

MAT 258 Syllabus

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| Semester: | Summer 2025 |
| Course title: | Discrete Math |
| Instructor: | Professor Matt Klassen |
| Email: | mklassen@digipen.edu |
| Phone: | (425) 895-4423 |
| Office hours: | M,W 12:30-1:30, in Teams, or by appointment |
| Course Web Page: | http://azrael.digipen.edu/MAT258 |
| Time/Place: | MAT258 M,W 9:00-10:40 PM, in Jimbo |

WEB PAGES AND MOODLE:

The Moodle page for MAT258 has a link to the course web page. The web page is the central repository for all course documents, including homework assignments. Updates to homework will be posted on the web page, which is linked on the moodle pages. Scores for quizzes, homework, exams, and projects, will be posted through perl scripts on the course web page.

MATERIALS:

Online materials required (but free and open to use):

Discrete Mathematics: An Open Introduction, 4th edition, by *Oscar Levin*

<https://discrete.openmathbooks.org/dmoi4.html>

BACKGROUND MATHEMATICS:

Basic Algebra, Calculus, and introductory Linear Algebra

COURSE DESCRIPTION:

This course gives an introduction to several mathematical topics of foundational importance in the mathematical and computer sciences. Typically starting with propositional and first order logic, the course considers applications to methods of mathematical proof and reasoning. Further topics may include basic set theory, number theory, enumeration, recurrence relations, mathematical induction, generating functions, and basic probability. Other topics may include graph theory, asymptotic analysis, and finite automata.

COURSE GOALS AND OBJECTIVES:

Students will learn to compute with the basic combinatorial techniques such as permutations and combinations and apply these to the study of finite probabilities. Students will also become proficient in the language of basic foundational mathematics. This will give the students the ability to work with the necessary tools for understanding advanced topics in computer science, as well as the next level of mathematics such as linear algebra.

The above objectives will be measured through quizzes and exams and homework assignments.

QUIZZES AND EXAMS:

Quizzes will be given periodically to test comprehension of lecture material. There are no make up quizzes, but the lowest two quiz scores will be dropped. The quizzes will last for approximately twenty minutes.

For multiple choice quizzes and exams, please follow these procedures: Work out the quiz problems and circle your answers on the question sheet. When you are finished, transfer the answers to the answer sheet. Go to a web browser and enter the answers online. After online answer submission (using the link on the course web page), go to the course Moodle page and submit a pdf copy of your answer sheet as well as your scratch work. Failure to submit both online answers, as well as scratch work, may result in a score of zero for the quiz. Under no circumstances are you allowed to discuss the quiz questions with any other student during the quiz or the data entry process. Your scores will be posted online by your student ID.

There will be a midterm exam given during regular class hours, and a final exam. There are *NO* make up exams unless you have a *compelling and well documented reason* for missing a test.

Calculators are allowed on quizzes and exams.

GRADING:

| | |
|--------------|-----|
| Midterm Exam | 20% |
| Homework | 20% |
| Quizzes | 20% |
| Project | 20% |
| Final Exam | 20% |

Grades will be determined based on total course percentage. Percentage scores will determine letter grades according to the scale: (in the worst case)

| | |
|----|-----------|
| A | 93 – 100 |
| A- | 90 – 92.9 |
| B+ | 87 – 89.9 |
| B | 83 – 86.9 |
| B- | 80 – 82.9 |
| C+ | 77 – 79.9 |
| C | 73 – 76.9 |
| C- | 70 – 72.9 |
| D | 60 – 69.9 |
| F | < 60 |

ACADEMIC INTEGRITY:

Academic dishonesty, or cheating, occurs when a student represents someone else's work as their own, or assists another student in doing so. This can happen on exams, quizzes, homework, or projects. Academic dishonesty also may occur when a student uses any prohibited reference or equipment in the completion of a task. For example, the use of a calculator, notes, books or the internet when it is prohibited. Plagiarism is a common form of academic dishonesty. This can take the form of copying and pasting excerpts from the web, and representing them as original work. The type and severity of any occurrence, as well as the legitimacy of any claim of academic dishonesty, will be judged by the instructor and the disciplinary committee. All students are asked to help in promoting a culture of academic integrity by discouraging cheating in all forms.

HOMEWORK ASSIGNMENTS:

Homework will be assigned and posted on the web page and collected weekly. You are responsible for checking the web page and noting the assignments and the due date. You may work on homework together, as well as consult the tutors and the instructor. However, the final work that you turn in must be your own work.

PROJECTS:

Project description and documentation will appear on the website. Projects in Discrete Mathematics typically involve computational methods applied to areas such as finite games and counting problems.

COMPUTATIONAL RESOURCES:

You are encouraged to do linear algebra and other calculations for the homework using a calculator or symbolic package such as PARI. The symbolic algebra package PARI/GP is free and open-source. There is a link on the web page with examples of how to use PARI to do basic linear algebra calculations. Another package which includes PARI is called SAGE (Software for Algebra and Geometry Experimentation.)

DISABLED STUDENT SERVICES:

Students with physical, psychological or learning disabilities that affect their ability to perform major life activities associated with this class may be eligible for reasonable accommodations under the Americans with Disabilities Act. If you have a documented disability please contact the Disability Support Services office to arrange for accommodations for this class.

TENTATIVE WEEKLY TOPICS:

| Week | Dates | Topics |
|------|------------------|---|
| 1 | May 12 - 16 | Basic Logic, Set Theory, Functions, Counting |
| 2 | May 19 - 23 | Permutations, Combinations, Binomial Coefficients, Generalizations |
| 3 | May 26 - 30 | Sets and Functions, Discrete Probability |
| 4 | June 2 - 6 | Probability Theory, Combinatorial Games, and Examples |
| 5 | June 9 - 13 | Expected Value and Variance |
| 6 | June 16 - 20 | Review, Midterm |
| 7 | June 23 - 27 | Generating Functions, Recurrence Relations, and Inclusion-Exclusion |
| 8 | June 30 - July 3 | Propositional Logic and Equivalence |
| 9 | July 7 - 11 | Quantifiers and Predicate Logic |
| 10 | July 14 - 18 | Rules of Inference, Proofs and Number Theory |
| 11 | July 21 - 25 | Topics in Computation and Graph Theory |
| 12 | July 28 - Aug 1 | Final Exams |