

Math 0400: Discrete Mathematical Structures

Finite Mathematics Fall Term 2023-2024 CRN: 10027

Instructor: Anthony Sorrentino

Office: 620 Thackeray Hall

Office Hours:

- Monday and Wednesday: 4:30 PM to 5:30 PM (in my office)
- Tuesday and Thursday: 4:00 PM to 5:00 PM (Zoom)
- Zoom appointments are also available on my bookings page:  Bookings

E-mail: ats32@pitt.edu

Textbook

Finite Mathematics for the Managerial, Life, and Social Sciences, Twelfth Edition, Soo T. Tan. However, the Eleventh Edition and the Tenth Edition can be sufficiently used. I do recommend using the eTextbook that is available through WebAssign.

WebAssign is available through RedShelf Inclusive Access.

Course Prerequisite

Minimum Math placement score of 61 or completion of Math 0031, Math 0020, or Math 0110 with a minimum grade of C

Objective

This course is designed to introduce students from various disciplines to the applied world of mathematics within a discrete context.

Topics

- Represent problem situations with graphs of straight lines and linear functions.
- Apply systems of linear equations and matrices to various situations.
- Introduction to logic including truth tables and arguments.
- Compound interest including effective rate and present value.
- Apply arithmetic and geometric progressions to problem situations
- Analyze situations using counting principles, probability and probability distribution rules, including Bayes' Theorem and Markov Chains.

Calculator Policy

TI-84 Plus Graphing Calculator or graphing calculator with similar capabilities.

Calculators with CAS capability are strictly prohibited.

Also, laptops and cell phones cannot be used in place of a calculator.

It is also recommended that you use a laptop computer for in-class sessions as well. Top Hat can work with mobile devices, but not as well.

Pitt Health Guidelines

- This course will follow the University guidelines for in-person meetings. Face coverings may be worn at your own discretion unless guidelines require them.
- I will be simulcasting and recording all class meetings to allow as much flexibility in dealing with any health issues needed.

Grading Weights

Participation	5%
WebAssign Practice	10%
Homework	15%
Exam 1	20%
Exam 2	20%
Final Exam	30%

Final Grading Policy

This course follows the math department One-Letter Grade Rule: *"The end-of-course grade assigned to each student should not exceed his/her final exam grade by more than one letter grade except under unusual circumstances."* This is math department policy and is meant to encourage students to study for the final exam.

It is the instructor's discretion as to how to scale grades and award +/- grades. Because of this, final grades will be based on the following scale:

A+	99% to 100%
A	91% to 98.9%
A-	90% to 90.9%
B+	89% to 89.9%
B	81% to 88.9%
B-	80% to 80.9%
C+	79% to 79.9%
C	71% to 78.9%
C-	70% to 70.9%
D	60% to 69.9%
F	Below 60%

Non-standard Grades (G Grade)

The "G" grade is applied only when students who have been attending a course and making regular progress are prevented from completing the course by circumstances beyond their control, such as a major medical emergency. These grades will only be given in very rare, documented circumstances governed by the current University G Grade Policy.

Exam Dates

See the class schedule for the dates of the three midterm exams. The date, time and room of the final exam will be announced by your instructor. All dates on the course calendar are subject to change, so pay attention to announcements regarding exams.

Participation

Before each session you will be expected to complete the following:

- **Reading summaries** in Top Hat which contain examples for you to complete and videos that review the examples. These will also give you opportunities to take any notes that you would take in lecture. (Especially if you use the guided notes that are provided.)
- **Started and/or continued work on your practice problems and homework.** The best (and really the only) way to learn to math is to practice it. Practice makes perfect, so you will be given a considerable (but doable) number of problems to practice each week. So, completing these a little at a time is the best way to go.

We will spend class time going over any questions that you have on the problems from these. So, it is important that you keep up with this work. If you have not completed the reading summaries or attempted any problems prior to the class session, the insight you can gain from the class sessions will likely be limited. Keeping up with your work is the key element to your success in this course.

This work, how well you participate in our class sessions, as well as a general sense of meeting your deadlines, is all factored into a participation grade. This grade does not make up a major part of your final grade, but it will give both you and I an indication of potential issues that may develop if certain issues are not addressed.

Practice Problems and Homework

You will be provided with a list of practice problems from the textbook. You are expected to solve these problems, although they will not be collected and graded.

The work that will count as part of your grade will be the WebAssign Practice problems and the Homework posted in Canvas.

- **WebAssign Practice Problems**
In general, you will have one set of these to complete each week. These are problems that are based on those found in the textbook exercises. These test your skills on the basic concepts.

Practice Problems and Homework (continued)

- **Canvas Homework**

These problems will be more like those that tend to appear on exams. These tend to be more involved and require you to demonstrate how well you apply the concepts. Although these will be set as quizzes in Canvas, you will have unlimited attempts and the highest grade will be kept.

Make-Up/Extension Policy

Missed exams cannot be made up unless missed due to a conflict with an official university sponsored event or a verifiable illness with a doctor's excuse. Consideration may be given in the event of an extreme emergency. Please contact your instructor immediately if you are unable to attend an exam!

- **Arrangements for an alternate exam date must be made and scheduled to occur prior to the exam date.**
- **In the cases of an emergency illness, injury, etc., arrangements for an alternate exam date must occur before exams are returned in class.**

Each practice assignment and homework must be completed and submitted on the day it is due. Because these are also posted in several areas, **there is no excuse for not knowing the due date for a homework assignment.** Since one homework assignment is dropped for the course, any missing homework will be assigned as the dropped assignment. Any other missing homework assignments will be given 0 grades. **Only extreme circumstances will be considered for potential make-up on a case-by-case basis (documentation may be requested).** However, I must see that attempts on the assignment have already been made and an extreme circumstance prevented you from finishing it on time. **A request for an extension due to you only starting on the assignment the day it is due, or due to you not keeping a suitable pace will not be accepted.**

Academic Integrity

Students in this course will be expected to comply with the [University of Pittsburgh's Policy on Academic Integrity](#). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators.

To learn more about Academic Integrity, visit the [Academic Integrity Guide](#) for an overview of the topic. For hands-on practice, complete the [Understanding and Avoiding Plagiarism tutorial](#).

Quantitative Reasoning General Education Requirement

This course fulfills the Dietrich School of Arts and Sciences Quantitative Reasoning General Education Requirement (GER). That GER reads as follows:

Quantitative and Formal Reasoning

All students are required to take and pass with a grade of C- or better at least one course in university level mathematics (other than trigonometry) for which algebra is a prerequisite, or an approved course in statistics or mathematical or formal logic.

Getting Help

Tutoring

Free tutoring is available through the [Math Assistance Center \(MAC\)](#).

Office Hours

Fall term: Mondays and Wednesdays, 4:30 PM – 5:30 PM

[Zoom Appointments available.](#)

Disability Resource Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services](#) (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Math 0400 Suggested Practice Problems

1.1 The Cartesian Coordinate System	Ed 12: #1-46 Ed 11: #9, 11, 13, 17, 21, 23, 25, 28, 29-33, 35, 37, 38, 42, 43 Ed 10: #9, 11, 13, 17, 21, 23, 25, 28, 29-33, 36, 37, 41, 42
1.2 Straight Lines	Ed 12: #1-64, 70, 71, 74-77 Ed 11: #1-4, 5, 7, 11, 13-32, 34, 36-40, 43-48, 59, 74, 77 Ed 10: #1-4, 5, 7, 11, 13-34, 36, 38-42, 45-48, 57, 70, 73
1.3 Linear Functions and Mathematical Models	Ed 12: #1-23, 31-41, 45-49 Ed 11: #1-13, 15-21, 23, 35, 39, 43, 47 Ed 10: #1-13, 15-21, 23, 33, 37, 41, 45
1.4 Intersection of Straight Lines	Ed 12: #1-29 Ed 11, 10: #1-9, 11-14, 17, 19, 21-28
2.1 Systems of Linear Equations: An Introduction	Ed 12: #1-20, 23-31 Ed 11: #1, 3, 6, 7, 13, 15, 19, 20, 23-31 Ed 10: #1, 3, 6, 7, 13, 15, 17-25
2.2 Systems of Linear Equations: Unique Solutions	Ed 12: #1-24, 27, 29, 31, 33, 35, 37-43, 45-49, 50, 61-65 Ed 11, 10: #1, 2, 6, 7, 9-15, 19, 23, 27, 29, 31, 33, 35, 37-41, 45-49, 57, 59-63
2.3 Underdetermined and Overdetermined Systems	Ed 12, 11, 10: #1-6, 15-23, 37-41
2.4 Matrices	Ed 12, 11, 10: #1-21, 23, 27-37, 39-41
2.5 Multiplication of Matrices	Ed 12: #1-19, 24-34, 37, 39-42, 45-49 Ed 11: #1-19, 25-31, 33, 37, 39-42, 45-49 Ed 10: #1-19, 25-31, 35, 37-40, 43-47
2.6 Inverse of a Square Matrices	Ed 12, 11, 10: #1-3, 5-10, 17-20, 25-26, 33-34, 39-43
A.1 Logic; Propositions and Connectives	Ed 12, 11, 10: #1-31
A.2 Truth Tables	Ed 12, 11, 10: #1-19
A.3 The Conditional and Biconditional Connectives	Ed 12: 1-27, 29-38 Ed 11, 10: #1-23, 29-35
A.4 The Laws of Logic	Ed 12, 11, 10: #1-16, 19-24
A.5 Arguments	Ed 12, 11, 10: #1-21

REVIEW

EXAM 1

5.1	Compound Interest	Ed 12: #1-61, 79-82 Ed 11: #1-57, 75-78 Ed 10: #1-53, 71-74
5.4	Arithmetic and Geometric Progressions	Ed 12, 11, 10: #1-20, 23-42
6.1	Sets and Set Operations	Ed 12: #1-68 Ed 11: #1-44, 51-53, 55-58 Ed 10: #1-42, 49-54
6.2	The Number of Elements in a Finite Set	Ed 12: #1-32, 35-38, 45-48 Ed 11: #1-22, 27, 29, 33, 34, 43-45 Ed 10: #1-22, 27, 29, 30, 35-37
6.3	The Multiplication Principle	Ed 12: #1-29 Ed 11: #1-25 Ed 10: #1-21
6.4	Permutations and Combinations	Ed 12: #1-60, 77-82 Ed 11: #1-58 Ed 10: #1-54
7.1	Experiments, Sample Spaces, and Events	Ed 12: #1-40 Ed 11, 10: #1-38
7.2	Definition of Probability	Ed 12, 11, 10: #1-24
7.3	Rules of Probability	Ed 12: #1-29, 35-41 Ed 11: #1-25, 27-29, 35-41 Ed 10: #1-27, 29-33, 37, 38
7.4	Use of Counting Techniques in Probability	Ed 12, 11, 10: #1-30, 35-40
7.5	Conditional Probability and Independent Events	Ed 12: # 1-34 Ed 11, 10: #1-32
7.6	Bayes' Theorem	Ed 12, 11, 10: #1-24, 43-48
8.1	Distributions of Random Variables	Ed 12, 11, 10: #1-27

REVIEW

EXAM 2

8.2	Expected Value	Ed 12, 11, 10: #1-18, 30-37
8.3	Variance and Standard Deviation	Ed 12: #1-20 Ed 11, 10: #1-18
8.4	The Binomial Distribution	Ed 12: #1-26 Ed 11, 10: #1-25
8.5	The Normal Distribution	Ed 12, 11, 10: #1-20
8.6	Applications of the Normal Distribution	Ed 12, 11, 10: #1-17
9.1	Markov Chains	Ed 12, 11, 10: #1-24

REVIEW

FINAL EXAM