

## Math 255: Elementary Number Theory Spring 2022

The course website is <https://www.uvm.edu/~cvincen1/math255.html>.

**Logistical Information:** This course counts for 3 credit hours, and meets on MWF 9:40am-10:30am in person in Lafayette L107 or on Teams. Please see your UVM email or Teams/Outlook calendar for meeting links if you wish to join remotely.

**Instructor Information:** Professor Christelle Vincent, available on Teams or in Innovation E445.

For content (i.e. mathematical) questions, please post your question to Campuswire. For personal matters, please reach me by email at [christelle.vincent@uvm.edu](mailto:christelle.vincent@uvm.edu) or message me on Teams.

All course information is available on our course website, including assignments, readings, etc. Announcements will be communicated through Teams.

**Textbook:** *Elementary Number Theory*, 2nd edition, by Underwood Dudley. There will be assigned reading from the book, so you should have access to a copy.

It is not recommended that you use a copy of a different edition, since the homework problems will come from the 2nd edition and the numbering may be different.

**Course Description and Goals:** In Math 255 we will study properties of integers, more particularly congruences, prime numbers, and quadratic reciprocity. The class is aimed at students with no or limited knowledge of abstract algebra.

The goals for this class are the following:

1. To solidify your conception of mathematics as a language and a way to make sense of and solve problems
2. For you to become proficient in proof writing
3. To help you become confident in your ability to learn mathematics from a book
4. To teach you some cool facts about integers and for you to become comfortable with some number-theoretic algorithms

**Office Hours:** I am available to meet in person on Monday, Wednesday and Friday immediately after class; if possible please let me know in advance if you wish to meet with me (email or Teams message is fine). I am also available for office hours on Teams by appointment; please contact me by email or on Teams to set up a meeting time. For asynchronous help (especially after business hours), please consider posting on Campuswire.

**Attendance:** You are expected to attend every lecture, either in person or remotely. If for whatever reason you cannot attend lecture, you are responsible for watching the recording or getting the notes from a classmate. There is no penalty for missing any in-class activity.

**Religious accommodations:** Students have the right to practice the religion of their choice. If you believe you might need accommodations to take part in religious celebrations, please submit in writing to me by the end of the second full week of classes your religious holiday schedule for the

semester. Because of the flexibility of the class I do not expect many issues, but I am happy to chat.

**SAS:** In keeping with University policy, any student with a documented disability interested in utilizing accommodations should contact SAS, the office of Student Accessibility Services (previously ACCESS). Once you have your accommodation letter from them, I will be available to meet with you privately to discuss the accommodations you plan to use in this course.

**Grading:** You will have a fair amount of latitude in what you choose to turn in for your grade in this class. There is **no penalty** for missing any work; however, you do need to turn in work to earn points in the class.

The class will be graded out of 400 points. Students who have earned 360 points or more will earn an A (A-, A, or A+, with exact cutoffs to be determined later in the semester); students who have earned between 320 and 359 points will earn a B (B-, B, or B+); students who have earned between 280 points and 319 points will earn a C (C-, C, or C+); students who have earned between 240 and 279 points will earn a D; students who have earned 239 points or fewer will get a failing grade.

To earn 400 points this semester, your goal should be to earn approximately 33 points each week. Every week, you will have the opportunity to turn in:

- One online reading quiz worth 10 points, due on Monday morning at 9:40am. This is a firm due date and there will be no extensions.
- Some in-class activities worth at least 10 points in total. These activities can be completed either during synchronous class or when you view the class recording later on, but must be turned in by Sunday at 11:59pm. This is also a firm due date and there will be no extensions.
- A metacognition reflection encouraging you to think about your learning in the class worth 5 points. This must be turned in by Sunday at 11:59pm. This is also a firm due date and there will be no extensions.
- A variety of homework assignments, depending on the material we are covering. There will be some programming assignments, some computations-by-hand assignments, some proof assignments, and whatever else I come up with. All homework has a final due date of May 11 at 11:59pm, but you are strongly encouraged to complete homework every week.
- Some bigger projects, as appropriate. All projects have a final due date of May 11 at 11:59pm.

Finally, if you can think of any other work that you would like to do that you think is relevant to this class, please contact me, and we can set up a custom assignment for you. This can include a short report on anything you have read related to the class, any explorations you have done that are related to the class, or other ideas that you might have.

Grades will be posted on Blackboard so you can keep track of how you are doing.

**Grade boosters:** You can earn a “grade booster” which will raise your earned letter grade by one letter unit (from B- to B, or from A to A+, etc.) in the following ways:

- Submit 8 out of 12 online reading quizzes; and/or
- Submit some in-class work for 8 out of 12 weeks (does not need to be all days); and/or

- Submit 8 out of 14 metacognition reflections; and/or
- Earn a Level 3 reputation on Campuswire.

Boosters are stackable; for example if you fulfill three of the conditions above your grade will be raised a whole letter grade (from C- to B- for example). If you fulfill all four your grade will be raised a whole letter grade plus one unit.

**Pause weeks:** There will be two weeks this semester where no new material will be covered. During those two weeks class attendance will be optional. There will not be new homework, online reading quiz, or in-class activities, though there will be the opportunity to turn in a metacognition.

**Graduate credit:** To obtain graduate credit in this class, students must attempt all assigned proof homework. They will be marked with a star on the course website. The grade does not matter, but all problems must be attempted.

**Statement on diversity:** Mathematics can be learned and enjoyed by everyone, regardless of gender, age, race, sexual orientation, or other personal characteristics. As a group we will work to create a space where we all feel welcomed and encouraged, and any actions or speech that detract from this atmosphere will not be tolerated.

In particular, we will be mindful of encouraging others to let us know if they do not already know something and do everything to support them in their learning. We will not say that things are “trivial.” We will offer corrections gently and with the intention of helping the other, as opposed to making ourselves feel good.

**Recording of class time:** Our class sessions will be audiovisually recorded for students in the class to refer back to, and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and use a profile image which you are comfortable with having on a recording. Likewise, students who un-mute during class or speak up in person are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the “chat” feature, which allows students to type questions and comments live. If you are attending in person you can send me a Teams chat using your cell phone. The recordings will only be available to the instructor and other students via Teams.

**Course evaluations:** All students are expected to complete an evaluation of the course at its conclusion. These will be anonymous and confidential, and the constructive criticism offered will be used to improve subsequent versions of the course.

**Intellectual property statement:** Students are prohibited from publicly sharing or selling academic materials that they did not author (for example: class syllabus, outlines or class presentations authored by the professor, practice questions, text from the textbook or other copyrighted class materials, etc.); and students are prohibited from sharing assessments. Violations will be handled under UVM’s Intellectual Property policy and Code of Academic Integrity.

**COVID-19 policies:** The University of Vermont reserves the right to make changes in the course offerings, mode of delivery, degree requirements, charges, regulations, and procedures contained herein as educational, financial, and health, safety, and welfare considerations require, or as necessary to be compliant with governmental, accreditation, or public health directives.

The Green and Gold Promise clearly articulates the expectations that UVM has for students, faculty, and staff to remain compliant with all COVID-19 recommendations from the federal CDC, the State of Vermont, and the City of Burlington. The Code of Student Conduct outlines policies related to violations of the Green and Gold Promise. Sanctions for violations include fines, educational sanctions, parent notification, probation, and suspension.

**Statement about academic integrity:** The University strives to provide an environment that encourages all students (undergraduate, medical, graduate, and continuing education) to learn, create, and share knowledge responsibly. As society entrusts our students and faculty to pursue knowledge and report their discoveries truthfully, any deliberate falsehood or misrepresentation undermines the stature of the University. The following standards of academic integrity are deemed necessary for fulfilling the University's mission, as well as its motto: *Studiis et Rebus Honestis* ("For honorable studies and pursuits"). These standards are also necessary for evaluating the quality of student work in a fair manner. For further information, please visit <https://www.uvm.edu/sites/default/files/UVM-Policies/policies/acadintegrity.pdf>.

**Statement on alcohol and cannabis in the academic environment:** As a faculty member, I want you to get the most you can out of this course. You play a crucial role in your education and in your readiness to learn and fully engage with the course material. It is important to note that alcohol and cannabis have no place in an academic environment. They can seriously impair your ability to learn and retain information not only in the moment you may be using, but up to 48 hours or more afterwards. In addition, alcohol and cannabis can:

- Cause issues with attention, memory and concentration
- Negatively impact the quality of how information is processed and ultimately stored
- Affect sleep patterns, which interferes with long-term memory formation

It is my expectation that you will do everything you can to optimize your learning and to fully participate in this course.

**Statement on Student Athletes:** In order to be excused from classes, student athletes should submit appropriate documentation to the Professor in advance of all scheduling conflicts within the first two weeks of class. Those missing class are expected to submit make-up assignments within a reasonable time period.