

## Welcome to Math 260 Sets and Logic – Fall 2015

**Section 1: 10:00 - 10:50 M-F in Bouillon 110**

**Section 2: 1:00 - 1:50 M-F in Hertz 118**

**Instructor:** Dr. Jean Marie Linhart

**Phone:** (509) 963-2123

**Webpages:** (course) <http://canvas.cwu.edu>  
(me) <http://www.cwu.edu/math/jean-marie-linhart>

**Office:** Bouillon 119

**E-mail:** [jmlinhart@cwu.edu](mailto:jmlinhart@cwu.edu)

**Office Hours:** M-Th 2:00 - 2:50 pm  
and by appointment

**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.

It is very important that you read the appropriate sections from the book before lecture. 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.

### Course Goals:

If it is not raining, then Kit will go for a run. But, given the previous statement, what do you know about whether Kit runs when it is raining? You might think she's not going to go for a run, but the sentence simply doesn't tell you anything about what happens if it rains. 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 (possibly the) essential facet of the discipline.

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.

## Grades/Exams/Homework

Assignments and grades will be posted to Canvas.

### Grades

Grades will be calculated using the following weighting system:

Quizzes and Homework: 30%;

Midterm Exams: 40% (20% each)

Final Exam: 30%

and the following scale:

	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–	

### Homework

We will have a graded written assignment most weeks. These problems are to help you learn the material.

Present your work neatly, in logical order. First restate the question if it is not already on your paper, then present your solution. Use your words to explain what is going on, and always include a graph or diagram if needed. Use a ruler to make truth-tables.

### Quizzes

We will have a weekly in-class quiz on Friday. These should take 10-15 minutes to complete. It will be on the material recently covered in class up through Wednesday. Your lowest quiz score will be dropped.

## Exams

There will be three exams: two in-class mid-terms and a final. The first mid-term is scheduled for Friday October 16, the second mid-term is scheduled for Wednesday November 18, and the Final Exam will be on Thursday December 10. If there are changes to the mid-term dates, they will be announced in class and on Canvas. The Final Exam will be cumulative.

## Late and Make-up Policy for Graded Assignments, Quizzes and Exams

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.

I expect you to hold yourself to professional standards in this class. 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. Likewise, you may make-up one in-class quiz, no questions asked, within 2 business days of the missed quiz.

Emailing 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.

## 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, try to write up your home work 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. Do not discuss exams and quizzes with others who may not yet have taken the exam or quiz or within earshot of anyone who may be taking the exam or quiz at a later time. It is entirely possible for someone to be taking an exam or quiz at a later time than you are.

Cheating will result in at minimum a zero on the assignment, quiz or exam. Cheating will be reported to the office of student conduct. Egregious offenses may result in a failing grade for the course and/or more serious consequences as merited by the situation.

## Getting Help:

We've all needed help with something. Working with students on math is one of the best parts of my job. If you find yourself feeling uncertain, wanting a deeper understanding, wanting to get better grades, or struggling to learn and succeed, please 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, please send me an email and suggest several times when you are available so we can find a mutually convenient time to meet.

## Secrets for Success:

1. Read the book before class and take notes on what you read.
2. Attend class daily and participate willingly, whether it is by asking questions, answering questions, or working with others.
3. Budget time for homework – a minimum of 10 hours per week for work outside of class. It can help to have a regular times when you know you'll work on math.
4. Start on the homework problems as soon as you can.
5. Attempt to work on your math every day or at least every other day. The hardest part is usually getting started. Find a quiet place to work, get your book and notes together. Put away distractions such as your cell phone, TV, or laptop. Then, set a timer for 30 minutes (or 15 if you are having a bad day) and resolve to put your best effort in for at least that length of time.
6. Discussing problems and solutions with peers and using the internet is encouraged, with two caveats.
  - Before you go ask or look for a solution, make an honorable effort to solve the problem on your own. Spend time thinking and strategizing before asking or searching for help.

- You must write up your understanding of a solution **on your own**. Practice makes perfect! See my [guide to group work and using outside resources](#), <http://www.cwu.edu/math/group-work-and-using-outside-resources>, on the web.
7. As you progress in your university studies and in your career, problems get more and more difficult to solve. You may have to start with easier (possibly unassigned) problems before you are even ready to start to work on an assigned problem. Some problems may take more than an hour to solve. Persistence pays off.
  8. Explain what you are doing. Use your words. This will help you to understand the concepts critical to success in the class, and will help you get a higher grade.
  9. I am always happy to help you if you are stuck. You will get the most out of my help and the University Math Center if you attempt the problem on your own or with your peers before asking an expert.
  10. Do your scratch work before you do a final write-up of your work. What you hand in should be neat and professional and all pages should be stapled together.

## Important Dates

September 29 – Last Day for Add/Drop

October 16 – first mid-term exam

November 6 – uncontested withdrawal deadline

November 11 – Veteran’s Day, no classes

November 18 – second mid-term exam

November 25-27 – Thanksgiving Holiday, no classes

December 4 – last day of classes

December 10 - final exam at 8 am in our usual classroom

## 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, Bouillon 140 or [dssrecept@cwu.edu](mailto:dssrecept@cwu.edu) or (509) 963-2171.

**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.

W Sept 23	Introduction
Th Sept 24	1 Why Prove Theorems? , 2.1 Statements, Logic
F Sept 25	Quiz (on 2.1), 2.2 Biconditional, Logical Equivalence and Implication
M Sept 28	2.2 Biconditional, Logical Equivalence and Implication
T Sept 29	2.3 Sets and Predicates
W Sept 30	2.4 Quantifiers (HW 2.1, 2.2)
Th Oct 1	2.4 Quantifiers
F Oct 2	Quiz, Review, Catch up
M Oct 5	2.5 Rules of Inference
T Oct 6	2.6 Negations (HW 2.3 - 2.4)
W Oct 7	2.6 Negations
Th Oct 8	Review, Catch up
F Oct 9	Quiz, Review, Catch up
M Oct 12	2.7 Distributive and Factor Laws for $\vee$ and $\wedge$
T Oct 13	2.7 Distributive and Factor Laws for $\vee$ and $\wedge$ (HW 2.5-2.6)
W Oct 14	2.8 The Conditional Reflex
Th Oct 15	Review
F Oct 16	Exam I over chapter 2
M Oct 19	3.1 Direct Proof and Existential Proof
T Oct 20	Return Exam 1, 3.2 Divisibility
W Oct 21	3.2 Divisibility
Th Oct 22	3.3 The Division Algorithm and Prime Factorization
F Oct 23	Quiz, Review, Catch up
M Oct 26	3.3 The Division Algorithm and Prime Factorization
T Oct 27	3.4 The Contrapositive Proof (HW 3.1-3.2)
W Oct 28	3.5 Proof by Cases
Th Oct 29	3.5 Proof by Cases
F Oct 30	Quiz, Review, Catch up and Halloween Celebration
M Nov 2	3.6 Reductio Ad Absurdum: Proof by Contradiction
T Nov 3	3.7 Logs and Contradiction (HW 3.3-3.5)
W Nov 4	3.8 Critiquing Proofs
Th Nov 5	Review/Catch up
F Nov 6	Quiz, Review, Catch up
M Nov 9	4.1 A Little Set Theory
T Nov 10	4.2 Proofs and Sets (HW 3.6-3.8)
W Nov 11	Veterans Day Holiday
Th Nov 12	4.3 Big Unions and Big Intersections
F Nov 13	Quiz, Review
M Nov 16	4.4 Cartesian Products and Power Sets (HW 3.8, 4.1, 4.2)
T Nov 17	Review
W Nov 18	Exam 2
Th Nov 19	5.1 What Is a Function?
F Nov 20	5.2 One-to-one and Onto Functions
M Nov 23	Return Exam 2, 6.1 Induction
T Nov 24	6.1 Induction (HW 5.1, 5.2)
W Nov 25	No class – Self Study Day
Th Nov 26	Thanksgiving Holiday
F Nov 27	Thanksgiving Holiday
M Nov 30	6.2 Practice with PMI
T Nov 30	6.2 Practice with PMI
W Dec 2	Catch up
Th Dec 3	Quiz and Review (HW 6.1, 6.2)
F Dec 4	Review
M Dec 7	Section 1: 8 am Final Exam
T Dec 8	Section 2: noon Final Exam