Welcome to Math 335 – Winter 2019
1:00 - 1:50 M-Th in SAMU 107

Instructor: Dr. Jean Marie Linhart   **Office:** SAMU 221B
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   (me) http://www.cwu.edu/math/jean-marie-linhart   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 to a message within 24 hours during the week, please contact me again. While I strive to be responsive and prompt, sometimes things get put off for later and unintentionally forgotten.

If modifications are made to this syllabus, students will be notified of changes in class and on Canvas.

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

Texts: *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.

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

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 your persistence, your problem solving skills, your 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	38%	93-100	A	80-82.9	B-	67-69.9	D+
Exams	36%	90-92.9	A-	77-79.9	C+	63-66.9	D
Article Summary	18%	87-89.9	B+	73-76.9	C	60 - 62.0	D-
Homework	8%	83-86.9	B	70-72.9	C-	below 60	F

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.

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: There will be two combinatorics exams that are graded for mastery, not on partial credit. A passed exam will be evaluated as an A (excellent) or a B (very good), or as NY for Not Yet passed. They can be taken up to a total of 3 times; retakes are given in office hours or by appointment. If scores increase, the most recent score will be recorded. If the score decreases, the average of the prior two scores will be recorded. These exams generally can be completed in about 20-30 minutes.

There will be one additional 50 minute exam that is proof-based. This exam is graded on a partial credit basis. This exam might have a take-home component that is to be completed individually.

Exams will be announced at least 1 week ahead of time. Exam make-ups are only given for documented excused absences. If you are out sick the day of an in-class exam, you will need a doctors note.

Article summary: You will be writing an article summary of Gale, D. and L. S. Shapley. 1962. College admissions and the stability of marriage. *The American Mathematical Monthly.* 69(1):9-15. You will write two drafts before completing a final draft. These assignments are already up on Canvas. **Deadlines are strict.**

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, taking notes 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.

Attendance: I expect you to be in class every day. You are responsible for all material presented in class. If you miss a day, get notes from a classmate.

If there is a final exam meeting time for our class, even if it is not a graded activity for you, you are still required to attend. An example might be that other members of the class are finishing up presentations. Missing a scheduled final exam period meeting will result in a reduction of one letter grade from your overall course grade.

Academic Integrity: You are expected to do your own work. While you are welcome to use outside resources and consult with others on all work taken home, you are subject to the requirement that 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, 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**.

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.

Students with Disabilities: I am happy to work with students with disabilities. To set up academic adjustments in this class, you should give me or email me a copy of your *Confirmation of Eligibility for Academic Adjustments* from the Disability Support Services Office. **You must also 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 or ds@cwu.edu or (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

January 3 – 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	