Point Loma Nazarene University, Fall 2025
Discrete Mathematics
Department of Mathematical, Information, and Computer Science – School of STEM

Professor: Kyle Havens	**Course:** Math 3043	**Section:** 1	**Units:** 3
Office: Rohr Science 284	**Days:** Monday, Wednesday, Friday	**Class Time:** 11:00-11:55am	
Phone: (619) 849-3362	**Email:** kylehavens@pointloma.edu	**Location:** RS 395	

PLNU Mission – Teach, Shape, Send: Point Loma Nazarene University exists to provide higher education in a vital Christian community where minds are engaged and challenged, character is modeled and formed, and service is an expression of faith. Being of Wesleyan heritage, we strive to be a learning community where grace is foundational, truth is pursued, and holiness is a way of life.

Department Mission: The Mathematical, Information, and Computer Sciences department at Point Loma Nazarene University is committed to maintaining a curriculum that provides its students with the tools to be productive, the passion to continue learning, and Christian perspectives to provide a basis for making sound value judgments.

Course Description: Sets, functions, propositional logic and switching theory, graphs including trees, matrices, induction and proof by contradiction, combinatorics, and probability. Selected applications from computer science included.

Required Materials: Textbook – *Discrete and Combinatorial Mathematics: An Applied Introduction*, 5th Edition by Grimaldi, Ralph (ISBN: 9780201726343)

Office Hours: Located in Rohr Science. Professor Havens has open office hours at the following times:

Monday	Tuesday	Wednesday	Thursday	Friday
7:30-8:15am	10:45-11:45am	12:30-2:30pm	10:45-11:45am	7:30-8:15am
9:45-10:45am	2:00-2:45pm		2:00-2:45pm	

Student Learning Outcomes: Upon completion of this course, students will be able to:
1. Students will be able to write proofs.
2. Students will be able to demonstrate facility with algebraic structures.
3. Students will be able to apply their mathematical knowledge to solve problems.
4. Students will use the theory of algorithms and computation to solve problems.

Class Performance: Your final grade in this course is calculated by the following system. Details on next page.

33%	Final Exam	Cumulative. You must get a "D" on the final exam to pass.
40%	Exam Average	The average score of your two in-class exams
12%	Class Activities	Based on completion of individual and group activities.
10%	Written Homework	Traditional written homework from the textbook.
5%	Quizzes and Participation	Based on interactive activities, attendance, and quizzes.

Prerequisite: Math 1064 (or equivalent) with a grade of C- or higher.

Good Attendance: A student with no more than one unexcused absence is defined to have "good attendance."

Letter Grade: The letter grade you receive in this course is based on the final percentage score you earned in the previously described weighted grading system. Requests for an opportunity to improve your grade due to personal circumstances will be denied. Borderline grades may be rounded up if student has good attendance.

[92%,100%]: A	[82%,88%): B	[70%,78%): C
[90%,92%): A-	[80%,82%): B-	[68%,70%): C-
[88%,90%): B+	[78%,80%): C+	[60%,68%): D

Final Exam: The final exam is cumulative and will be held at the following time in our classroom:

Wednesday, December 17th from 10:30am to 1:00pm

Final Exam: Successful completion of this class requires taking the final examination on its scheduled day. The final examination schedule is posted on the [Traditional Undergraduate Records: Final Exam Schedules](#) site. If you find yourself scheduled for three (3) or more final examinations on the same day, you are authorized to contact each professor to arrange a different time for one of those exams. However, unless you have three (3) or more exams on the same day, no requests for alternative final examinations will be granted.

Exams: There will be two midterm exams during the semester covering roughly five-six weeks of content each. See the course schedule for more information. Graphing calculators are allowed on the exam and are provided by the department. No external calculators and no notes are allowed on exams. Contact me **before** missing an exam if you have a critical emergency. Make-up exams are not allowed without prior consent. If you do not inform me that you will be missing an exam beforehand, you will get a zero. Exams are weighted equally at 20% of your total grade. If you have good attendance, I will adjust the weighted scale in your favor, 27% for the highest exam and 13% for the lowest. Practice questions may be posted on Canvas in advance of the exam designed to help you identify topics that you need to study further.

Written Homework: Written homework problems are assigned from the textbook and will be submitted to Canvas. The problems are to be done by hand and are assigned from your textbook. The due dates will be posted in Canvas, but typically you will have at least one week to complete the assignments from a chapter after it is covered in class. Each written problem set will consist of anywhere from ten to thirty questions, depending on the difficulty. A random sample 5-10 questions will be graded for correctness by a student grader, and the rest will be graded for completion. Late homework is not accepted without a well-documented emergency. Please be sure that written assignments are legible and organized. You are responsible for ensuring your submissions can be viewed by the grader. If your submission is illegible or causes an error it will receive a zero. I encourage you to work together on your homework, but directly copying an online source or another student's homework is considered plagiarism and will not be tolerated. Copying solutions from AI is also considered academic plagiarism. A maximum of two written homework assignments can be turned in late subject to a 10% penalty as long as they are submitted before the corresponding exam. Other late work is not accepted.

Class Activities: Mathematics requires active participation. Participation means asking questions, taking notes, making conjectures and checking them, providing solutions to problems, and sharing ideas with classmates. I will act as the expert facilitator during class time, with a mixture of lecture, group problem solving, use of technology, and integrated discussion. You will receive activity credit for your attendance by using the sign-in sheet. Each class we will work on a class activity directly related to the chapters of study. You are to work on them in your groups and submit them to Canvas by the last day of lecture on the subject. These may be fully graded or you may get credit for completion, depending on the activity.

Course Credit Hour Information: In the interest of providing sufficient time to accomplish the stated Course Learning Outcomes, this class meets the PLNU credit hour policy for a 3-unit class delivered over 15 weeks. It is anticipated that students will spend a minimum of 37.5 participation hours per credit hour on their coursework. For this course, students will spend 115 estimated total hours meeting the course learning outcomes.

Artificial Intelligence Policy: You are allowed to use Artificial Intelligence (AI) tools (e.g. ChatGPT, Gemini Pro 1.5, GrammarlyGo, Perplexity, etc.) to generate ideas, but you are **not allowed** to use AI tools to generate content (math, text, video, audio, images) that will end up in any work submitted to be graded for this course. If you have any doubts about using AI, please gain permission from the instructor.

PLNU Academic Accommodations Policy: PLNU is committed to providing equal opportunity for participation in all its programs, services, and activities in accordance with the Americans with Disabilities Act (ADA). Students with

disabilities may request course-related accommodations by contacting the Educational Access Center (EAC), located in the Bond Academic Center (EAC@pointloma.edu or 619-849-2533). Once a student's eligibility for an accommodation has been determined, the EAC will work with the student to create an Accommodation Plan (AP) that outlines allowed accommodations. Professors are able to view a student's approved accommodations through Accommodate.

PLNU highly recommends that students speak with their professors during the first two weeks of each semester/term about the implementation of their AP in that particular course. Accommodations are not retroactive so clarifying with the professor at the outset is one of the best ways to promote positive academic outcomes.

Students who need accommodations for a disability should contact the EAC as early as possible (i.e., ideally before the beginning of the semester) to assure appropriate accommodations can be provided. It is the student's responsibility to make the first contact with the EAC. Students cannot assume that because they had accommodations in the past, their eligibility at PLNU is automatic. All determinations at PLNU must go through the EAC process. This is to protect the privacy of students with disabilities who may not want to disclose this information and are not asking for any accommodations.

Additional Course Information: Additional PLNU policies and practices that apply to this course can be found at the link below. The link includes PLNU's statement on spiritual care, state authorization, copyright policy, recording notification, academic honesty policy, language and belonging, sexual misconduct and discrimination, attendance and participation policy, course modality definitions, LomaBooks, use of technology, and the Loma Writing Center.

https://docs.google.com/document/d/11BgAANLOJ9tjt837d24EZ181ukM2qzHF/edit?usp=sharing&ouid=109910715651511117850&rtpof=true&sd=true

Course Schedule: This course syllabus and schedule are subject to change due to unforeseen circumstances.

Week of	Monday	Wednesday	Friday
9/1/2025	*No Class* Labor Day	**Course Introduction and Social Time**	**1.1-1.2:** Sum and Product Rules and Permutations
9/8/2025	**1.3:** The Binomial Theorem	**1.4:** Combinations with Repetitions and Summary	**2.1:** Connectives and Truth Tables
9/15/2025	**2.2:** Equivalence and the Laws of Logic	**2.3:** Implication and Rules of Inference	**2.4:** Use of Quantifiers
9/22/2025	**2.5:** Definitions and the Proofs Theorem	**3.1:** Sets and Subsets	**3.2:** Set Operations and Laws of Set Theory
9/29/2025	**3.3-4:** Counting and Venn Diagrams, Probability	**4.1:** Well-Ordering and Mathematical Induction	**4.2:** Recursive Definitions
10/6/2025	**4.3:** The Division Algorithm: Prime Numbers	**4.4:** The GCD: Euclidean Algorithm	**Ch1-4:** Catch Up and Review for Exam
10/13/2025	*Exam #1*	**5.1-5.2:** Cartesian Products Relations, Functions	**5.3:** Onto Functions and Stirling Numbers
10/20/2025	**5.4:** Specials Functions	**5.5:** The Pigeonhole Principle	*No Class* Fall Break
10/27/2025	**5.6:** Function Composition and Inversion	**8.1:** The Principle of Inclusion and Exclusion	**8.2:** Generalizations of the Principle
11/3/2025	**8.3:** Derangements: Nothing Is in Its Right Place	**10.1:** First-Order Linear Recurrence Relation	**10.2:** Second-Order Linear Homogeneous Recurrence
11/10/2025	**11.1:** Graph Theory Definitions and Examples	**11.2:** Subgraphs, Complements, and Graph Isomorphism	**Ch5,8,10:** Catch Up and Review for Exam
11/17/2025	*Exam #2*	**11.3:** Vertex Degree: Euler Trails and Circuits	**11.4-5:** Planar Graphs and Hamilton Circuits
11/24/2025	**12.1-2:** Tree Definitions, Properties, and Roots	*No Class* Thanksgiving Break	
12/1/2025	**12.3-4:** Weighted Trees and Prefix Codes	**13.1-2:** Dijkstra's Shortest Path and Min Spanning Trees	**Ch13.3:** Transportation and The Max-Flow Min-Cut Thm
12/8/2025	**13.4:** Matching Theory	**Ch11-13:** Catch Up and Review for Exam	*No Class* Study Day
12/15/2025	*No Class: Finals Week*	*Final Exam*	*No Class: Finals Week*

		10:30am-1:00pm (Cumulative)	