MATH 247-01 Discrete Mathematics
Syllabus for Fall 2020

Mon, Wed, & Fri, 10:00 – 10:50am

Online, synchronous

Instructor: Dr. Eric Errthum   **Winona Email Username:** eerrthum {at} winona {dot} edu

Course Texts	
"Discrete Mathematics" **by zyBooks.com**	**"Applied Discrete Structures"** **by Al Doerr and Ken Levasseur.**

1) Sign in or create an account at
 	
      learn.zybooks.com
 	
2) Use code:
 	
  WINONAMATH247ErrthumFall2020
 	
3) Click "Subscribe" to enter payment info (~$58 and will last until Jan 2021).
Alternatively, access cards are sold through the WSU bookstore.
	• A free pdf of the book can be downloaded from:
	  http://faculty.uml.edu/klevasseur/ads-latex/ads.pdf
	
	OR
	
	• An XML version of the book can be found here:
	  http://faculty.uml.edu/klevasseur/ads/index.html

Note about Calculators: You are allowed at most times to use a calculator, but you must show work. Although, at times you will be asked how to demonstrate certain computations _without_ the use of a calculator.	

Prerequisite: MATH140 – Applied Calculus or MATH212 – Calculus I. (Though you can probably get by with a strong Pre-Calc background.)

About This Course: This course is designed to fill students in on the side of mathematics that they missed out on as they worked toward calculus. In contrast to Calculus where it is essential that the real numbers have the property of being arbitrarily close, the objects studied in this course – such as integers, sets, graphs, and statements in logic – do not vary smoothly in this way, but have distinct, separated values. Areas of application included digital circuits, design optimization, computer science, general problem solving, etc.

Accessing the Course: Beside the textbooks mentioned above, most materials for this course can be found on D2L/Brightspace. Sometimes links will be provided to external material.

Typical Day in this Course: A complete, detailed schedule can be found on D2L. Most days in this course can be split into 3 parts: Before, During, and After. Make sure you <u>check D2L every day</u> and <u>look 2 – 3 days forward _and_ backward</u> each time so that you don't miss anything.

- <u>Before each class:</u> Read the appropriate sections in the ZyBook and complete all the Participation and Challenge Activities. Occasionally there will be other resources or youtube videos to watch.
- <u>During class:</u> Most days I will post a collection of video lectures covering the material for that day. On group collaboration days you will spend class time posting and responding on D2L.
- <u>After class:</u>   Each class has a collection of problems for you to complete before the next group collaboration day and/or before the next unit

Errors and Mistakes: This is the first time this course is being offered online. If you see anything that looks wrong (weird due date, missing homework file, etc.), please email me right away so we can minimize everyone's frustration and confusion.

Piazza: This course uses Piazza for class discussion. Find our class page at:

https://piazza.com/winona/fall2020/math247/home.

(You will have to **use your winona.edu email and create a password**.) This system is highly catered to getting you help fast and efficiently from classmates and/or myself. Rather than emailing me, I encourage you to post your questions on Piazza so that everyone can benefit from the discussion. At the same time, I encourage you to answer other students' posts if you are able (especially if it's at a time of day when I might not be available to give a quick answer).

Types of Piazza Posts		
Bad Examples	**Okay Examples**	**Good Examples**
"What's the answer to #7 on the Group homework?" "I just don't get today's topic. Can anyone help out?" **Any discussion of the Written HW or an Exam is prohibited, email me directly with questions**	"How do you get started on #7 of the Group homework?" "I keep getting a ZyBook activity question wrong. Is there a tricky part I might be forgetting?" "Are there any other good videos covering today's material?"	"What video lecture covers a problem like #7 in the Group homework?" "In the video lecture, can someone explain where the formula at 2:23 came from?" **On Group Homework Days:** "Problem #7:" … gives detailed solution

| MATH247 Platform Guide		
Platform	**D2L/Brightspace**	**ZyBook**	**Piazza**
Use	Course content, Written HW, exams	Pre-Class Readings and Activities	Discussion, Group Homework responses
URL	https://winona.learn.minnstate.edu/	http://learn.zybooks.com	https://piazza.com/winona/fall2020/math247/home
User name	Star ID *(example: ab1234cd)*	WSU Email entered when you sign up *(example: john.doe@go.winona.edu)*	WSU Email entered when you sign up *(example: john.doe@go.winona.edu)*
Password	Star ID password *(same one you use to log into email, laptop, etc.)*	Chosen when you sign up *Note: It is advised that you do NOT use your Star ID password.*	Chosen when you sign up *Note: It is advised that you do NOT use your Star ID password.*

Learning Targets: There are 32 learning targets in this class divided (unequally) into 8 units. Your final grade for the course will be determined by your ability to demonstrate these skills. The complete list of Learning Targets can be found on D2L in the document "MATH247 Learning Targets".

Active Tasks: These tasks are designed to keep you engaged in the class and on track to achieve success.

- **ZyBook Participation and Challenge Activities:** The ZyBook text for the course has built in interactive components labelled either "Participation Activity" or "Challenge Activity". You have unlimited attempts at these activities to get them right. The readings and these activities should be **completed before the designated class period** on that topic. You have unlimited attempts up to the time they are due.
    - *Grading:* ZyBook activities are assigned a percentage based on correct responses.

- **Group Collaboration Day Homework:** Each lecture has a follow-up set of problems, usually out of the Doerr and Levasseur text. These problems should be completed before the next Group Collaboration Day. On Group Collaboration Day, problems will be assigned randomly to pairs of students; one student responsible for posting the answer to Piazza, the other responsible for checking that it is correct and/or suggesting edits. The pair should work together via Piazza posts until an answer both agree on has been arrived at.
    - *Grading:* Problems are either "complete" or "incomplete" depending on if the student pair (poster and checker) arrived at a correct response with both participating. Ultimately you are assigned a completion percentage.

- **Mathematical Virtue Essays:** This course does more than aim to give you specific mathematical skills. It also hopes to instill in you the mathematical virtues of Persistence, Curiosity, Imagination, Disposition to Beauty, Creativity, Strategization, and Thinking for Oneself. You will be given the opportunity of demonstrating one or more of these virtues through essay prompts. More information can be found on D2L in the "Mathematical Virtues" document.
    - *Grading:* Essays are awarded a "High Pass", "Pass", or "Incomplete". An essay earns a "High Pass" if it answers all parts of the prompt, communicates well, and truly exhibits the Mathematical Virtue being written about. An essay earns a "Pass" if it answers all parts of the prompt but falls short of a "High Pass". An essay is "Incomplete" if it does not answer all parts of the prompt.

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[1] Philosophy, following details, and wording heavily borrowed from/influenced by Robert Talbert, GVSU.

HOW TO STUDY MATH
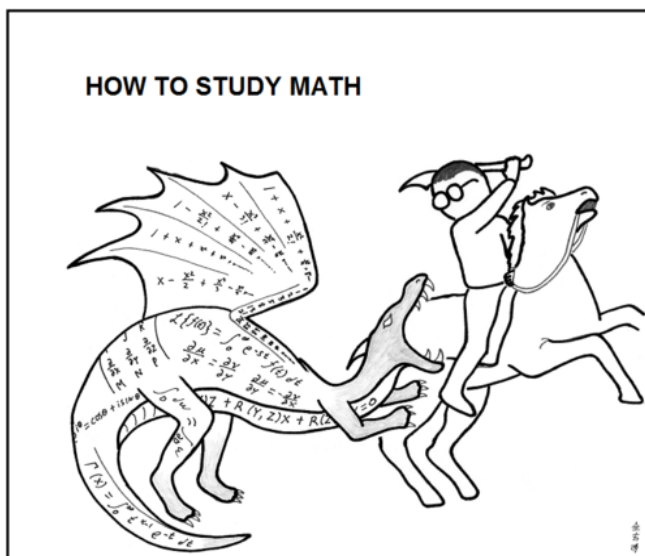
Don't just read it; fight it!

Ask your own questions, look for your own examples, discover your own proofs.

Is the hypothesis necessary? Is the converse true?

What happens in the classical special case?

What about the degenerate cases?

Where does the proof use the hypothesis?

--- Paul R. Halmos

Targeted Tasks: Each unit will utilize a variety of tasks and assessments to gauge your understanding of specific Learning Targets:
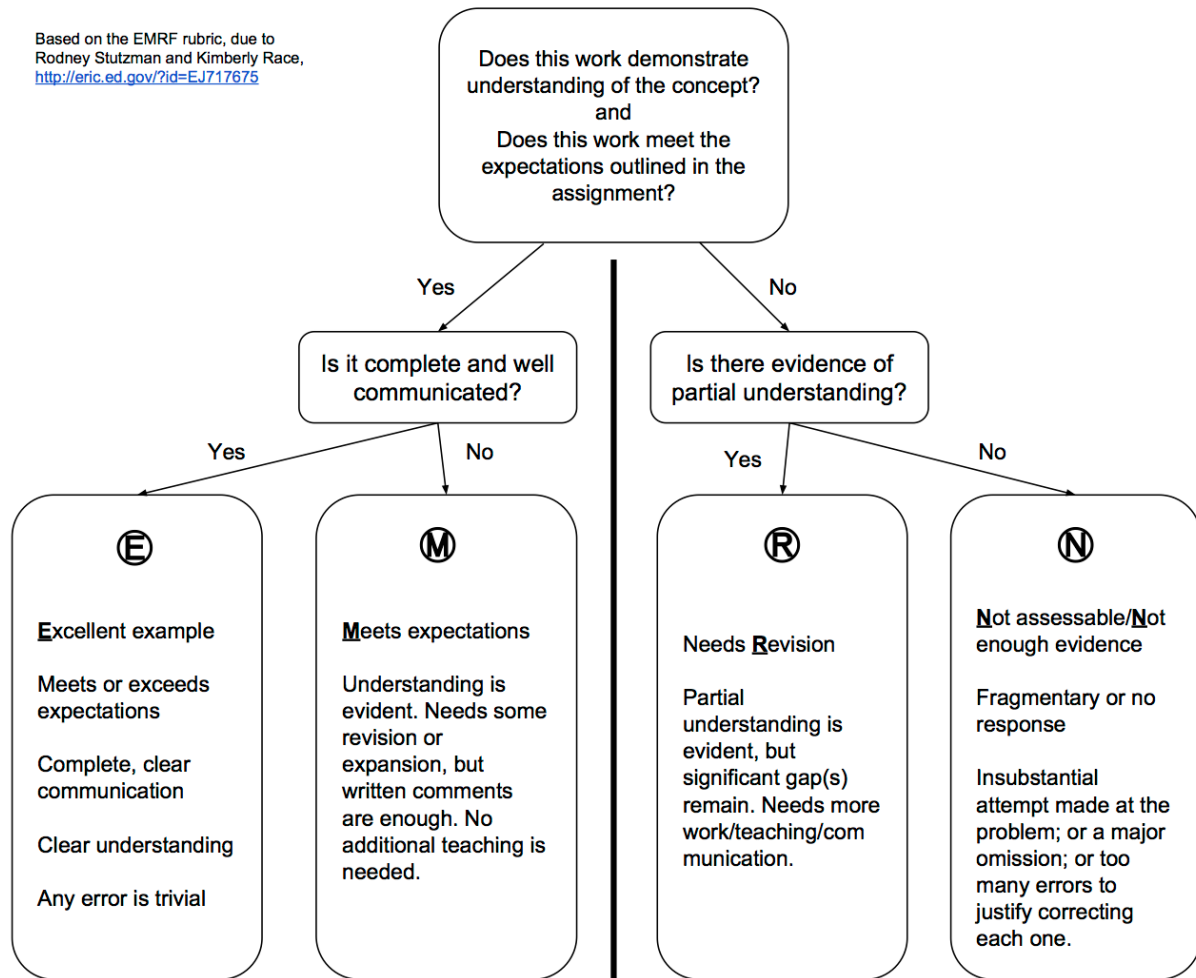
- **Written Homework:** This is the traditional collection of problems that students will submit individual, written responses/solutions for. These problems can be found in the content for Day 1 in each unit and are typically due on the day the next unit begins. (Note: You can ask for and give hints on Piazza, but please do NOT post full solutions there.)
- **Partnered Problems:** In some sections, for some Learning Targets, you may request to swap student-generated problems with a fellow student and submit solutions and reflections. Opportunities for these will be announced on D2L.
- **Exams:** We will have 3 traditional, timed exams and comprehensive final. Information on how to submit your responses on D2L will be given closer to the exam times. Tentatively exams are scheduled for:
  - Exam 1: 10am – 11am on October 2
  - Exam 2: 10am – 11am on October 28
  - Exam 3, 10am – 11am on December 4
  - Final Exam: 8am – 10am on December 9
- **Video/Zoom Presentation:** For some topics you may choose to meet with me over zoom and/or create a video wherein you present the solution to a significant problem in the unit (that hasn't been otherwise assigned or done). Opportunities for these should be requested through email after the exam on the relevant material.

Grading for Targeted Tasks: Each of these items is graded by evaluating the work relative to college-level expectations for quality and one of four marks is given to the work — E, M, R, or N. These marks are explained more in the rubric diagram and table below.

Mark	Description
E	**E**xcellent or **e**xemplary. The work has either no errors at all, or only trivial ones. The work shows clear communication and uses correct, well-constructed English along with correct mathematical notation. All work is clearly explained, and detailed justifications are provided.
M	**M**eets the expectations for the assignment (but is not "excellent"). The solution is complete and reasonably well-communicated and understanding of the concept is evident. There may be some minor, easily correctible mistakes including language or notational errors. Adequate explanations are provided but there are some minor gaps or omissions.
R	**R**evision needed, due to a serious error or omission. Partial understanding is evident, but there are significant gaps, omissions, or errors.
N	**N**ot assessable, due to major omissions or persistent/systemic major errors.

Rubric

Does this work demonstrate understanding of the concept?
and
Does this work meet the expectations outlined in the assignment?

Yes → **Is it complete and well communicated?**

No → **Is there evidence of partial understanding?**

Yes → **Ⓔ**

No → **Ⓜ**

Yes → **Ⓡ**

No → **Ⓝ**

Ⓔ

Excellent example

Meets or exceeds expectations

Complete, clear communication

Clear understanding

Any error is trivial

Ⓜ

Meets expectations

Understanding is evident. Needs some revision or expansion, but written comments are enough. No additional teaching is needed.

Ⓡ

Needs **R**evision

Partial understanding is evident, but significant gap(s) remain. Needs more work/teaching/communication.

Ⓝ

Not assessable/**N**ot enough evidence

Fragmentary or no response

Insubstantial attempt made at the problem; or a major omission; or too many errors to justify correcting each one.

How to earn an E (or M) on a Learning Target: Students will earn an E or an M mark on a Learning Target in one of the following ways:

Earn an E (or M) on an exam question

OR

Earn an E (or M) on **at least 2 of**:
- A Written HW problem
- A Partnered Problem
- A Zoom/Video Presentation

Once you have earned an E (or M) on a Learning Target, it cannot be lost.

Improving your Mark: If you want to improve your mark on a Learning Target, you should email the instructor for the appropriate/available options. Some possible options are:
- Writing an "Exam Autopsy" describing where you went wrong on the exam
- Writing up the solution to an alternate written HW problem
- Working with a classmate on a Partnered Problem
- Giving a presentation of a similar problem to the instructor over Zoom
- Creating a "How To" video that could be shared with other students in future sections

Details for any of these options available as needed. In general, if you want to improve your mark in a Learning Target, email me. Note: **You are only allowed to improve your mark in 1 Learning Target per week**.

Determination of Course Grade: Your course grade is determined by the *number* of accomplishments you rack up during the course and the *level of skill* demonstrated by your work. The *Grade Determination Table* below shows what accomplishments are required for each basic grade level from A through C. Please note that all the requirements for a grade level must be met in order to earn that grade. The grade awarded will be the highest grade for which all requirements are met. I will try to keep an updated record on D2L, but you can always email me directly if D2L seems to be incorrect and/or out-of-date.

MATH247 Grade Determination Table				
	to earn an **A**	to earn a **B**	to earn a **C**	to earn a **D**
ZyBook Activities	≥90%	≥80%	≥70%	Complete 2 of the 3 requirements for a C
Group Collaboration Completions	≥80%	≥70%	≥60%	
Learning Targets (Exams, Written HW, Presentations, etc.)	Earn an E or M on at least 29 out of 32 learning targets, including **at least 12** E marks	Earn an E or M on at least 26 out of 32 learning targets, including **at least 6** E marks	Earn an E or M on at least 23 out of 32 learning targets *(no quota for E marks)*	
Mathematical Virtue Essays	Earn: a "High Pass" on at least 2 essays OR a "Pass" on at least 3 essays	Earn: a "High Pass" on at least 1 essay OR a "Pass" on at least 2 essays	No Essay Requirement	No Essay Requirement

Academic Dishonesty: Any type of academic dishonesty (cheating, copying, etc.) will result in failure and will be reported to school authorities. This includes access to past quizzes, exams, etc. that has not been handed out to the whole class. **<u>This also includes student-to-student communication during an or exam and/or posting homework or exam questions to unsanctioned websites.</u>** If you are having trouble with the course, please contact the instructor first.

Note: This syllabus is subject to change if deemed necessary by the instructor.

Commitment to Inclusive Excellence

WSU recognizes that our individual differences can deepen our understanding of one another and the world around us, rather than divide us.

In this class, people of all ethnicities, genders and gender identities, religions, ages, sexual orientations, disabilities, socioeconomic backgrounds, regions, and nationalities are strongly encouraged to share their rich array of perspectives and experiences.

If you feel your differences may in some way isolate you from WSU's community or if you have a need for any specific accommodations, please speak with the instructor early in the semester about your concerns and what we can do together to help you become an active and engaged member of our class and community.

If you or a friend has been a victim of sexual assault, dating violence, domestic violence, or stalking, you can talk to a trained, confidential advocate by calling 507.457.5610.