Math 343: Discrete Mathematics (3.0 units)

Time & Place: 11:00 to 12:15 T & TH in RCL 103

Instructor: Dr. Catherine Crockett

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Office Rohr Science, Room 226

Office hours: MWF 8:30-9:30, 11-12, T 1-2, M 3-4 or by appointment or by appointment

Important Dates:

Exam 1: October 5, 2017 (Thursday)

Exam 2: November 7, 2017 (Tuesday)

Final Exam (comprehensive): December 14 (Thursday) 10:30-1

Text: *Discrete and Combinational Mathematics* by Ralph P. Grimaldi , 5th edition , PEARSON

Prerequisite: MTH 144 or MTH 164 (or equivalent)

PLNU Mission

To Teach ~ To Shape ~ To 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 becomes an expression of faith. Being of Wesleyan heritage, we aspire 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.

COURSE OBJECTIVES

This course is a blend of computational and theoretical mathematics. The goals for the course are:

1. To introduce the student to the topics and techniques of discrete methods and combinatorial reasoning (calculus is the study of continuous functions as opposed to discrete functions).
2. To expand the student's methods of inquiry and exploration.
3. To present an adequate survey of discrete mathematics for computer science, physics, engineering and mathematics to prepare student for coursework in their discipline.

LEARNING OUTCOMES

- Students will be able to write proofs.
- Students will be able to demonstrate facility with algebraic structures.
- Students will be able to apply their mathematical knowledge to solve problems.
- Students will use the theory of algorithms and computation to solve problems.

ASSESSMENT AND GRADING

Grades for the course will be based on:

Exams (2 at 20% each)	40% of the course grade
Homework	20% of the course grade
Quizzes	10% of the course grade
Final exam (comprehensive)	30% of the course grade
Total:	100%

Grading Scale: Approximate minimal percentages required to obtain a given grade are:

Grades in percentages

	A	B	C	D	F
+		[87.5,90)	[77.5, 80)	[67.5, 70)	[0,60)
	[92.5,100]	[82.5,87.5)	[72.5, 77.5)	[62.5,67.5)	
-	[90, 92.5)	[80, 82.5)	[70, 72.5)	[60, 62.5)	

Homework (20%): Homework will be assigned every class meeting. All homework assigned in a week will be due **at the start of class** the next Thursday. A homework assignment is late if it is not received at the start of the class on the due date. No late homework will be accepted except by prior arrangement (with me) or with a documented emergency. However, the lowest homework score will be dropped.

The object of the homework is to learn how to do the problems so there should be calculations on your homework using the terminology and methods of the class and not just an answer. Please be sure that your homework is stapled together and the problems are in order. Homework will be scored on a combination of completeness (with work shown) and correctness. A random selection (the same for all people) of the problems will be graded on any homework assignment

Quizzes (10%): Quizzes will be given at the beginning of classes on most Tuesday (please see the calendar for exact dates). Questions will be based on the class discussion/homework problems from the day before. Make-up on quizzes may occur only by prior arrangement with me or a well-documented emergency beyond your control. However, the lowest quiz score will be dropped.

Exams (20% each): There are two in-class exams. If you do not take an exam you will receive a zero for it. Late exams may be taken only by prior arrangement with me or a well-documented emergency beyond your control. The examination schedule is included in the daily schedule. I do not intend to accept excuses such as poor communication with parents, benefactors, sport team sponsors and/or travel agents.

Final Exam (30%): The final is **comprehensive and is given on Thursday, December 14 10:30 to 1**. The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor.

Class Enrollment: It is the student's responsibility to maintain his/her class schedule. Should the need arise to drop this course (personal emergencies, poor performance, etc.), the student has the responsibility to follow through (provided the drop date meets the stated calendar deadline established by the university), not the instructor. Simply ceasing to attend this course or failing to follow through to arrange for a change of registration (drop/add) may easily result in a grade of F on the official transcript.

Side Note: Turn off any cell phone, pager or things that make noise while you are in class. Also, do not text or work on other classes while in class -to do so is disrespectful to your classmates and me. You may be asked to leave the class for such behavior, resulting in an absence.

General Advice:

You learn mathematics by doing it yourself. You should expect to spend approximately two hours outside of class for every one hour in class working on homework and going over concepts. When doing homework, please note it is normal to not be able to do every problem correct on the first attempt. Do not be discouraged, instead seek help.

For information about the class, homework assignments, handouts or grades, please log onto canvas.pointloma.edu. There you will find all of this class information. Please let me know if you can't access the class information or have any questions.

Sources of Help:

1. Me. If you have questions, ask me. See my office hours or email catherinecrockett@pointloma.edu
2. Other classmates. Form study groups! Work together!
3. The MLC (in Rohr science room 230)- schedule posted outside the room.

University Policies:

FINAL EXAMINATION POLICY

The final exam date and time is set by the university at the beginning of the semester and may not be changed by the instructor. This schedule can be found on the university website and in the course calendar.

No requests for early examinations will be approved. Only in the case that a student is required to take three exams during the same day of finals week, is an instructor authorized to consider changing the exam date and time for that particular student.

PLNU COPYRIGHT POLICY

Point Loma Nazarene University, as a non-profit educational institution, is entitled by law to use materials protected by the US Copyright Act for classroom education. Any use of those materials outside the class may violate the law.

Credit Hour

In the interest of providing sufficient time to accomplish the stated course learning outcomes, this class meets the PLNU credit hour policy for a 4-unit class delivered over 15 weeks. Specific details about how the class meets the credit hour requirements can be provided upon request.

PLNU ACADEMIC HONESTY POLICY

Students should demonstrate academic honesty by doing original work and by giving appropriate credit to the ideas of others. Academic dishonesty is the act of presenting information, ideas, and/or concepts as one's own when in reality they are the results of another person's creativity and effort. A faculty member who believes a situation involving academic dishonesty has been detected may assign a failing grade for that assignment or examination, or, depending on the seriousness of the offense, for the course. Faculty should follow and students may appeal using the procedure in the university Catalog. See http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Honesty for definitions of kinds of academic dishonesty and for further policy information.

PLNU ACADEMIC ACCOMMODATIONS POLICY

If you have a diagnosed disability, please contact PLNU's Disability Resource Center (DRC) within the first two weeks of class to demonstrate need and to register for accommodation by phone at 619-849-2486 or by e-mail at DRC@pointloma.edu. See Disability Resource Center for additional information. For more details see the PLNU catalog:
http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Academic_Accommodations

Students with learning disabilities who may need accommodations should discuss options with the instructor during the first two weeks of class.

PLNU ATTENDANCE AND PARTICIPATION POLICY

Attendance is expected at each class session. In the event of an absence you are responsible for the material covered in class and the assignments given that day.

Regular and punctual attendance at all classes is considered essential to optimum academic achievement. If the student is absent from more than 10 percent of class meetings, the faculty member can file a written report which may result in de-enrollment. If the absences exceed 20 percent, the student may be de-enrolled without notice until the university drop date or, after that date, receive the appropriate grade for their work and participation. See

http://catalog.pointloma.edu/content.php?catoid=24&navoid=1581#Class_Attendance in the Undergraduate Academic Catalog.

Course Schedule:

Please note this schedule is tentative. Any changes will be announced.

week	Monday	Tuesday	Wednesday	Thursday	Friday
1 8/28- 9/01	8/28 No class	8/29 (Monday's schedule)	8/30	8/31 First class meeting Introduction Section 1.1: Sum & Product Rules Section 1.2: Permutations	9/01
2 9/04- 9/08	9/04 No Class Labor Day	9/05 **Quiz #1** Section 1.3: The Binomial Theorem Section 1.4: Combinations with Repetition	9/06	9/07 **HW #1** Section 2.1: Truth Tables Section 2.2: The Laws of Logic	9/08
3 9/11- 9/15	9/11	9/12 **Quiz #2** Section 2.3: Rules of Inference Section 2.4: The Use of Quantifiers	9/13	9/14 **HW #2** Section 2.5: Quantifiers, Definitions, and the Proofs of Theorems	9/15
4 9/18- 9/22	9/18	9/19 **Quiz #3** Section 3.1: Sets and Subsets Section 3.2: Set Operations & the Laws of Set theory	9/20	9/21 **HW #3** Section 3.3: Counting and Venn Diagrams Section 3.4: A First Word on Probability	9/22
5 9/25- 9/29	9/25	9/26 **Quiz #4** Section 4.1: Mathematical Induction Section 4.2: Recursive Definitions	9/27	9/28 **HW #4** Section 4.3: The Division Algorithm: Prime Numbers Section 4.4: The GCD: The Euclidean Algorithm	9/29
6 10/02- 10/06	10/02	10/03 **Quiz #5** Review for Exam #1	10/04	10/05 **HW #5** **Exam #1**	10/06
7 10/09- 10/13	10/09	10/10 Section 5.1: Cartesian Products and Relations Section 5.2: Functions: Plain and One-to One	10/11	10/12 Section 5.3: Onto Functions: Stirling Numbers of the Second Kind Section 5.4: Special Functions	10/13
8 10/16- 10/20	10/16	10/17 **Quiz #6** Section 5.5: The Pigeonhole Principle Section 5.6: Function	10/18	10/19 **HW #6** Section 8.1: The Principle of Inclusion and Exclusion Section 8.2: Generalizations	10/20 No classes Fall Break Day

		composition and Inverse		of the Principle	
9 10/23- 10/27	10/23	10/24 **Quiz #7** Section 8.3: Derangements: Nothing is in Its Right Place Section 8.5: Arrangements with Forbidden Positions	10/25	10/26 **HW #7** Section 10.1: First-Order Linear Recurrence Relation Section 10.2: The Second-Order	10/27
10 10/30- 11/03	10/30	10/31 **Quiz #8** Section 10.3: The nonhomogeneous Recurrence Relation Bubble Sort	11/01	11/02 **HW #8** Exam #2 Review	11/03
11 11/06- 11/10	11/06	11/07 **Exam #2**	11/08	11/09 Section 11.1: Definitions & Examples Section 11.2: Subgraphs, Complements, and Graph Isomorphism	11/10
12 11/13- 11/17	11/13	11/14 **Quiz #9** Section 11.3: Vertex Degree Section 11.4: Planar Graphs	11/15	11/16 **HW#9** Section 11.5: Hamilton Paths & Cycles Section 11.6: Graph Coloring & Chromatic Polynomials	11/17
13 11/20- 11/24	11/20	11/21 **Quiz #10** Section 12.1: Definitions, Properties and Examples Section 12.2: Rooted Trees	11/22 No Class Thanksgiving Break	11/23 No Class Thanksgiving Break	11/24 No Class Thanksgiving Break
14 11/27- 12/01	11/27	11/28 Section 13.1: Dijkstra's Shortest-Path Algorithm Section 13.2: Minimal Spanning Trees	11/29	11/30 **HW #10** Section 13.3: Transport Networks Section 13.4: Matching Theory	12/01
15 12/04- 12/08	12/04	12/05 **Quiz #11** TBD	12/06	12/07 **HW #11** Review for Final Exam	12/08
Finals week 12/11- 12/15	12/11	12/12	12/13	12/14 **Final Exam 10:30- 1:00**	12/15