

Logic & Computability

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Fall 2024/25

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Syllabus

W	Date	Covers	Subject	Announce	Submit
1	30 th Sep	1	Introduction to Logic and Computability	TP	
2	07 th Oct	1	Propositional Logic, Proof, Deduction, Induction		
3	14 th Oct	1	Predicate Logic	A1	
4	21 st Oct	1	Second Order Logic		
5	28 th Oct		Republic Day 		
6	04 th Nov	1, 2	Verification with Model Checking		
7	11 th Nov	2, 3	Computation with Boolean Circuits and Automata		
-	18 th Nov		Fall Break		
8	25 th Nov	2, 3	Turing Machine's Limit, Oracles, Reducibility	A2	A1
9	02 nd Dec	1, 3	Polynomial Complexity Classes		MT
A	09 th Dec	3, 4	Space and Probabilistic Complexity	A1 _G	
B	16 th Dec	3, 4	Pseudorandomness, One-Way Functions and Cryptography	MT _G	
C	23 rd Dec	5	Derandomization and Cryptologic Models		A2
D	30 th Dec	5	Computational Learning Theory		
E	06 th Jan	7	Quantum Computing (BQP), Quantum XOR-gate, Shor's Algorithm	A2 _G	TP

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Formalization

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Fundamental Question

- ✓ How do you think?

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Initial formalizations

- ✓ Compass and straightedge
 - ✗ squaring the circle, trisecting an angle, doubling the cube
- ✓ Cartesian coordinates
 - ✗ Every step is an application of $+$, $-$, $\times$, $\div$, $\sqrt{}$
 - ✗ How many times is enough?
- ✓ Euclid's GCD *algorithm*
 - ✗ See rational sieve [Wikipedia, 2024]

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Bibliography

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References

[Wikipedia, 2024] Wikipedia (2024). Rational sieve. https://en.wikipedia.org/wiki/Rational_sieve.

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