

## MATH 465 NUMBER THEORY SPRING 2025 SYLLABUS

**Class number:** 20734, **Class ID:** 029556

**Instructor:** Bob Vaughan, 335 McAllister

**Email:** rcv4psu.edu

**Web:** <https://personal.science.psu.edu/rcv4/>

**Office Hours:** MWF 02:15–03:20 and otherwise by arrangement.

**Class:** MWF 1:25–2:15 Thomas 216.

**Text:** • A Course of Elementary Number Theory, <https://personal.science.psu.edu/rcv4/CENT.pdf>

• An alternative is LeVeque, Fundamentals of Number Theory, Dover, ISBN–10:0486689069, ISBN–13:978-0486689067.

• For background reading see:

Davenport, The Higher Arithmetic, CUP, ISBN–10: 0521722365, ISBN–13: 978-0521722360

Hardy & Wright, An Introduction to the Theory Of Numbers, 6th Edition, OUP, ISBN-10 9780199219865, ISBN-13 978-0199219865

Niven, Zuckerman & Montgomery, An Introduction to the Theory of Numbers 5th Edition, Wiley, ISBN-10 0471625469, ISBN-13 978-0471625469.

**Homework:** Submit Mondays on Canvas or Wednesday when Monday is a holiday.

First homework due Wednesday 22nd January.

**Grading:** • Homework 35%,

• First Midterm Exam: In class Wednesday 5th February 5%,

• Second Midterm Exam: In class Wednesday 5th March 10%,

• Third Midterm Exam: In class Wednesday 9th April 15%,

• Final Exam 35%,

**Grades:** A 90–100%, B 80–89%, C 70–79%, D 60 - 69%, F 0 - 59%. These ranges may be adjusted downward and the  $\pm$  grades will be within the appropriate ranges. There is **NO** extra credit work. Late homework will not be except by prior arrangement in extenuating circumstances. In no circumstances will homework be accepted after the graded ones have been returned to the students.

No makeup exams are available except by prior arrangement in extenuating circumstances.

**Topics.** The Integers and Unique Factorisation, Chapter 1.

Euclid's Algorithm, Chapter 2.

Congruences and Residue Classes, Chapter 3.

Primitive Roots, Chapter 4.

Quadratic Residues, Chapter 5.

Sums of Squares, Chapter 6.

Arithmetical Functions, Chapter 7.

The Distribution of Primes, Chapter 8.

If there is time some other topics will be chosen from

Diophantine Equations and Algebraic Number Theory.

**Course objective.** By the end of the course the student should be familiar with the basic principles that underpin our understanding of the properties of the integers.

- All Penn State Policies regarding academic integrity apply to this course. Academic integrity is the pursuit of scholarly activity in an open, honest and responsible manner. Academic integrity is a basic guiding principle for all academic activity at The Pennsylvania State University, and all members of the University community are expected to act in accordance with this principle. Consistent with this expectation, the University's Code of Conduct states that all students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts.

Academic integrity includes a commitment by all members of the University community not to engage in or tolerate acts of falsification, misrepresentation or deception. Such acts of dishonesty violate the fundamental ethical principles of the University community and compromise the worth of work completed by others.

- Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. Student Disability Resources (SDR) website provides contact information for every Penn State campus

<https://equity.psu.edu/offices/student-disability-resources>

For further information, please visit Student Disability Resources website

<http://equity.psu.edu/sdr/>

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: See documentation guidelines <http://equity.psu.edu/sdr/guidelines>

If the documentation supports your request for reasonable accommodations, your campus disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early as possible. You must follow this process for every semester that you request accommodations.

- Many students at Penn State face personal challenges or have psychological needs that may interfere with their academic progress, social development, or emotional wellbeing. The university offers a variety of confidential services to help you through difficult times, including individual and group counseling, crisis intervention, consultations, online chats, and mental health screenings. These services are provided by staff who welcome all students and embrace a philosophy respectful of clients' cultural and religious backgrounds, and sensitive to differences in race, ability, gender identity and sexual orientation.

Counseling and Psychological Services at University Park (CAPS)

(<http://studentaffairs.psu.edu/counseling/>): 814-863-0395

Counseling and Psychological Services at Commonwealth Campuses

(<https://studentaffairs.psu.edu/counseling/caps-campuses>)

Penn State Crisis Line (24 hours/7 days/week): 877-229-6400. Crisis Text Line (24 hours/7 days/week): Text LIONS to 741741

- Consistent with University Policy AD29, students who believe they have experienced or observed a hate crime, an act of intolerance, discrimination, or harassment that occurs at Penn

State are urged to report these incidents as outlined on the University's Report Bias webpage (<http://equity.psu.edu/reportbias/>)

- When searching for help with your course, your instructor will always be the best resource for advice. The University is aware of fraudulent companies and scammers who prey on a student's desire for assistance with coursework. A student who hires someone to do work on their behalf demonstrates a clear example of a violation of academic integrity highlighted above. Sharing login credentials with others is also in violation of Penn State Policy AD95 and may be subject to additional disciplinary action. Furthermore, a fraudulent company and/or scammer may extort the student by threats to communicate the student's arrangement with the University. If you find yourself in such a situation, it is best to contact your instructor immediately.