

Welcome to Math 260 Sets and Logic – Winter 2019

Section 1: 10:00 - 10:50 am M-F in SAMU 149

Section 2: 2:00 - 2:50 pm M-F in SAMU 128

Instructor: Dr. Jean Marie Linhart

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Office Hours: M-Th 3:05 - 3:50 pm
and by appointment

The best ways to contact me are email, Canvas message, and office hours. If there's something I need to remember for later PLEASE put it in email or Canvas message! If I don't reply within 24 hours over a business day, please contact me again. While I strive to be responsive and prompt, sometimes things get put off for later and unintentionally forgotten.

Prerequisites: MATH 173 with a grade of C or higher or MATH 172 and CS 301 with grades of C or higher.

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

We are going to cover almost the entire book over the course of the quarter.

Reading the book will help you to master the material for this course, but reading a math book (or any academic text) isn't like reading a newspaper article or a novel. You should have paper out next to you where you are simultaneously taking notes of important points and vocabulary encountered in the text. You should also note any questions that you have. Bring your notes to class and be sure your questions get answered. I will provide you with some "guided notes" to fill in while you are reading the book. Try reading the book and filling these out at home before coming to class.

Course Goals

If a number is divisible by 4, then it is even. By the previous statement, what do you know if you know if a number is not divisible by 4? You might think you know the number is also not even, like 3 or 5, but this is not true, as 2 and 6 are examples of even numbers that are not divisible by 4, and that are even. This sentence simply doesn't tell you anything about numbers that are not divisible by 4, and it shouldn't. Being precise in our words and using careful logic in our thinking is the subject matter for this class.

We go over elementary logic and truth tables, rules of inference, which apply both to mathematics and the logic used in constructing code and the values of variables in computer science. For mathematics majors, this course helps increase your mathematical maturity and gets you the logical foundations for proof-writing which is an (in many cases the) essential facet of the discipline. Proofs must be mastered even by computer scientists and other applied mathematicians, as theoretical mathematics gives us the practical tools we use to actually compute things and that tell us that algorithms are correct and eventually terminate.

Critical thinking and writing are two crucial areas for success in the workplace, and these are the important ingredients for success in this class. Instead of long calculations and graphs, this class requires you to describe your thought process, and justify the steps you take.

I look forward to being your guide on this journey!

Grades/Exams/Homework

Grades

Grades are based on 4 exams, worth 92% of the final grade (23% each). The remaining 8% of the final grade is based on homework, class participation, and attendance.

Grades will be calculated using the following scale:

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

Assignments, due dates, and grades will be posted to Canvas.

Exams

There will be three in-class midterm exams and a final exam. All exams in this class are cumulative. Each in-class exam will be written so that a student can complete it in 50 minutes. The final exam may be slightly longer.

Attendance for the exams is mandatory. The dates are at the end of this syllabus. In order to make up a missed exam you must have a documented excused absence. In other words, if you are sick that day, you need a doctor's note.

Homework, Attendance and Class Participation

Students are expected to be in class daily. I take attendance daily. Pay attention and actively engage with what we are doing. I will give you opportunities to think through ideas in lecture, try to think ahead and proactively ask yourself to answer the questions we discuss. Take good written notes, jotting down thoughts and ideas in the margins to explain what is going on.

We will have a graded written assignment most weeks, and additional ungraded practice will be required for success. The purpose of homework problems are to help you learn the material, and determine what you understand well and where you have questions that you need to have answered. Please get your questions answered.

Present your work neatly, in logical order. Work that is difficult to read may not be read or graded. First restate the question if it is not already on your paper, then present your solution. Always include a graph or diagram if needed. When possible, use a ruler to make truth-tables. Stop and write a sentence or three to explain what is going on.

Late and Make-up Policy

Field trips, illnesses, accidents and deaths in the family are a part of life. I will arrange to take late work or for a make-up or alternative if you contact me either ahead of time or within 24 hours and provide documentation.

Because even professionals sometimes run into conflicts, I will accept at most **one** late homework assignment, no questions asked, for full credit, provided it is handed in at the beginning of the next class period, or if you get my written (emailed) agreement to hand it in later.

Emailing or Canvas messaging me with information about absences and late work will help to make sure there's a documentation trail in case I don't remember a verbal conversation. I often don't remember verbal conversations.

You must provide a documented excuse (doctor's note, accident report) to make up a missed exam.

Office Hours and Getting Help

Office hours are scheduled to make sure there is a time that you can come see me because you have questions on course material or have issues that you otherwise want to talk to me about. I welcome your visit, and office hours will be scheduled during the first week of class when I know what will best fit my students' schedules. Keep in mind, it is impossible for me to schedule office hours at a time convenient to everyone, and I encourage you to ask for an appointment if you need one. I also strive to promptly answer questions posted over email or by Canvas message.

We've all needed help with something. Working with students on math and to succeed in school and in their future career is one of the best parts of my job. If you have questions on course material or need to If you find yourself feeling uncertain, wanting a deeper understanding, wanting to get better grades, or struggling to learn and succeed, please take advantage of opportunities to ask questions in class, post questions on Canvas, and come see me. I want to answer all your questions thoroughly, even though it may not be possible to answer every question during class itself. Please give me a chance to help. If you can't attend office hours, you are welcome to ask questions by email or by Canvas message. If you want an appointment, please send me an email and suggest several times when you are available so we can find a mutually convenient time to meet.

Academic Integrity

You have to do your own practice in order to gain a new skill; we all know this. Most of academic integrity is simply making the work you hand in reflect the understanding in your brain. Since understanding something while you are reading it or looking at or having someone explain it to you it is often different

from being able to explain or produce it yourself, write up your homework by yourself when you've put all the other resources away.

All in-class quizzes and tests are expected to be done without any resources except those explicitly authorized by the instructor. Please be discreet about discussing exams and quizzes when others may not yet have taken the exam or quiz. Someone may be taking an exam or quiz at a later time than you are.

Students with Disabilities

I am happy to work with students with disabilities. To set up academic adjustments in this class, you should give me a copy of your *Confirmation of Eligibility for Academic Adjustments* from the Disability Support Services Office and come see me in office hours or make an appointment to come see me as soon as possible so we can discuss how the approved adjustments will be implemented in this class. Students without this form should contact the Disability Support Services Office, Hogue 126, dssreceipt@cwu.edu, <https://www.cwu.edu/disability-support/>, phone (509) 963-2171. **Testing requests with testing services must be submitted at least 48 hours before an exam is given, or you will have to take the exam with the rest of the class.**

Important Dates

Jan 9 – Last Day for Add/Drop

Jan 21 – MLK Day, no classes

Jan 25 – First Exam

Feb 15 – Second Exam

Feb 15 – Uncontested withdrawal period deadline

Feb 18 – Presidents Day, no classes

Mar 1 – Third Exam

Mar 8 – Last day of classes

Mar 15 – Section 1: 8-10 am Final exam; Section 2: 12-2 pm Final Exam

Math 260: Tentative Schedule / Reading:

Changes to the schedule will be announced in class; changes to the exam schedule will also be posted to Canvas.

Th Jan 3	Introduction, 1.1 Statements, Logic
F Jan 4	1.1 Statements, Logic and 1.2 Biconditional, Logical Equivalence and Implication
M Jan 7	1.2 Biconditional, Logical Equivalence and Implication
T Jan 8	1.2 and 1.3 Sets and Predicates
W Jan 9	1.3 Sets and Predicates
Th Jan 10	1.3 and 1.4 Quantifiers
F Jan 11	1.4 Quantifiers
M Jan 14	1.4 Quantifiers
T Jan 15	1.4 Quantifiers and 1.5 Rules of Inference
W Jan 16	1.5 Rules of Inference
Th Jan 17	1.6 Negations
F Jan 18	1.6 Negations
M Jan 21	MLK Holiday – no class
T Jan 22	1.7 Distributive and Factor laws for \vee and \wedge
W Jan 23	1.7 and 1.8 The Conditional Redux and 2.1 Direct Proof and Existential Proof
Th Jan 24	Catch up or Review
F Jan 25	Exam 1
M Jan 28	2.1 Direct Proof and Existential Proof
T Jan 29	Proof outlines and 2.2 Divisibility
W Jan 30	2.2 Divisibility
Th Jan 31	3.1 Sets, subsets and set operations
F Feb 1	3.2 Proofs and sets
M Feb 4	3.2 Proofs and sets
T Feb 5	2.3 The Division Algorithm and Prime Factorization
W Feb 6	2.3 The Division Algorithm and Prime Factorization
Th Feb 7	2.3 The Division Algorithm and Prime Factorization
F Feb 8	2.3 The Division Algorithm and Prime Factorization
M Feb 11	2.4 The Contrapositive Proof
T Feb 12	2.4 The Contrapositive Proof
W Feb 13	2.4 The Contrapositive Proof
Th Feb 14	♥ (Valentine's Day) Catch up or Review
F Feb 15	Exam 2
M Feb 18	President's Day – no class
T Feb 19	2.5 Proof by Cases
W Feb 20 9	2.5 Proof by Cases
Th Feb 21	2.6 Reduction ad Absurdem; Proof by Contradiction
F Feb 22	2.6 Reduction ad Absurdem; Proof by Contradiction
M Feb 25	2.7 Logs and Contradiction
T Feb 26	2.7 Logs and Contradiction
W Feb 27	5.1 and 5.2 Induction
Th Feb 28	Catch up or Review
F Mar 1	Exam 3
M Mar 4	5.2 Induction
T Mar 5	5.2 Induction
W Mar 6	5.2 Induction
Th Mar 7	4.1 What is a Function?
F Mar 8	4.2 One-to-one and Onto Functions
M Mar 11	Finals Week Office Hours 10:30-11:30 am
F Mar 15	Final exam section 1: 8 am
F Mar 15	Final exam section 2: 12 pm