MAT225– Discrete Mathematics (Fall 2026) Course Syllabus

Instructor
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Important Sites
D2L https://d2l.ship.edu
Zoom Office Hours https://ship.zoom.us/j/94338091000

Course Materials
Text Book: *Discrete Mathematics: Mathematical Reasoning and Proof with Puzzles, Patterns and Games,* D. E. Ensley and J. W. Crawley
D2l provides links to videos, notes, and homework. You will submit your class activities to this site and you can check your grades.

Course Description
Study of topics associated with analysis of discrete and/or finite mathematical models. Topics from logic, set theory, Boolean algebra, mathematical proof, recursion, induction, combinatorics, probability, and graph theory are covered. *Prerequisite: Grade of D or better in MATH 140 or a mathematics placement level ≥ 4.*

Learning objectivities
- Be exposed to an awareness of mathematics as an abstract discipline and as a tool for solving problems in common application areas. (Major SLO-1A)
- Participate in discipline-specific extra-curricular activities, such as department seminars, mathe matics conferences, undergraduate research, etc. (Major SLO-1B)
- Demonstrate the ability to understand the logical structure of mathematical statements and ab stract definitions. (Major SLO-2B)
- Demonstrate the ability to write direct proofs. (Major SLO-3A)
- Explain information presented in mathematical forms (e.g., equations, graphs, diagrams, tables, and words). (Gen Ed SLO-Q1)
- Perform calculations and draw appropriate conclusions based on them. (Gen Ed SLO-Q2)
- Express quantitative evidence in support of an argument (considering what evidence is used, and how evidence is formatted, presented, and contextualized). (Gen Ed SLO-Q3)
- Identify and explain an essential concept, as well as the relation to other relevant concepts. (Gen Ed SLO-R1)
- Identify the basic parts of the concept and their relation to each other, as well as demonstrating understanding of the concept based upon the analysis. (Gen Ed SLO-R2)
- Apply the concept to a case or issue and determines the significance or value of the case or issue in relation to the concept, as well as its implications. (Gen Ed SLO-R3)

Tentative Schedule
Exam 1: Thursday of September 17
Exam 2: Thursday of October 8
Exam 3: Wednesday of November 5
Quiz: Tuesday of November 24 (asynchronous online)
Final: To be announced (it will be on the final week, and cumulative)

Tutoring
Free, drop-in or appointment-required Learning Center Tutoring at Mowrey

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Grading
Your grade will be based on your notes, homework, quizzes, and a cumulative Final. I will use the following grading scheme:

Class Activities	**10%**	Attendance +Note Submission+ Quizzes
Homework	**20%**	MOM work online
Exams	**70%**	Exam1, Exam2, Exam3 & Final (each 23.75%) & Quiz (5%)

At the end of the course, I will assign grades based on the following scale:

Percentage	90 -100	87-89	84-86	80-83	77-79	74-76	70-73	60-69	0-59
Final Grade	A	A-	B+	B	B-	C+	C	D	F

Expectations
In class, you will learn new ideas and work on problems to master the ideas. If you have any questions, please do not hesitate to ask in class or in my office hours.

If you miss any class, you can find **study materials (book, notes, videos) in d2l and contact me** immediately to find extra information. You can email me or come to my office.

Homework: You will see weekly **MOM homework** links in d2l. You can redo MOM homework problems as many times as you want before the deadline. Sometimes you will be asked to **submit 1 pdf file to d2l** or **submit a paper** in class.

Scan App Information
Adobe Scan app

- Android link: https://play.google.com/store/apps/details?id=com.adobe.scan.android&hl=en_US
- Apple link: https://apps.apple.com/us/app/adobe-scan-digital-pdf-scanner/id1199564834
- Video tutorial: https://www.youtube.com/watch?v=MCyhOkBpELc

Genius Scan app

- Android link:https://play.google.com/store/apps/details?id=com.thegrizzlylabs.geniusscan.free&hl=en_US
- Apple link: https://apps.apple.com/us/app/genius-scan-pdf-scanner/id377672876
- Video tutorial: https://www.youtube.com/watch?v=PAmUKvvUjgs

Tentative Course Calendar (Fall 2026)

Adjustments and updates to the course schedule, due to inclement weather or other unforeseen events, will be announced in class.

Week	Section and Topic	STUDENT LEARNING OBJECTIVES - TSWBT (the student will be able to):	Assignments
1 8/24-28	M (1.1) T(1.2) W(1.3) R(1.4)	• Simulate the Josephus problem J(n,3) and its variation J(n,2) • Discover patterns in sequences and familiarize notation • Build truth table for propositions and find logical equivalence • Evaluate the truth value of quantified predicates	**Weekly HW in d2l**
2 8/31-4	M(1.5) T(2.1a) W(2.1b) R(2.2a)	▪ Build truth table for implication and the negation of implication ▪ Fill in the missing steps in a formal proof ▪ Write a contrapositive statement ▪ Write a proof for basic statement in Number Theory	
3 9/7-11	MA(Review) T(2.2b) W(2.3a) R(2.3b)	▪ Review ▪ Study division theorem and evaluate the integer mod integer ▪ Understand the principle of Mathematical Induction and apply ▪ Write proof by mathematical induction	
4 9/14-18	M (2.5a) T(2.5b) W(Review) R(Exam)	• Write proof by contradiction • Study Pigeonhole principle and apply • Review • Exam	**Exam on Thursday**
5 9/21-25	M(3.1) T(3.2) W(3.3) R(3.4)	• Use Venn Diagrams and the inclusion-exclusion principle to find the size of a set • Find the number of subsets of a set • Prove set properties • Use the properties in Boolean Algebra to simplify the operations of sets and logics	
6 9/28-10/2	M(4.1) T(4.3a) W(4.3b) R(4.4)	• Review relations and functions • Find a one-to-one function and onto function between two sets • Use a one-to-one correspondence to show that two sets have the same cardinality • Study properties of relations	
7 10/5-9	M(4.5) T(4.7) W(Review) R(Exam)	• Study equivalence relations and partitions • Study Iterated functions • Review • Exam	**Exam on Thursday**
8* 10/14-20	W(5.1) R(5.2) M(5.3a) T(5.3b)	• Recognize combinatorial equivalence • Use basic rules to count • Counting combinations • Use the combination to build the binomial Theorem	
9* 10/21-27	W (5.4) R (5.5) M(6.1) T(6.2)	▪ Generate other binary sequences ▪ Show a sequence satisfies a recursion ▪ Evaluate probability using a die or a deck of cards ▪ Evaluate probability using sum and product rules	
10* 10/28-11/3	W(6.3) R(6.4) M(6.5) T(Review)	• Evaluate probability in games • Find expected value in games • Use recursion to find expected value • Review	
11** 11/4-10	W(Review) R(Exam) M(7.1a) T(7.1b)	• Review • Exam • Determine if a graph has an Eulerian trail • Study basic terminology and notation in Graph theory	**Exam on Thursday**
12* 11/11-17	W(7.2a) R(7.2b) M(7.3a) T(7.3b)	• Study graph properties • Study tree properties • Show two graphs are isomorphic ▪ Determine if a graph is planar	
13* 11/18-24	W(7.5a) R(Review) M(Review) T(Quiz)	• Investigate the Wolf-Goat-Cabbage problem and finding a winning strategy in removing stones • Review • Review	**Online Quiz on Tuesday**

		• Online Quiz	
14 11/30 - 12/4	M(Review) T(Review) W(Review) R(Review)	• Review for the final.	
16	Final	• Final exam is a cumulative exam. The date will be announced later.	**Final Exam**

Course Syllabus Language for Faculty

Title IX Reporting Requirements

Shippensburg University of Pennsylvania and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by a student during a classroom discussion, in a writing assignment for a class, or as part of a university-approved research project. **Faculty members are obligated to report sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred to the person designated in the University Protection of minors policy.**

Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence are available on the Office of Human Resources website:

Shippensburg University - Title IX Services and Resources

Shippensburg University – Office of Human Resources Title IX Services and Resources

Reports may be made to the following individuals:

Title IX Coordinator – Students
Lorie Sheetz
Vice President of Student Affairs & Dean of Students
Office of Student Affairs
Old Main 210
Shippensburg, PA 17257
Email: LADavis@ship.edu
Phone: 717-477-1164
Or Visit Title IX Reporting Form to report a concern

Title IX Coordinator – Employees/Contractors
Nipa Browder
Associate Human Resources Director
Office of Human Resources
Old Main 109
Shippensburg, PA 17257
Email: Nbrowder@ship.edu
Phone: 717-477-1124 Option 7

Deputy Title IX Coordinators:

Jennifer Milburn
Housing/ResLife
Old Main 210
Shippensburg, PA 17257
Email: JSMilburn@ship.edu
Phone: 717-477-1904

Alix Rouby
Career Center
CUB 108
Shippensburg, PA 17257
Email: AJRouby@ship.edu
Phone: 717-477-1595

Mary Burnett
International Programs
MOW 247
Shippensburg, PA 17257
Email: MEBurnett@ship.edu
Phone: 717-477-1279

Link for the online reporting form: (This is for reporting an issue, not making a formal complaint):

Title IX Report Form

Link for the Formal Complaint form:

Title IX Formal Complaint that must be signed