

BILL, RECORD LECTURE!!!!

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Advice on Theory Courses

Why Give This Talk?

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These questions cannot be asked in a vacuum. One should look at **all** of the theory courses and see what makes sense within them to take.

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Actually you should look at **all** of the courses and see what makes sense; however, I will just talk about what I know—the theory courses.

\geq 400-level Theory Courses offered in Spring 2022

1. CMSC 423: Bioinformatic Algs, DB, Tools—by Pop. (Does not count for req.)
2. CMSC 451: Algorithms—by Childs.
3. CMSC 452: Elt Theory of Computation—by Kruskal
4. CMSC 454: Algorithms for Data Science—by Srinivasan
5. CMSC 456: Cryptography— by Adams, Katz, Dachman-Soled.
6. CMSC 457: Introduction to Quantum Computing—by Wu.
7. CMSC 475: Combinatorics and Graph Theory—by Wong. (Does not count for req.)
8. CMSC 752: Ramsey Theory and its “Applications”—by Gasarch.
9. CMSC 858D: Grad Comp Bio—by Patro. (Do not know if counts for req.)
10. CMSC 858F: Alg Lower Bounds—by Hajiaghayi. (Do not know if counts for req.)

I will only discuss the courses that satisfy theory req.

CMSC 451–Algorithms

Elevator Talk Given a problem I want to design an efficient algorithm for it.

If you liked 351 you will like 451.

Good for the coding interview

We've had a STICS course on the coding interview

Stuff every CS major should know, but you can learn on your own

CMSC 452—Elementary theory of Computation

Elevator Talk I want to look at models of computation so that I can state and prove that certain problems are hard to solve. Or hard given $P \neq NP$.

If you liked 250 and 330 you will like 452.

Used to be stuff every CS major should know Not sure if it still is.

CMSC 454—Algorithms for Data Science

Elevator Talk Algorithms to deal with **large** data sets. Relevant to ML!

If you liked 320 you will like 454

Will be stuff every CS major should know within 5 years

Relatively New Course

CMSC 456—Cryptography

Elevator Talk Encrypting, Decrypting, and cracking codes.

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I doubt any of you will be taking it in the Spring.

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I doubt any of you will be taking it in the Spring.

But I'll take this opp to remind you:

If you take 456 you should also take 414 to get the full picture.

CMSC 457—Introduction to Quantum Computing

Elevator Talk Quantum computing will do wonderful things!

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Someday!

If you liked Linear Algebra you will like 457.

Will be stuff every CS major should know within 105 years

You can't learn this on your own or elsewhere

You don't have to know Physics but you do need to be good at Math

CMSC 752—Ramsey Theory and its “Applications”

Elevator Talk Total Disorder is Impossible! No matter how you 18-color N , there will be two numbers, a square apart, that are **the same color**.

If you liked 250 and like Math you will like 752.

Will never be stuff every CS major should know

You can't learn this on your own or elsewhere

The Divide

CMSC 451 and 452 are “important”

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CMSC 451 and 452 are “important”

CMSC 457 and 752 are “cool”