

## Introduction to Number Theory - Math 430 (3 credits) – Spring 2021

**Instructor:** Dr. Brent Hancock

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**Class times:** N/A (online)

**Office hours:** Tues & Thurs 10:30-11:20 am or by appointment

Office hour visits: I plan on using Blackboard Ultra via Canvas to run office hours virtually. Plan ahead and bring your prior work so I can best assist you 😊

**Email Correspondence:** I will respond to student communications during business hours (M-F, 8am-5pm). You can typically expect a reply within approximately 24 hours, not including weekends. If you email me with questions about specific homework problems, I can be most helpful if you send pictures of what you've tried so far or provide a brief explanation of what you've tried so far.

### Course Resources:

- Access to Canvas online at <http://canvas.cwu.edu> (this is where I will post course handouts/notes, video links, assessments, grades, policies, announcements etc. so it is important that you log on regularly).
- Some type of calculator (graphing or scientific). Cell phones may not be used as calculators during exams.

### Course Description:

This course introduces students to selected topics in number theory. In this course, students will apply fundamental concepts and algorithms in elementary number theory to solve problems and prove certain results. Students will form conjectures and collaboratively explore those conjectures by generating examples/counterexamples and formal proof. Learner objectives, outcomes and skills will likely include, but may not be limited to:

- Solving problems and proving results related to divisibility
- using the Euclidean Algorithm to find the greatest common divisor
- understanding and using the Fundamental Theorem of Arithmetic to compute and solve a variety of problems
- applying the Chinese Remainder Theorem
- understanding and applying Fermat's Little Theorem
- solving linear congruence equations
- investigating some famous historical theorems about number theory
- computing Pythagorean Triples and solving related problems

### Online Layout:

Because of the coronavirus pandemic, this course will be run remotely online. Naturally this modifies how the day-to-day layout will look. For this course, I will post links on Canvas to Youtube videos that I have created specifically for Math 430.

**\*\*IMPORTANT\*\***: You will NOT be required to meet at synchronous times with the whole class. You will only be graded on the assessments listed in the table on page 3. That said, I will be available for (optional) virtual office hours during the listed times on Tues/Thurs if you have questions along the way.

The course videos are labelled according to “Day,” i.e. Day 1, Day 2, etc. Given that this is a 3-credit course, I will typically upload videos for 3 “Days” per week (what would have normally been our MWF classes). The videos are “unlisted” so you will have to access them through the provided links. Often each “Day” will contain multiple videos. You will also be assigned a “Daily Homework” problem or problems following most course “Days.” These Daily HW problems will not typically be collected, but are designed for you to think about course content after each Day so that you are prepared to watch the subsequent Day’s video. Sometimes a Daily HW problem will show up on a subsequent homework set that will be collected.

### **What the main course assessments look like at a glance (more details on the next page):**

- Weekly homework sets (submitted virtually)
- A mastery portfolio of select revised homework problems
- 2 “midterm” exams and a comprehensive final exam

### **Important policies:**

- No late work is accepted without *prior arrangements* made with me due to extenuating circumstances.
- Don’t cheat, and don’t plagiarize. Respect the CWU Student Conduct Code (<http://app.leg.wa.gov/WAC/default.aspx?cite=106-125>)
- I follow CWU’s policies and recommendations for academic misconduct.

## **COURSE ASSESSMENT DETAILS**

### **Homework sets:**

So that you can practice the essential skills, procedures, and proofs in the course, there will be homework sets collected approximately once per week. The due date of each homework set will be indicated as each set is assigned. Some problems on the homework sets will include further practice of skills developed during class, while others will ask you to explore and prove new results that build on the existing ideas discussed during class. Students are encouraged to work together on homework sets, but each student must submit their own writeup.

### **Mastery Portfolio:**

Students will submit a portfolio at the end of the quarter comprised of select homework problems from throughout the course. The problems submitted will be revised solutions of problems previously submitted. The rationale behind this portfolio is to allow students to demonstrate mastery of particular topics that they might not have fully grasped earlier in the course. You will submit in your portfolio up to one homework problem per homework set. If you received a perfect score on a homework set then you do not have to include any problems from that set in

your mastery portfolio. More details about the submission and contents of the mastery portfolio will be provided on Canvas at a later time.

### **Midterm Exams and Final Exam:**

We will have two “midterm” exams in this class. Upcoming dates for these exams will be posted on Canvas in “Modules” well before the exam is scheduled to occur. We will also have a cumulative final exam covering all the material from this course.

### **\*\*Important Note about Exams and HW**

Please note that there will be no makeup exams or HW assignments. Exceptions will only be granted if you miss an exam due to a *verifiable and documented* medical emergency or other university-authorized absence and have given me *appropriate advance notice*. Please consult the University student handbook for details on what is considered to be a University-authorized absence, and provide me with a written request ASAP (i.e. before the drop deadline) if you think you will have a conflict with any test dates.

### **COURSE GRADE CALCULATION**

<b>Weight</b>	<b>Assessment category (grading scale)</b>
25%	Homework Sets
5%	Mastery portfolio
40%	“Midterm” Exams (2)
30%	Final Exam

### **Letter grades will be assigned as follows:**

A- 90.0 - 92.9%	A 93.0 - 100%	
B- 80.0 - 82.9%	B 83.0 - 86.9%	B+ 87.0-89.9 %
C- 70.0 - 72.9%	C 73.0 – 76.9%	C+ 77.0 - 79.9%
D 60.0 - 69.9%		
F 0 - 59.9%		

**Accommodations for students with disabilities:**

Students who need accommodation of their disabilities should contact me privately to discuss specific accommodations for which they have received authorization. If you need accommodation due to a disability, please register with Disability Support Services. They may also be reached via email at ([DS@cwu.edu](mailto:DS@cwu.edu)).

**Changes to the syllabus:**

I reserve the right to make modifications to this syllabus at any time. In the event of such changes, I will notify the class and upload a revised syllabus on Canvas.