

# Welcome to Math 335 – Winter 2021

## ONLINE Meetings TuTh 3:00 - 3:50

<b>Instructor:</b> Dr. Jean Marie Linhart <b>Webpages:</b> (course) <a href="http://canvas.cwu.edu">http://canvas.cwu.edu</a>	<b>E-mail:</b> JeanMarie.Linhart@cwu.edu <a href="http://www.cwu.edu/math/jean-marie-linhart">http://www.cwu.edu/math/jean-marie-linhart</a>
<b>Zoom Office hours:</b> WF 3:05 pm and by appointment; times may be modified on Canvas	

This is an online course where I will try to make lecture material asynchronous and reserve our class meeting times (TuTh 3:00 pm on Zoom) for interactive activities and questions.

COVID-19 has caused a lot of upheaval in our world in the past months, and has required a shift to online learning so that we can better protect each other. I think this course is well-suited to online learning. My experiences teaching online so far tell me that we will all make mistakes, sometimes things will just go wrong, and sometimes technology doesn't work. Know that I am going to do my best to help you out when you make mistakes, when things just go wrong, and when technology isn't working. I would appreciate your kind criticism and help when I'm the one who is making mistakes, having things go wrong, and when technology isn't working. The homework I assign and the other things I ask you to do are things that will be helpful to your learning and that will also create a sense of community for our class. Your constructive criticism and praise are welcome – the best way to talk to me is by email or Canvas message.

Please log in to Canvas and work on our course daily and start assignments promptly – the expectation is that you should be spending about 12 hour per week on the course (1 hour class time, 2 hours homework per credit.) The due date for homework assignments should not also be the “do” date for the assignment! Spreading this work out so that you are working about 3 hours a day on 4 different days during the week will not only make it easier for you to learn the material, it will also greatly reduce your stress level.

To help me cut down on answering the same question multiple times, please post questions that others might share to the relevant content discussion or ask them during our regular class meeting times. I am monitoring discussions daily.

If your question is personal then the best way to contact me is by email (JeanMarie.Linhart@cwu.edu) from your university email address, or by Canvas message. Please put “[Math 335]” and a descriptive subject in the subject line. I'm really good at following up to email and messages, but I do occasionally put something off for later and forget about it. So if you haven't gotten a response within one business day, please send your question again. **You should also check your Canvas messages and university Outlook email address daily.**

Please contact me ASAP if you are sick or if there's a reason why you need special consideration or an extension of due dates.

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This syllabus is subject to modification. Students will be notified of changes in the Announcements on Canvas.

**Prerequisite:** Math 260 with a grade of C or higher.

**Texts:** *How to Prove it: A Structured Approach*, by Daniel J. Velleman. This is a classic resource on the proof techniques.

*Mathematics for Computer Science*, by Eric Lehman, F. Thomson Leighton, Albert R. Meyer, available freely on the web at <https://people.csail.mit.edu/meyer/mcs.pdf> as well as on Canvas. You may notice that one of the authors of this book, F. Thomson Leighton, is CEO Akamai Technologies, and Eric Lehman is a software engineer at Google – mathematics and computer science are complementary subjects. I have enjoyed reading this book; it has a lot of subtle humor woven into the technical information.

**Technology & support:** This is an online course that will rely on the Canvas learning platform. Make an effort to become familiar with Canvas and seek support for technical issues. If you are having technical issues with Canvas, click the Help icon in Canvas to contact the 24/7 support hotline (877-399-8897). You will find additional Canvas support and technology requirements on the CWU online learning website (<http://www.cwu.edu/online-learning>). Additionally the CWU Servie Desk can assist you with MyCWU network and login issues ([servicedesk@cwu.edu](mailto:servicedesk@cwu.edu)): 509-963-2001

I highly recommend updating to the newest version of whatever browser you are using, as well as the most up-to-date Flash plug-in. If you have any issues with Canvas, a first thing to try is to switch browsers. I am using the Firefox browser on my laptop.

Canvas is not officially supported on mobile browsers, but it does offer an app for iOS and Android. However, because it is made to work on a desktop or laptop, the phone app is not the best interactive experience. Since Canvas uses small elements of Flash, not all Canvas features may be supported on mobile devices, especially on iOS.

**Course Goals:** Math 335 introduces the topic of combinatorics, the mathematics of counting. You probably think you are pretty good at this already, after all you have 10 fingers and 10 toes, and you know there are 26 letters in the alphabet. But how many ways are there to assign a letter to each finger and toe if repetitions are allowed? If repetitions are not allowed? If the pinky fingers and big toes must be assigned vowels which cannot be repeated? If you simply have to choose 10 letters and order does not matter? These and other questions will be explored in the class.

We also introduce graph theory, but we do not mean the graph of a function. Instead a graph consists of vertices or nodes which can be connected by edges which may or may not have a directionality to them. One important application of graph theory is graph coloring. A coloring for a graph is valid only if two vertices that are connected by an edge then those two vertices are colored with two different colors. Verifying that a coloring is valid is easy, but figuring out the smallest number of colors for which there is a valid coloring is hard. Applications of graph coloring include managing scheduling conflicts.

The most important things for you to do in this class are to develop proactiveness in starting work early, persistence, problem solving skills, initiative in looking things up, proof writing, and your mathematical communications skills. Being able to write up and communicate ideas using mathematically correct and clear language is crucial for success in this course, in subsequent courses, and for your career as a mathematician. As such, understanding why things work, and being able to explain your logic is far more important than just getting the correct answer.

## Graded Coursework

Grades will be calculated using the following weighting system and scale.

Portfolio	30%	93-100	A	80-82.9	B-	67-72.9	D+
Exams	30%	90-92.9	A-	77-79.9	C+	63-66.9	D
Article Summary	20%	87-89.9	B+	73-76.9	C	60 - 62.0	D-
Homework	20%	83-86.9	B			below 60	F

**Note that because of EP/EF grades, I do not give C- grades. If you are below a C, you will get at most a D+**

**Portfolio:** The portfolio is a typed collection of proofs you have written and problems you have solved, along with reflection and commentary. The math in the portfolio should be correct, and clearly explained using proper mathematical terminology and notation. The material you include in your portfolio represents your best work. Show me the best that you can do.

While you may discuss portfolio questions with other students in the class, your final write-up for portfolio questions must be your own; you may not copy from any outside source. If you are writing up your work while looking at someone else's solution, you are copying, which is academic dishonesty. What you hand in should represent what you know about the question.

You may periodically resubmit portfolio questions for a regrade but you must also provide a note detailing what changes you made on each question. If a note telling me about the questions you changed and how you changed them is not included, old work will not be regraded.

**Make sure you keep a record of the work you do for the portfolio, and that it is backed up and not just on a USB drive or on a laptop that might cease working. You will need some of this material at the end of our class and for Math 499S.**

**Exams:** Exams are to be done closed book, closed notes, without consulting others or outside resources. Some exams are mastery graded, not on partial credit. A passed exam will be evaluated as an A (excellent) or a B (very good). Exams that are not passed are graded as NY for Not Yet passed. Mastery graded exams can be retaken up to a total of 3 times. If scores increase, the most recent score will be recorded. If the score decreases, the average of the prior two scores will be recorded. Exams that are not mastery graded are graded on partial credit

There will be two mastery graded combinatorics exams. These exams can generally be completed in 20-30 minutes.

There will be an induction exam in which you are asked to do two induction proofs similar to those you have practiced on the homework.

There will be an exam in which I ask you to do a proof using the Well Ordering principle, a proof using the (Generalized) Pigeonhole Principle, and provide definitions of mathematical terms and statements of theorems that you have been told to know or memorize ahead of time.

Exams will be announced at least 1 week ahead of time.

**Article summary:** You will be writing an article summary of Catone, Christopher. 2019. Bringing Calculus into Discrete Math via the Discrete Derivative. *The College Mathematics Journal*. 50:1, 21-27 <https://doi.org/10.1080/07468342.2019.1530553> You will write two drafts before completing a final draft. These assignments are already up on Canvas.

**Homework and Reading:** Readings will be assigned regularly and are important for your understanding of the material, even if they are not graded. Read with a pencil in your hand, making an outline and making calculations as you go. I recommend reading technical material at least twice.

Short homeworks will be assigned, often to be completed by the next class day. Expect to be graded on correctness, completeness, organization and your explanations. Sometimes, you will be given longer assignments with more time to complete them. It is expected that your work will be neat, complete, correct and well-explained.

**Academic Integrity:** You are welcome to discuss work done at home with others unless otherwise specified in the assignment instructions, and to use outside resources when you have made an honorable attempt at a problem but are stuck, but what you hand in should represent your understanding of the material. Copying verbatim or even looking at someone else's completed work while writing your own is never permitted. What you hand in should, in fact, represent your own understanding of the material and not work copied or memorized from another source. See my [guide to group work and using outside resources](http://www.cwu.edu/math/group-work-and-using-outside-resources), <http://www.cwu.edu/math/group-work-and-using-outside-resources>, on the web.

All work and exams are expected to be done without any resources except those explicitly authorized by the instructor. Exams and quizzes are not to be discussed 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.

If a paper or report is assigned, students are expected to conform to academic standards for citing summarized, paraphrased and quoted work used; if you are not sure what this means, please **ask**.

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.

**Late Policy:** Contact me ASAP if you are sick or if there's a reason why you need special consideration of an extension of due dates. In general, I will grant a 24 hour extension if it is requested before the due date, longer extension requests should be accompanied with an explanation of extenuating circumstances. Assignments are subject to a 10% per day penalty for being late without an extension, and will not be accepted more than 48 hours after the due date, unless a special extension has been granted.

**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 reach out. Please give me a chance to help. I want to answer all your questions thoroughly, even though it may not be possible to answer every question during class itself. 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.

**Students with Disabilities:** 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

**Diversity:** 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.

**Mandatory Reporting:** I am a mandatory reporter for sexual assault. If you disclose a sexual assault to me, I am required to report it to the University administration.

**COVID-19 Procedures:** 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.

**Stress:** Stress and other life circumstances that may be out of your control can make learning and focusing difficult. If you find stress or other mental health concerns make academics difficult, Central has resources to support you. I encourage you to reach out as soon as you notice you are struggling. Student Counseling Services – crisis appointments available – 509-963-1391 – <http://www.cwu.edu/medical-counseling/counseling-clinic>. Mental health crisis support outside of normal business hours – 1-800-273-8255; Text HOME to 741741; Call 9-1-1. Wellness Center – confidential sexual assault and other victim advocacy – 509-963-3213 – <http://www.cwu.edu/wecare/>. Disability Services – registration for disability accommodation – 509-963-2214 – <https://www.cwu.edu/disability-services/>. Case Management – connect students with resources and support those most at-risk – 509-963-1515 – <https://www.cwu.edu/case-management/>.

## Important Dates

January 5 – classes begin	Feb 19 – Final draft article summary due
January 9 – change of schedule period ends	March 8 – Last day of classes
January 21 – MLK Day, no class	Tue March 12 – Final Exam noon
February 15 – uncontested withdrawal deadline	
February 18 – President’s Day, no class	