FLORIDA POLYTECHNIC UNIVERSITY

Syllabus: MAD 2104 Discrete Mathematics

Welcome to Discrete Mathematics – MAD 2104! This course serves students in computer science, computer engineering, data science, and applied mathematics. This course was designed in collaboration between the mathematics and computer science departments to ensure the topics and depth of coverage best serve the needs of students in computing-related disciplines.

Course Information

- **Course Number and Title:** MAD 2104 Discrete Mathematics
- **Section Number:** 02
- **Credit Hours:** 3 semester hours
- **Academic Term:** Spring 2026

Instructor Information

- **Instructor:** Dr. Luka Mernik
- **Office Location:** IST-2025
- **Office Hours:** Monday, Wednesday, and Friday 10:00am- 10:50am; and BY APPOINTMENT
- **Email address:** lmernik@floridapoly.edu

Course Delivery and Course Description

- **Delivery Mode**: Face-to-face
- **Class Meetings**: MWF 12:00pm-12:50pm in IST-1060
- **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

- **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

At the end of this course, a student will:

1. Demonstrate an operational proficiency and conceptual understanding of sets, functions, relations, and their representations
2. Correctly apply various counting principles and combinatorial thinking to evaluate discrete probabilities.
3. Construct a clear and valid proof of a proposition using standard or strong mathematical induction, specifying the base case, the inductive hypothesis, and the inductive step.
4. Analyze sequences and summations by recognizing patterns, finding closed formulas, or constructing recursive definitions.
5. Translate statements into formal logic, use truth tables, logical equivalences, and apply Boolean algebra in the analysis and simplification of logical expressions.
6. Correctly apply propositional logic to write clear and valid mathematical arguments using methods such as direct proofs and proofs by contradiction.
7. Describe and analyze fundamental definitions and properties of graphs, and identify important graphical structures such as paths, trees, and circuits.
8. Perform fundamental algorithms and operations on integers, including the division algorithm, Euclidean algorithm, modular arithmetic, and conversion to other bases.

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.

- **Tutoring and Learning Center**: The Tutoring and Learning Center (The TLC) provides tutoring to all Florida Poly students who may need additional academic support. The TLC is staffed by students who have excelled in the courses they tutor. They offer support by reviewing concepts and materials from class, clarifying points of confusion and providing assistance with learning strategies. While the focus of TLC is to provide support to students in freshman-level courses, upper-level courses are also tutored at the Center. The TLC is located in the IST Commons (second floor).
    - **Knack Tutoring**: Students looking for additional assistance outside of the classroom are advised to consider working with a peer tutor through Knack. Florida Polytechnic University has partnered with Knack to provide students with access to verified peer tutors who have previously aced this course. To view available tutors, visit floridapoly.joinknack.com and sign in with your student account.

- **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://floridapolytechnic.libguides.com/writingservices.

Grading Scale

Grade	A	B+	B	B-	C+	C	D	F
Percentage	90%	87%	83%	80%	77%	70%	60%	< 60%

Assignments / Evaluation Methods

Written homework	11%
Group projects	11%
Attendance / participation	3%
Midterm Exams (x5)	50% (10% each)
Comprehensive final exam	25%
Total	100%

- **Academic support:** *We want every student to be successful!* We encourage taking advantage of office hours and tutoring!
- **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.
- **Attendance:** To succeed in this class, it is essential that you attend class regularly, and, as such, students are responsible for entering the A+ attendance code for each class. 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.
- **Projects:** There will be two group projects assigned throughout the semester. Additional details, instructions, and a grading rubric will be given with each project.
- **Exams:** There will be five exams during the semester, tentatively on the dates specified and will be administered during the designated class period.
- **Final Exam:** The final exam will be comprehensive, taken by all students, and administered during the final exam period. Your lowest exam score may be replaced by your final exam score if that would improve it, up to a maximum of 80%. Note: The final may not be used to replace a missed exam or a score of zero.

Late Work / Make-up work

- Written homework submitted up to 24 hours late will be accepted with a 20% penalty. Written homework submissions will not be accepted more than 24 hours late. Failing to submit by the deadline due to technical issues is still considered to be a late submission. It is your responsibility to ensure that you are sending the correct file.
- Group projects submitted up to 24 hours late will be accepted with a 20% penalty. Group project submissions will not be accepted more than 24 hours late.
- Make-up exams will be given only in case of an emergency or if requested in advance for an appropriate reason. Documentation will be required for all make-up exams. (Example of an appropriate request: being too sick to take an exam, communicating with your instructor before the exam, and providing documentation. Example of an inappropriate request: oversleeping and expecting to be able to take a makeup.)
- Assignments and due dates are posted on Canvas. Students are responsible for checking Canvas regularly to be aware of assignment deadlines and other class information. Extensions without penalty may be granted on a case-by-case basis in extreme circumstances. Please communicate with your instructor.

Course Schedule (Subject to Change)

	Monday	Wednesday	Friday
Jan 12 – 18	Introduction 0.3 – Sets	0.3 – Sets	0.4 – Functions
Jan 19 – 25	Martin Luther King Jr. Day	Relations Supplement	Relations Supplement 0.2 – Mathematical Statements
Jan 26 - Feb 1	0.2 – Mathematical Statements	Review	Exam #1 (Sets, Functions, Relations, Logic)
Feb 2 – 8	3.1 – Propositional Logic	3.1 – Propositional Logic	Boolean Algebra
Feb 9 – 15	Boolean Algebra	3.2 – Proofs	3.2 – Proofs
Feb 16 – 22	Proofs Workshop	Exam #2 (Prop. Logic, Boolean Algebra, Proofs)	2.1 – Sequences Intro
Feb 23 – Mar 1	2.2 – Types of Sequences	2.4 – Recurrence Relations	2.4 – Recurrence Relations
Mar 2 – 8	2.5 – Induction	2.5 – Induction	Induction Workshop
Mar 9 – 15	Discrete Probability Supplement 1.1 – Add. & Mult. Principle	Review	Exam #3 (Sequences, Induction)
Mar 16 – 22	Spring Break		
Mar 23 – 29	1.2 – Binomial Coefficients	1.3 – Combinations and Permutations	1.3 – Combinations and Permutations
Mar 30 – Apr 5	4.1 – Graphs (Basics)	4.1 – Graphs (Basics)	4.2&4.3 – Trees & Types of Graphs
Apr 6 – Apr 12	4.5 – Euler Paths and Circuits 4.5 – Hamiltonian Paths	Review	Exam #4 (Counting, Graph Theory)
Apr 13 – 19	5.2 – Division Algorithm	5.2 – Euclidean Algorithm	5.2 – Congruences
Apr 20 – 26	5.2 – Congruences Representation in other Bases	Review	Exam #5 (Algorithms, Number Theory)
Apr 27 – May 1	Comprehensive Wrap-up	Reading Days	
May 2 – 8	Final Exam Week		

Course Policies

- **Civility and collegiality:** Faculty members and students come to the university to participate in a highly professional educational environment. To that end, both students and faculty members are expected to treat each other with mutual regard and civility. In more general terms, collegiality means respecting the right of both faculty members and students to participate fully and fairly in the educational enterprise**.**
- **Participation:** Students are expected to participate fully in the classroom experience. Questions are welcomed. Students are asked to turn off and put away their cell phones (noting exceptions for authorized accommodations) except when requested to use them for a class-related purpose. The use of earbuds or headphones during class is not allowed (noting exceptions for authorized accommodations).
- **Official email address:** Florida Polytechnic University email is the official method of communication for the University. Students are required to check their email frequently (at least once per day). We cannot reply to any email received from an address other than those that end in floridapoly.edu.
- **Questions and concerns:** Students with a concern or issue should feel free to email their instructor. Instructors will make every reasonable effort to respond by the end of the next class day. If, after sending the instructor a follow-up email, the issue is not resolved, the student may email the department chair, Dr. Mike Brilleslyper, at mbrilleslyper@floridapoly.edu. Students may request an appointment with the department chair for further discussion, if needed**.**
- **Changes to syllabus**: This syllabus is subject to changes posted to Canvas and announced in class.

University Policies

- **Reasonable Accommodations**
  The University is committed to ensuring equal access to all educational opportunities. 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: DisabilityServices@floridapoly.edu; (863) 874-8770; or https://floridapoly.edu/studentlife/disability-services/.
- **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. Any faculty or staff member you speak to is required 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 discuss resources and options available.
- **Academic Integrity**
  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 sanctions up to and including expulsion from the university.
- **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 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****.*