

## Course Information

- **Course Number and Title:** MAD 2104 Discrete Mathematics
- **Credit Hours:** 3
- **Academic Term:** Fall 2024

## Instructor Information

- **Instructor:**
- **Office Location:**
- **Office Hours:**
- **Email address:**

## Course Delivery and Course Description

- **Delivery Mode:** In-Person
- **Course Website:** Canvas course site
- **Official Catalog Course Description:** This course discusses logic, sets, functions, integers, mathematical reasoning and induction, counting principles, permutations and combinations, discrete probability, advanced counting techniques and inclusion-exclusion.
  - **Course Pre and/or Co-Requisites:** MAC 2312 - Analytic Geometry and Calculus 2
  - **Communication/Computation Skills Requirement (6A-10.030):** N
- **Required Texts and Materials:**
  - Discrete Mathematics: An Open Introduction, 3rd Edition.  
<https://discrete.openmathbooks.org/dmoi3.html>
  - Scientific or graphing calculator.

## Course Objectives and Outcomes

- **Course Objectives:**
  - Develop a more rigorous sense of logic through studying the language of mathematics.
  - Understand sequences and mathematical induction and the well-ordering principle with applications.
  - Learn the difference between a function and a relation.
  - Recognize congruence modulo  $n$  as an equivalence relation and utilize properties of modular arithmetic.
  - Understand counting techniques and their use in discrete probability.
  - Construct logically sound mathematical proofs.
- **Course Learning Outcomes:**
  - Produce the negation of a given conditional statement.
  - Prove a given statement using mathematical induction.
  - Calculate a probability using counting techniques.
  - Use the Inclusion/Exclusion Rule to count the number of elements of a union of sets.

- **Alignment with Program Outcomes:**

Course Learning Outcome	Learning Level (Anderson/ Krathwohl)	Program Learning Outcome (ABET/GenEd)
Produce the negation of a given conditional statement.	Analyzing	ABET: 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. GenEd: Demonstrate fluency in mathematical concepts.
Prove a given statement using mathematical induction.	Analyzing	ABET: 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. GenEd: Demonstrate fluency in mathematical concepts.
Calculate a probability using counting techniques.	Analyzing	ABET: 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. GenEd: Apply appropriate mathematical techniques and problem-solving strategies to produce valid results.
Use the Inclusion/Exclusion Rule to count the number of elements of a union of sets.	Applying	ABET: 7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. GenEd: Apply appropriate mathematical techniques and problem-solving strategies to produce valid results.

## Course Policies

### Attendance

- Students are expected “to attend all of their scheduled University classes and to satisfy all academic objectives as defined by the instructor” (University Policy, FPU-5.0010AP).
- Attending class regularly is important for success in this course.  
Falsifying attendance for yourself or for another student is an act of academic dishonesty and subject to academic discipline.

### Participation

Students are expected to participate in the classroom experience. The use of earbuds/headphones during class is specifically not allowed and students who engage in this behavior may be asked to leave the class for the day (noting exceptions for authorized accommodations). Persistent problems with participation may result in a [code of conduct](#) referral.

### Late Work/Make-up work

Make-up exams will not be permitted except for sickness or family emergency. A written note from an appropriate person (doctor, family member, etc.) is required. If possible, notification SHOULD be made BEFORE the missed event.

Homework submitted up to 24 hours late will be accepted with a 20% penalty. No submissions will be accepted more than 24 hours late.

Extensions without penalty may be granted on a case-by-case basis. Please communicate with your instructor.

## Grading Scale

The following gives the lowest number required to guarantee the corresponding grade:

A	A-	B+	B	B-	C+	C	D	F
90%	87%	84%	80%	77%	74%	70%	60%	0%

## Assignment/Evaluation Methods

Homework	15%
Groupwork	7%
Quizzes	5%
Attendance	3%
Exam 1	15%
Exam 2	15%
Exam 3	15%
Final Exam	25%
Total	100%

**Homework:** Homework will be assigned in Canvas on a regular basis and will be covering some important topics to get well-prepared for exams. Scan your work and submit it in a pdf form through Canvas. At the end of the semester, your two lowest homework scores will be dropped. Homework submitted up to 24 hours late will be accepted with a 20% penalty. No submissions will be accepted more than 24 hours late. \*Failing in submitting by the deadline due to technical issues is still considered a late submission. It is your responsibility to ensure that you are sending the correct file.

**Groupwork:** Most class periods will end with assigned groupwork. The assignments will consist of a few problems and will emphasize techniques and topics from the lecture.

Submission assignments will be discussed in class and group assignments will be made after the first week.

**Quizzes:** Quizzes will be administered at the beginning of class, tentatively on the dates specified in the schedule below. Quizzes are meant to act as a reminder of the important concepts and skills that will be assessed during the exams. At the end of the semester, your lowest quiz score will be dropped.

**Attendance:** To succeed in this class, it is essential that you attend class regularly, and as such attendance will be taken daily to determine your attendance grade. As stated earlier in the syllabus, falsifying attendance for yourself or for another student is an act of academic dishonesty and is considered a violation of the university's academic integrity policy.

**Exams:** There will be three common exams during the semester, tentatively on the dates specified in the schedule below. Exact dates and room assignments will be released by the Registrar after the semester begins.

**Final Exam:** The final exam will be comprehensive, taken by all students, and administered during the final exam period.

## Course Schedule (Subject to Change)

- Important Dates: <https://floridapoly.edu/academics/academic-calendar/index.php>

Week	Monday	Wednesday	Friday
Aug 18		Introduction Sets	Sets
Aug 25	Mathematical Statements (And/Or/Negation)	Mathematical Statements (Implications/Converse/Contrapositive/Iff)	Mathematical Statements (Predicates/Quantifiers/ De Morgan's Law)
Sept 1	<b>No Class (Labor Day)</b>	Propositional Logic (Double Negations/Negating Implications)	Propositional Logic (Deduction/Validity)

<b>Sept 8</b>	<b>Quiz 1</b> Direct Proofs	Direct Proofs Writing Advice	Exam Review <b>Test 1 (9/13)</b>
<b>Sept 15</b>	<b>No Class</b>	Proof by Contraposition	Proof by Contradiction
<b>Sept 22</b>	Counterexamples Proof by Cases	Sequences (Closed Form/Recursion/Partial Sums)	<b>Quiz 2</b> Mathematical Induction
<b>Sept 29</b>	Mathematical Induction	Mathematical Induction	Mathematical Induction
<b>Oct 6</b>	Strong Mathematical Induction Well-Ordering Principle	Proof Examples (Floor Ceiling)	Proof Examples (Quotient and Remainder Theorem)
<b>Oct 13</b>	<b>Quiz 3</b>	Exam Review <b>Test 2 (10/16)</b>	<b>No Class</b>
<b>Oct 20</b>	Algorithms	Reflexivity, Symmetry, and Transitivity	Equivalence Relations
<b>Oct 27</b>	Modular Arithmetic	Modular Arithmetic	<b>Quiz 4</b> Counting (Multiplicative Principle)
<b>Nov 3</b>	Counting (Additive Principle) Inclusion/Exclusion Principle	Probability Theory	Expected Values
<b>Nov 10</b>	<b>No Class (Veteran's Day)</b>	<b>Quiz 5</b> Counting (Binomial Coefficients)	Exam Review <b>Test 3 (11/15)</b>
<b>Nov 17</b>	<b>No Class</b>	Counting (Permutations/Combinations)	Counting (r-Combinations)
<b>Nov 24</b>	Counting (Stars and Bars)	<b>No Class (Thanksgiving Break)</b>	<b>No Class (Thanksgiving Break)</b>
<b>Dec 1</b>	Review	Review	<b>Reading day, No class</b>

## Academic Support Resources

- **Library:** Students can access the Florida Polytechnic University Library through the University website and [Canvas](#), on and off campus. Students may direct questions to [library@floridapoly.edu](mailto:library@floridapoly.edu).
- **Peer Learning Strategists (PLS):** Are specially trained student leaders who help their peers strategize approaches to course content and work through solution methods. PLS work in collaboration with the courses they support so the content and methods are aligned with your instructors' expectations. Students can meet with a PLS in The Learning Center, which is located on the first floor of the Innovation, Science and Technology (IST) building in room 1019.
- **Academic Success Coaches:** All students at Florida Poly are assigned an Academic Success Coach. Your Academic Success Coach can assist you with academic success strategies. Please visit the Student Success Center on the second floor of the IST building to meet with an Academic Success Coach.
- **Writing Center:** Located on the second floor of the IST (2059/2061), the Writing Center helps students to develop their writing and presentation skills. Consultations are available in person and virtually. For more detail, visit <https://floridapoly.edu/writingcenter>.

## Civility and Collegiality

Faculty and students come to the university for the same reason, which is to participate in a highly professional educational environment. To that end, both students and faculty are expected to treat each other with mutual regard and civility. In more general terms, collegiality means respecting the right of both faculty and students to participate fully and fairly in the educational enterprise.

## University Policies

### Reasonable Accommodations

The University is committed to ensuring equal access to all educational opportunities. The University, through the Office of Disability Services (ODS), facilitates reasonable accommodations for students with disabilities and documented eligibility. It is the student's responsibility to self-identify as a student with disabilities and register with ODS to request accommodations.

If you have already registered with ODS, please ensure that you have requested an accommodation letter for this course through the [ODS student portal](#) and communicate with your instructor about your approved accommodations as soon as possible. Arrangements for testing accommodations must be made in advance. Accommodations are not retroactive.

If you are not registered with ODS but believe you have a temporary health condition or permanent disability requiring an accommodation, please contact ODS as soon as possible.

The Office of Disability Services (ODS):  
DisabilityServices@floridapoly.edu  
(863) 874-8770  
The Access Point  
[ODS website: www.floridapoly.edu/disability](http://www.floridapoly.edu/disability)

### Accommodations for Religious Observances, Practices and Beliefs

The University will reasonably accommodate the religious observances, practices, and beliefs of individuals in regard to admissions, class attendance, and the scheduling of examinations and work assignments. (See [University Policy](#).)

### Title IX

Florida Polytechnic University is committed to ensuring a safe, productive learning environment on our campus that prohibits sex discrimination and sexual misconduct, including sexual harassment, sexual assault, dating violence, domestic violence and stalking. Resources are available if you or someone you know needs assistance. You may speak to your professor, but your professors have an obligation to report the incident to the Title IX Coordinator. Please know, however, that your information will be kept private to the greatest extent possible. You will not be required to share your experience. If you want to speak to someone who is permitted to keep your disclosure confidential, please seek assistance from the Florida Polytechnic University [Ombuds Office](#), BayCare's Student Assistance Program, 1-800-878-5470 and locally within the community at [Peace River Center](#), 863-413-2707 (24-hour hotline) or 863-413-2708 to schedule an appointment. The [Title IX Coordinator](#) is available for any questions to discussion [resources and options](#) available.

## Academic Integrity

The faculty and administration take academic integrity very seriously. Violations of [academic integrity regulation](#) include actions such as cheating, plagiarism, use of unauthorized resources (including but not limited to use of Artificial Intelligence tools), illegal use of intellectual property, and inappropriately aiding other students. Such actions undermine the central mission of the university and negatively impact the value of your Florida Poly degree. Suspected violations will be fully investigated, possibly resulting in an academic integrity hearing and sanctions against the accused student if found in violation. Sanctions range from receiving a zero on the exam or assignment, to expulsion from the university. Repeat offenders are subject to more severe sanctions and penalties.

## Recording Lectures

Students may, without prior notice, record video or audio of a class lecture for a class in which the student is enrolled for their own personal educational use. Recordings may not be used as a substitute for class participation or class attendance. Recordings may not be published or shared in any way, either intentionally or accidentally, without the written consent of the faculty member. Failure to adhere to these requirements is a violation of state law (subject to civil penalty) and the student code of conduct (subject to disciplinary action).

*Recording class activities other than class lectures, including but not limited to lab sessions, student presentations (whether individually or part of a group), class discussion (except when incidental to and incorporated within a class lecture), and invited guest speakers is **prohibited**.*