TEXAS A&M UNIVERSITY

# SYLLABUS

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|---|---|
| Course title and number | CSCE 629 - 602 Analysis of Algorithms |
| Term | Fall 2019 |
| Meeting times and location | M/W/F M/W/F 10:20 am-11:10 am @ HRBB 113 |
| Course webpage | https://fangsong.info/teaching/f19_629_alg/ |
| Piazza | https://piazza.com/tamu/fall2019/csce629602 |

## Course Description and Prerequisites

Algorithms are becoming a central technology for solving problems from a variety of fields. This course will cover the core techniques for designing and analyzing efficient algorithms. The focus will be on the key mathematical ideas and methods, as opposed to implementations.

Prerequisite: CSCE 411 or equivalent.

## Instructor Information

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|---|---|
| Name | Fang Song |
| Email address | fang.song@tamu.edu Start subject line with "f19-629". Use Piazza for quick response. |
| Office hours | M 1 - 3 pm and by appointment |
| Office location | HRBB 427B |

## Teaching Assistant

Abhishek Das. abkds@tamu.edu. Office hours & location: Th 1 - 3 pm @ HRBB 526

## Textbook and/or Resource Material

Required Text: [CLRS] Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest and Clifford Stein. *Introduction to Algorithms*, 3rd edition, MIT Press, 2009.

Other suggested texts:

- [KT] Jon Kleinberg, Éva Tardos. *Algorithm design*, Pearson Addison-Wesley, 2006.
- [E] Jeff Erickson. *Algorithms*, 2019. The author maintains an e-copy among other useful materials on his website.
- [DPV] Sanjoy Dasgupta, Christos Papadimitriou, and Umesh Vazirani. *Algorithms*, McGraw-Hill Higher Education, 2008.

## Grading Policies

**Homework:** 40%. Weekly assignments.
**Mid-term exam**: 25%.
**Final Exam**: 30%
**Participation**: 5%.

**Grading Scale**: A = 90-100 B = 80-89 C = 70-79 D = 60-69 F = <60

**Homework policy**:

- No late homework is accepted.
- Collaboration on homework problems is highly encouraged, but you must write up solutions entirely on your own and clearly list who you worked with for each problem and any other source you have used other than the text (a person, a book, a research paper, a webpage, etc.).
- All assignment submissions must be type-set using LaTeX and submitted in PDF format. A

tutorial and learning materials on LaTeX will be given.

- "I'll take 15%" option. You should be as clear and concise as possible when writing up your solutions. Partial credit will only be given for answers that make significant progress towards correct solutions. If you realize you cannot solve a problem, you may write "I'll take 15%" instead of your answer, so you get 15% for this problem (or part of the problem). But if you do write an answer, you will get 0 if your solution is completely wrong. There will be optional problems sometimes with bonus credit, and the "I'll take 15%" option does not apply.
- For each assignment, a subset of problems (randomly chosen and not known to you in advance) will be graded.

**Course Topics, Calendar of Activities, Major Assignment Dates***

| Week | Topic | Main Reading |
|---|---|---|
| 1 – 3 | Review. Asymptotic notations, recurrences, merge sort, divide-and-conquer, elementary graph algorithms. | CLRS 1 – 4, 22 |
| 4 – 6 | Dynamic programming. Take-home Mid-term in Week 7 covering materials from week 1 – 6. | CLRS 15, KT 6 |
| 7 | Greedy algorithms | CLRS 16 |
| 8 - 10 | Advanced graph algorithms. Shortest paths, network flow. | CLRS 24 – 26 |
| 11 | Algorithms for algebra and number theory. | CLRS 28, 31 |
| 12 - 13 | NP, NPC, approximation algorithms. | CLRS 34 – 35 |
| 14 – 15 | Selected topics: randomized algorithms, convex optimization, quantum algorithms. | CLRS 5, 29, DPV 10 |
| 16 | Final exam on Dec. 10, 8 – 10 am. | |

* Check course webpage for details and updates

**Americans with Disabilities Act (ADA)**

The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you believe you have a disability requiring an accommodation, please contact Disability Services, currently located in the Disability Services building at the Student Services at White Creek complex on west campus or call 979-845-1637. For additional information, visit http://disability.tamu.edu.

**Academic Integrity**

*For additional information please visit: http://aggiehonor.tamu.edu*

*"An Aggie does not lie, cheat, or steal, or tolerate those who do."*