MAT 243: Discrete Math Structures
Fall 2023 Course Syllabus

Instructor: Professor Ryan Melendez	**E-mail:** melendez@asu.edu
In-Person Office Hours:	**Zoom Office Hours:**
In-Person Office: UCENT 347 (within UCENT Suite 300)	Zoom Office: https://asu.zoom.us/my/ryanmelendez
Tuesday & Thursday 12:00-1:00pm, or by appointment.	Monday 11:00am-12:00pm, or by appointment.

Course Schedule

Week	Dates	Monday	Wednesday
1	August 20 – 26 *First Day of Classes* *Thursday, August 17*	Introduction 1.1: Propositional Logic	1.1: Propositional Logic 1.2: Applications of Propositional Logic
2	August 27 – September 2	1.3: Propositional Equivalences	1.4: Predicates and Quantifiers
3	September 3 – 9 *Labor Day – Monday 9/4*	No Class – Labor Day	1.5: Nested Quantifiers
4	September 10 – 16	1.6: Rules of Inference	1.7: Introduction to Proofs
5	September 17 – 23	Exam 1 Review	**Exam 1**
6	September 24 – 30	2.1: Sets	2.2: Set Operations
7	October 1 – 7	2.3: Functions	2.4: Sequences and Summation
8	October 8 – 14 *Fall Break – 10/9-10/10*	No Class – Fall Break	4.1: Divisibility and Modular Arithmetic
9	October 15 – 21	4.2: Integer Representation and Algorithms	4.3: Primes and Greatest Common Divisors
10	October 22 – 28	Exam 2 Review	**Exam 2**
11	October 29 – November 4	5.1: Mathematical Induction	5.3: Recursive Definitions and Structural Induction
12	November 5 – 11 *Veterans Day – Fri 11/10*	5.3: Recursive Definitions and Structural Induction	6.1: The Basics of Counting 6.2: The Pigeonhole Principle
13	November 12 – 18	6.3: Permutations & Combinations	8.1: Recurrence Relations
14	November 19 – 25 *Thanksgiving Break – 11/23-24*	9.1: Relations and Their Properties 9.5: Equivalence Relations	Exam 3 Review
15	November 26 – December 2	**Exam 3**	Final Exam Review

Syllabus Disclaimer:
Instructors view the course syllabus as an educational contract between the instructor and the students. I reserve the right to make changes to the syllabus as deemed necessary by unforeseen events. If there are any syllabus changes, you will be notified in a timely manner by an announcement made in class or posted on Canvas. By remaining registered in the course through drop/add period, you agree to all terms and policies set forth in the syllabus.

Cellular Phone Policy:
I assume the responsibility of ensuring each of you is in a position to be successful in this class. Part of that responsibility is to ensure that all of us, collectively, are focused on the task at hand. Therefore, I request that your cell phone is silenced _and put away_ while you are in this class, as its usage during class is disruptive and distracting to the learning environment, both individually and as a group.

Key Semester Dates

Add Deadline:	Wednesday, August 23, 2023
Drop Deadline:	Wednesday, August 30, 2023
Course Withdrawal Deadline:	Wednesday, November 1, 2023

ASU Learning Mode:
As of the beginning of the Fall 2023 semester, ASU is operating in Learning Mode 1. This means instruction is delivered to students by faculty in person and on campus; remote attendance via Zoom is not available.

Course Description:
Welcome to MAT 243! This course will cover logic, sets, functions, elementary number theory, combinatorics, recursive algorithms, and mathematical reasoning, including induction.

Prerequisites:
This course is open to students with minimum sophomore standing OR visiting university students who have completed a math course at or above the level of calculus (MAT 210, MAT 251, MAT 265, or MAT 270) with a grade of C or better.

Course Learning Outcomes:
1. Engage in substantial problem solving related to logic, sets, functions, elementary number theory, combinatorics, recursive algorithms, mathematical reasoning, and induction.
2. Develop mathematical reasoning and an ability to write mathematical proofs.
3. Communicate and interpret results.

Course Learning Objectives:
At the completion of this course, students will be able to:
1. Apply logic and truth tables to solve problems.
2. Engage in mathematical proof writing.
3. Apply knowledge about set theory to solve problems.
4. Apply number theory to solve problems.
5. Apply a variety of counting techniques to solve problems.
6. Apply mathematical reasoning and induction to write proofs and solve problems.
7. Apply techniques in recursive algorithms to solve problems.

Required Text/Resources:
- *Discrete Mathematics and Its Applications*, *8nd Edition*; by Kenneth H. Rosen; McGraw-Hill Education & access to Connect
- The required materials for this course will be integrated into Canvas and made available to you at a special discounted price of $91.25, plus tax. You have the option to opt out of this program by clicking this link: https://includedcp.follett.com/1234 but please be advised that Connect access is required to take this course, and if you do opt out you will need to purchase elsewhere at current market rates, which will be more expensive. The charge for the materials will appear on your student account under the item type *Digital Integrated Course Mtrl* after the add deadline.

Calculator:
At minimum, a scientific calculator is required for this course. A few of the recommended models include the TI-30XS Multiview and TI-34 Multiview. A graphing calculator such as the TI-83 or TI-84 is not required, but may be used if you have one. You are expected to bring your calculator to class daily. Cellular phone calculators are <u>not</u> permitted in class or during an exam. Also, the sharing of calculators is not permitted during exams.

Student Success Center:
Tutoring is available in person and online. Be sure to go for help before it is too late and several days before an exam. The hours when a MAT 243 tutor is available at the Student Success Center or online can be found on their webpage at: http://tutoring.asu.edu.

Attendance:
Attendance and participation in class activities is an essential part of the learning process, and students are expected to attend class regularly. Moreover, part of being prepared for class involves bringing all course materials to class, including your coursepack and calculator. Some absences are, however, unavoidable. Excused absences for classes will be given without penalty to the grade in the case of:

- a university-sanctioned event [ACD 304-02];
- religious holidays [ACD 304-04];
- work performed in the line-of-duty [SSM 201-18]; and
- illness, quarantine or self-isolation related to illness **as documented by a health professional**.

Arrangements for any ASU sanctioned activity, ASU student athlete obligations, religious observances, or active duty military should be communicated to the instructor by email at least one week before the expected absence.

Absences for illness, quarantine or self-isolation related to illness should be documented by a health professional and communicated to the instructor as soon as possible by email. All arrangements must be requested within 24 hours. Excused absences do not relieve students from responsibility for any part of the coursework required during the period of absence. You will be provided with appropriate accommodations after you have notified the instructor.

Homework/Connect:
Homework will be graded on a regular basis. You are encouraged to work together, but each individual student is required to submit his or her own work. Most of your homework will be submitted online through Connect, but some written homework assignments may be collected and graded to supplement Connect. No late assignments will be accepted after the deadline for any reason, however, the approximate equivalent of one homework assignment will be dropped at the end of the semester. For the Connect problems, it is highly recommended that you work the problems on paper, and save these exercises as part of your notes. They come in handy when reviewing for an exam or for obtaining help if you have difficulty with the material. Details for accessing Connect will be announced during class and posted on Canvas.

Exams:
You will take 3 exams during the semester according to the tentative dates listed below. Any changes will be announced at least one week in advance. Each exam will involve a mix of mechanical skills and conceptual reasoning. The best possible preparation for them is regular attendance and completion of assigned homework.

Exam	Date	Topics on Exam
Exam #1	Wednesday, September 20, 2023	Chapter 1 Topics
Exam #2	Wednesday, October 25, 2023	Chapters 2 & 4 Topics
Exam #3	Monday, November 27, 2023	Chapters 5, 6, 8 & 9 Topics

Make-Up Policy:
Make-up exams are only given in the following cases:

- a university-sanctioned event [ACD 304-02];
- religious holidays [ACD 304-04];
- work performed in the line-of-duty [SSM 201-18]; and
- illness, quarantine or self-isolation related to illness **as documented by a health professional**
- documented emergency.

Arrangements for any make-ups must be requested within 24 hours of the original exam date and taken as soon as possible, up to within one week of the original exam date. *Once you contact the instructor for a make-up request, you are required to check and respond to your e-mail daily until the make-up exam is taken*. As a reminder, there are no make-ups for homework.

Final Exam:
There will be an optional final exam in this course. This exam will be cumulative and, if taken, will take the place of the lowest midterm exam. The final exam is during the final exam testing period on Monday, December 4th from 2:30 – 4:20pm. This is the only time to take the final and all students must submit a Canvas quiz indicating whether or not they will be taking the final by 11:59pm on Wednesday, November 29th. Further details will be announced in class. The final exam cannot replace a 0 on a midterm due to nonattendance.

Final Grade Breakdown:

Your final grade is determined as follows:

Component	Percentage
3 Midterm Exams	75%
Homework / Misc.	25%

Grade	Grading Scale
A+	98% – 100%
A	90% – 97.99%
A–	89.5% – 89.99%
B+	87% – 89.49%
B	80% – 86.99%
B–	79.5% – 79.99%
C+	77% – 79.49%
C	70% – 76.99%
D	60% – 69.99%
E	< 60%

Course Information:

- Since each student is expected to show respect for every student registered in the course, classroom disturbances are not tolerated. These include, but are not limited to: talking during lecture, arriving late, leaving early, cellular phone usage, and using racist, sexist, homophobic, or other negative language as explained in ASU's Student Code of Conduct. Recurring disturbances caused by an individual will result in an administrative withdrawal from the course.
- The highest standards of ASU's Academic Integrity Policy are expected of all students at all times. Violations of academic integrity include, but are not limited to, cheating, fabrication, tampering, plagiarism, or facilitating such activities. If you engage in academic dishonesty as determined through a collaborative inquiry process with your instructor and an academic integrity officer, consequences include: completion of an Academic Integrity Course, reduced/failing grades on an assignment/course, suspension, and/or expulsion. See the Student Academic Integrity Policy for details: https://provost.asu.edu/sites/default/files/academic-integrity-policy.pdf
- Students who feel they may need accessibility accommodation(s) in class must meet with the Student Accessibility and Inclusive Learning Services (SAILS) office [formerly the Disability Resource Center (DRC)] verifying the need for an accommodation and to discuss the type of accommodation that is appropriate. It is the student's responsibility to initiate contact with SAILS and should contact SAILS as early as possible, ideally before the beginning of the semester, to ensure appropriate accommodations can be provided. Students registered with SAILS must meet with the instructor to discuss any accommodations and notify the instructor at least one week prior to any exam.
- No individual extra credit assignments will be offered.
- During the semester I encourage my students to discuss concerns about their grade with me and strategies to improve upon their approach to the course. However, it is inappropriate to discuss the impact of a grade on academic standing, degree program, or scholarship requirements. This is also a violation of ASU's Academic Integrity Policy. All instructors have an obligation to ensure all grades are earned equally and fairly for all students independent of major, degree program, or scholarship requirements.
- This course is offered by the College of Integrative Sciences and Arts. If you have questions or concerns, please send your inquiry to your instructor directly or to cisa@asu.edu. For more information about the college, visit our website: https://cisa.asu.edu
- Welcome to the course! I encourage you to stay after class, utilize the Student Success Center, come to my office hours, or make an appointment with me to discuss any material that is unclear to you. I wish you well in the course and all of your other academic pursuits this semester.

Additional Information:

- Arizona State University is deeply committed to positioning itself as one of the great new universities by seeking to build excellence, enhance access and have an impact on our community, state, nation and the world. To do that requires our faculty and staff to reflect the intellectual, ethnic and cultural diversity of our nation and world so that our students learn from the broadest perspectives. At ASU, we recognize that in addition to race and gender being markers of diversity of higher education, additional categories include socioeconomic background, religion, sexual orientation, gender identity, age, disability, veteran status, nationality, and intellectual perspective.
- ASU policy prohibits harassment on the basis of race, sex, gender identity, age, religion, national origin, disability, sexual orientation, Vietnam era veteran status, and other protected veteran status.
- All students should contact an advisor to discuss requirements for their degree program, scholarship, or other benefits before making any changes to their academic schedule. This includes, but is not limited to:
  international students (students.asu.edu/international/support/academic), veterans (https://veterans.asu.edu),
  SAILS students (asu.edu/studentaffairs/ed/drc), and students with financial aid (students.asu.edu/financialaid).
- ASU Counseling Services provides counseling and crisis services for students who are experiencing a mental health concern, such as strained relationships, increased anxiety, substance use, feeling down, difficulty concentrating, or lack of motivation. Any student may call or walk-in to any ASU counseling center for a same day or future appointment to discuss any personal concern. Their website is: https://eoss.asu.edu/counseling and their 24/7 dedicated crisis line is available at 480-921-1006.
- Both Title IX federal law and university policy make clear that sexual violence and harassment based on sex is prohibited. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at https://sexualviolenceprevention.asu.edu/faqs. As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services is available if you wish discuss any concerns confidentially and privately.
- Please note that some course content may be deemed offensive by some students, although it is not my intention to offend anyone. If you find that any course content is offensive, please contact me.
- In accordance with ACD 304-06 Commercial Note Taking Services, written permission must be secured from the instructor in order to sell the instructor's oral communication in the form of notes.
- For assistance on using Zoom resources, visit the UTO site: https://uto.asu.edu/zoom-resources