

18.781: THEORY OF NUMBERS

SPRING 2023 SYLLABUS

“An elementary introduction to number theory with no algebraic prerequisites. Primes, congruences, quadratic reciprocity, diophantine equations, . . .”

INSTRUCTOR	Minh-Tâm Trinh (mqt@mit.edu)
TIME & PLACE	MWF 12–1 PM, Room 2-147
TEXTBOOK	Stillwell, <i>Elements of Number Theory</i> (softcover reprint)
GRADING	30% Problem Sets ($\times 6$) 45% Tests ($\times 3$) 25% Final Exam
WEBPAGE	https://math.mit.edu/~mqt/math/teaching/mit/18-781/

(TENTATIVE) SCHEDULE

2/6–2/10	1. Natural numbers and integers 2. The Euclidean algorithm	
2/13–2/17	3. Congruence arithmetic	Set 1 due (2/13)
2/20–2/24	Interlude: Groups	Presidents’ Day (2/20)
2/27–3/3		Set 2 due (2/27) Test 1 (3/3)
3/6–3/10	5. The Pell equation	<i>Add Date (3/10)</i>
3/13–3/17	6. The Gaussian integers	
3/20–3/24		Set 3 due (3/20) Test 2 (3/24)
3/27–3/31		Spring Break
4/3–4/7	7. Quadratic integers	Set 4 due (4/3) (4/10)
4/10–4/14	9. Quadratic reciprocity	
4/17–4/21		Patriots’ Day (4/17) Set 5 due (4/19) (4/24) Test 3 (4/21)
4/24–4/28	10. Rings	<i>Drop Date (4/25)</i>
5/2–5/5	11. Ideals	
5/8–5/12	11. Ideals 12. Prime ideals	Set 6 due (5/8)
5/15–5/26	Special topics; exam period	

LOGISTICS

Emails. If you need to email me about the course, **please put “18.781” in the email subject**. That helps me keep everything organized! In the email opening, you may address me as “Minh-Tam” or as “Dr. Trinh”.

Problem Sets. We will use Gradescope for submitting and grading problem sets. They will always be due at 11:59 PM on the date indicated.

If you submit a problem set late, then a penalty multiplier will be applied to your raw score. The multiplier is

$$0.9^{\lceil t/(24 \text{ hours}) \rceil},$$

where t is the time elapsed past 11:59 PM on the due date. Once the penalty has been applied, your raw score will be rounded up to the nearest integer (or half-integer) value.

To get full points on a proof-based problem, **you should write in complete sentences**. The grammar does not have to be perfect. You do not have to rewrite the problem statement itself.

Tests. These will be held during class time. You will not be allowed to use calculators, phones, or any other machines while taking a test.

Attendance. There is no attendance grade. But if you attend regularly, the course will be more fun for all of us.

If you get sick, **please don’t come to class!** (Regardless of whether it’s COVID or something else.) Stay at home, take care of yourself, and notify me as soon as possible. We will use Zoom to allow people to watch talks online and/or record them for later.

Office Hours. By appointment.