignment. As a part of the interaction you can discuss a meaning of the question or possible ways of approaching the solution. The homework should be written strictly by yourself. In case your solution is based on the important idea of someone else please acknowledge that in your solution, to avoid any accusations.

- ACADEMIC HONESTY

The integrity of the University community is affected by the individual choices made by each of us. GMU has an Honor Code with clear guidelines regarding academic integrity. Three fundamental and rather simple principles to follow at all times are that: (1) all work submitted be your own; (2) when using the work or ideas of others, including fellow students, give full credit through accurate citations; and (3) if you are uncertain about the ground rules on a particular assignment, ask for clarification. No grade is important enough to justify academic misconduct.

Plagiarism means using the exact words, opinions, or factual information from another person without giving the person credit. Writers give credit through accepted documentation styles, such as parenthetical citation, footnotes, or endnotes. Paraphrased material must also be cited, using MLA or APA format. A simple listing of books or articles is not sufficient. Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

- DISABILITY STATEMENT

If you have a learning or physical difference that may affect your academic work, you will need to furnish appropriate documentation to the Disability Resource Center. If you qualify for accommodation, the DRC staff will give you a form detailing appropriate accommodations for your instructor.

In addition to providing your professors with the appropriate form, please take the initiative to discuss accommodation with them at the beginning of the semester and as needed during the term. Because of the range of learning differences, faculty members need to learn from you the most effective ways to assist you. If you have contacted the Disability Resource Center and are waiting to hear from a counselor, please tell me.