

Spring 2021 Math 260.A01 Sets and Logic
M-F, 11:00 - 11:50 am

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Office Hours: M-F 1:00-1:50 pm and by appointment.

Course Goals: Math 260 is an introduction to the structures of mathematical proof. We will introduce basic set notation, set theory (often referred to as “naive set theory”), logic, quantifiers and some methods of proof: various types of direct proof, proof by contradiction, and proof by induction. We will also introduce and practice good mathematical thinking. Mathematical thinking is characterized by clarity and precision, and so is important in a wide variety of areas, including computer programming. To practice mathematical thinking, we will work with basic number theory and basic set theory.

Required Text: Harper, James D.; Logic, Sets and Proof: An Introduction CWU coursepack (available from the Wildcat Shop)

In principle, we intend to cover the whole book. We may skip a few sections, and we might not finish the whole book, but we will cover as much as possible in the time allotted.

An important element in familiarizing you with proofs is writing. You will do a lot of writing in this class. Unlike calculus, there will rarely be long calculations with lots of algebra. Rather, you will have to *describe* (in complete sentences) your thought process, and justify the steps you take. In many situations, you will “know” the “right” answer ahead of time, and so the main point is to explain why that answer is in fact correct. This rarely a matter of a simple calculation (although sometimes it is). Notice that explanation involves words, and as a result, solutions that don’t involve any words will never earn full credit!

1 Grades/Quizzes/Homework/Exams

Grades

Grades will be calculated using the following weighting system:

Homework: 5%;

Quizzes: 40%;

Exams: 55% total, broken up as follows: 15% for each mid-term and 25% for the final.

	87 – 89.9 : B+	77 – 79.9 : C+	67 – 69.9 : D+	below 60 : F
93 – 100 : A	83 – 86.9 : B	73 – 76.9 : C	63 – 66.9 : D	
90 – 92.9 : A–	80 – 82.9 : B–	70 – 72.9 : C–	60 – 62.9 : D–	

Quizzes

We will have a quiz every week, except for those weeks when we have an exam. Each quiz will be due on the Friday of the week it is assigned, at 4 pm. I encourage you to work with other students, but you should write up your solutions in your own words. **DO NOT COPY!** Because life is likely to happen to all of us this quarter, your lowest quiz score will be dropped.

Homework

There are two types of homework: reading questions, and book problems.

1. Reading questions will be a question or two based on some reading from the book. Reading questions will be assigned in class and will be due an hour before class the following day. It is always acceptable to answer these questions with “I don’t know”, but in that case you must explain the part (or parts) of the question that you don’t

understand. The goal of reading questions is to give me an idea **before class** of where difficulties are arising, and so answers to reading questions may not be turned in late. Reading questions will be worth 1 point each.

2. Book problems (as the name suggests) are homework problems from the book. **Problems assigned on a Wednesday or later will be due on the Friday of the following week at 4 pm.** (For example, problems assigned on March 31, April 1, 2, 5, or 6 will all be due at 4 pm on Friday, April 9.) Homework will be graded on completion. This means I'll be most interested in seeing that you have made a good-faith effort to do a problem. It is a good idea to work with other students from class. We won't have time to do many homework problems in class, so please feel free to ask during office hours. However, please do not put off asking about homework until the day before it's due! Each set of book problems will be worth five points.

Submitting Work Electronically: All work for this course will be submitted electronically through Canvas.

1. Book Problems, Quizzes, and Exams may only be submitted in .pdf format, and your submission must consist of a **SINGLE PDF FILE**. That is: you may **NOT submit a separate file for each page of your work! You must combine all parts of your submission into a single pdf prior to submission!** Your submission must be less than 20 MB, and fewer than 15 pages. Submissions that do not meet these guidelines will earn zero points.
2. If you choose to hand-write your homework, you have a couple of options for submission:
 - (a) You can scan it to a PDF document using a cell phone camera. Some apps that do this (there are many others if you don't like these): Adobe (free) or CamScanner (free version) for Android phones; the Notes App (built-in) or CamScanner (free version) for iPhone.
 - (b) You can take a well-lit, in-focus photograph, insert it into a Microsoft Word or OpenOffice Writer document (making sure that the photo is oriented correctly and easy to read), and then save the document as a .pdf file for upload to Canvas.

Whichever method you choose, please double-check that your image is oriented correctly. Images not oriented correctly, images that are not well-lit, or images that are out of focus will lead to the assignment being returned without being graded.

Late Policy for Book Problems and Quizzes

Quizzes and book problem homework will be due at 4 pm on Fridays. Quizzes or book problem homework submitted after 4 pm on their due date will have 4 points deducted, and 4 more points will be deducted every 24 hours after. That means: if you submit a quiz at 4:30 pm on Friday, you can earn at most 16 out of 20 on that quiz. If you submit your quiz one day on Saturday at 4:30 pm, you can earn at most 12 out of 20, since over 24 hours will have passed. In addition, no credit can be earned for quizzes or book problem homework submitted after graded work is returned to the class. This will typically be before class on Monday.

Exams

There will be three exams: two mid-terms and a final. You will have two hours to complete the mid-terms, and three hours to complete the final. The first mid-term must be completed in the 24 hour period between 4 pm, Tuesday, April 10 and 4 pm, Wednesday, April 11. The second mid-term must be completed in the 24 hour period between 4 pm Tuesday, May 11 and 4 pm, Wednesday, May 12. The final exam must be completed between noon

Wednesday, June 9 and 10 am, Friday, June 11. Notice that once you begin your exam, you will only have the allotted time or until the window closes, so plan ahead to make sure that you have an uninterrupted time period to work. Exams must be submitted electronically, so please make sure that you have the necessary tools to submit your work. The Final Exam will be cumulative. If you are unable to take an exam in the allotted time frame, you may be eligible for a make-up. To get a make-up, you must notify me before the exam (if possible) or within 24 hours after the exam that you will not be able to take it. In addition, a make-up is only allowed if you have proof of a compelling reason for having missed the exam. Make-ups will not be given for circumstances you know about ahead of time! When a make-up exam cannot be taken before I return the corrected exam, I reserve the right to instead replace that portion of your course grade with your final exam grade. These considerations also apply to the final: **IF YOU MISS THE FINAL BECAUSE YOU OVERSLEPT OR HAVE THE WRONG DATE OR TIME, YOU DO NOT GET A MAKE-UP FINAL!**

2 Important Dates

April 5 - Last Day for Add/Drop

April 20 (4 pm) to April 21 (4 pm) - first mid-term exam

May 11 (4 pm) to May 12 (4 pm) - second mid-term exam

May 13 - uncontested withdrawal deadline

June 9 (noon) to June 11 (10 am) - final exam

3 General Class Policies

Come to class — attendance is considered necessary for success! We will occasionally do things that are not in the book — you are responsible for all material covered in class! Do your own work. Work really hard; this class is likely to be quite difficult, but you will leave it with a useful set of skills that will be applicable in your future math and computer science courses.

Face Coverings and Social Distancing: Due to COVID-19, and under the directive and mandate of public health officials and the president of Central Washington University, students must adopt face covering protocol before entering any classroom or building at CWU until further notice. Students must also follow the social distancing placement marks in buildings and classrooms. If you do not have a face covering Central Washington University can provide one for you. If you have not yet received your CWU-supplied facial covering, please go to the SURC Information Desk. Please do so prior to the start of your first class. Face coverings must cover both the mouth and nose. Your mask protects me; my mask protects you. Masks with one-way valves for exhalation do not provide protective value for others — please don't use them as your face covering for any in-person interactions. Thank you for helping keep all of us safe!

Class Recordings: Attendance is considered mandatory, and you should plan to attend synchronously on an ongoing basis. Lecture/discussion will be recorded and posted on Canvas for those who can't attend synchronously on a given day. We all benefit from the conversations in-class, and they will be richer for having you there! One of the points of attending classes is to have an expert in the content area provide you with guidance in that content area, and be able to respond to any questions you may have. In addition, we may have some period of class where you will be in a small group with others to outline and write a proof. If you do not attend, you miss out on the substantial benefit these small group interactions provide.

When attending virtually, please turn on your camera if that is reasonable given your situation, bandwidth issues, etc. If you cannot turn on your camera, please use a profile picture on Zoom that matches your profile picture on Canvas (and please put one up on Canvas) so that we don't have to look at a sea of initials!

Academic Honesty: Consult university policies (CWUP 5-90-040(22), CWUR 2-90-040(22), and WAC 106-125-020) for student conduct, cheating, plagiarism, and other academic expectations. CWU's policies and recommendations for academic misconduct will be followed, leading to disciplinary action up to and including failing the course.

Inclusivity Statement: As a member of a peer learning community, a high degree of professionalism is necessary. **CWU expects every member of the university community to contribute to an inclusive and respectful classroom culture.**

Classroom Conduct: Students in this class are expected to interact with students and the professor professionally. Instances of disruptive conduct, obstructive conduct, or harassment (see definitions from the Washington Administrative Code: WAC 106-125-020) will be referred to the Dean of Student Success.

Disability Support Services: Central Washington University is committed to creating a learning environment that meets the needs of its diverse student body. Students with disabilities should contact Disability Services to discuss a range of options to removing barriers, including accommodations: Hogue Hall 126, 509.963.2214, DS@cwu.edu

Religious Obligations and Schedule Conflicts: In compliance with RCW 28B.137.010, Central Washington University makes every effort to deal reasonably and fairly with students who, because of religious obligations, have conflicts with scheduled exams, assignments or required attendance. Students must present written notice to their instructor *within the first two weeks of class* listing the specific dates on which accommodations are required. Contact the Dean of Student Success at (509) 963-1515 for further information or questions.

Communication: This is going to be an unusual quarter in many ways. Some of you are completely remote. Some of us may need to quarantine in the middle of the quarter. In all things, communication is key. If you have something going on, please let me know (no details you don't feel comfortable sharing, of course, just a general heads-up). Please do this even if you're not sure that whatever is going on will affect your class performance! As things need to change during the quarter, I will do my best to let you know as soon as I can. In all things, please extend grace to me and your classmates, and I will do my best to do the same. I will try to respond to email sent between 9 am and 4 pm, Monday through Thursday within three hours. Emails sent later in the evening may not be responded to until the next day. In addition, beginning Friday afternoon and continuing on through Saturday and Sunday, I may only check my email once or twice a day.

I reserve the right to change the policies contained in this syllabus as dictated by developments during the quarter.