South Plains College
Common Course Syllabus: MATH 2305

Department: Mathematics, Engineering, and Computer Science

Discipline: Mathematics

Course Number: MATH 2305

Course Title: Discrete Mathematics and Its Applications

Available Formats: hybrid

Campuses: Levelland

Course Description: A course designed to prepare math, computer science, and engineering majors for a background in abstraction, notation, and critical thinking for the mathematics most directly related to computer science. Topics include: logic, relations, functions, basic set theory, countability and counting arguments, proof techniques, mathematical induction, combinatorics, discrete probability, recursion, sequence and recurrence, elementary number theory, graph theory, and mathematical proof techniques.

Prerequisite: Successful completion with a grade of 'C' or better in MATH 2413 and successful completion with a grade of 'C' or better in COSC 1436.

Credit: 3 **Lecture:** 3 **Lab:** 0

Textbook: Discrete Mathematics and its Applications, seventh edition, Kenneth H. Rosen, McGraw-Hill, 2012. ISBN: 978-0-07-338309-5.

Supplies: You must have access to a laptop or desktop where you can complete your homework.

This course partially satisfies a Core Curriculum Requirement: None

Core Curriculum Objectives addressed:

- **Communications skills**—to include effective written, oral, and visual communication
- **Critical thinking skills**—to include creative thinking, innovation, inquiry, analysis, evaluation, and synthesis of information
- **Empirical and quantitative competency skills**—to manipulate and analyze numerical data or observable facts, resulting in informed conclusions

Student Learning Outcomes: Upon completion of this course and receiving a passing grade, the student will be able to:

1. Construct mathematical arguments using logical connectives and quantifiers.
2. Verify the correctness of an argument using propositional and predicate logic and truth tables.
3. Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability.
4. Solve problems involving recurrence relations and generating functions.
5. Use graphs and trees as tools to visualize and simplify situations.

6. Perform operations on discrete structures such as sets, functions, relations, and sequences.
7. Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction.
8. Apply algorithms and use definitions to solve problems to prove statements in elementary number theory.

Student Learning Outcomes Assessment: A pre- and post-test questions will be used to determine the extent of improvement that the students have gained during the semester

Course Evaluation: There will be departmental final exam questions given by all instructors.

Attendance/Student Engagement Policy: Attendance and engagement are the most critical activities for success in this course. The instructor maintains records of the student's attendance and submission of assignments throughout the semester. The student is expected to attend at least eighty percent (80%) of the **total** class meetings **and** submit at least eighty percent (80%) of the **total** class assignments to have the best chance of success. If the student fails to meet these minimum requirements, the instructor may remove the student from the class with an X, upon their discretion, to help the student from harming their GPA. If the student can not receive an X, the instructor will assign an F.

Plagiarism violations include, but are not limited to, the following:
1. Turning in a paper that has been purchased, borrowed, or downloaded from another student, an online term paper site, or a mail-order term paper mill;
2. Cutting and pasting together information from books, articles, other papers, or online sites without providing proper documentation;
3. Using direct quotations (three or more words) from a source without showing them to be direct quotations and citing them; or
4. Missing in-text citations.

Cheating violations include, but are not limited to, the following:
1. Obtaining an examination by stealing or collusion;
2. Discovering the content of an examination before it is given;
3. Using an unauthorized source of information (notes, textbook, text messaging, internet, apps) during an examination, quiz, or homework assignment;
4. Entering an office or building to obtain an unfair advantage;
5. Taking an examination for another;
6. Altering grade records;
7. Copying another's work during an examination or on a homework assignment;
8. Rewriting another student's work in Peer Editing so that the writing is no longer the original student's.
9. Taking pictures of a test, test answers, or someone else's paper.

Absence/Missed Assignments Due to Medical Condition:
A doctor's note is required and will be used by SPC to verify your absence with the health facility. If you miss an assignment due to a medical condition, you must contact your instructor as soon as possible and complete the missed work within one week of the return date listed by the doctor. Failure to do so will result in a grade of zero.

Absence/Missed Assignments Due to SPC-Approved Absence:
If you miss an assignment due to an SPC-approved absence, you must provide a letter from SPC or the professor associated with the event. For example, if the absence is for a sporting event and the excuse letter is from a professor, include their contact information for verification.

You must notify your instructor at least 24 hours prior to missing the assignment and complete the missed work no later than one week from the original due date. Failure to meet these requirements will result in a grade of zero for the missed assignment.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect from the student and the instructor. Neither the instructor nor the student should be subject to others' rude, disruptive, intimidating, aggressive, or demeaning behavior**.** Student conduct that disrupts the learning process or is deemed disrespectful or threatening shall not be tolerated and may lead to disciplinary action and/or removal from class.

South Plains College policies concerning diversity, disabilities, non-discrimination, Title IX Pregnancy Accommodations, and Campus Concealed Carry Statements can be found here: https://www.southplainscollege.edu/syllabusstatements/.

South Plains College policies, return to campus plan, and protocols regarding COVID-19 can be found here: https://www.southplainscollege.edu/emergency/covid19-faq.php.

SPC Bookstore Price Match Guarantee Policy: If you find a lower price on a textbook, the South Plains College bookstore will match that price. The difference will be given to the student on a bookstore gift certificate! The gift certificate can be spent on anything in the store.

If students have already purchased textbooks and then find a better price later, the South Plains College bookstore will price match through the first week of the semester. The student must have a copy of the receipt, and the book must be in stock at the competition at the time of the price match.

The South Plains College bookstore will happily price match BN.com & books on Amazon noted as *ships from and sold by Amazon.com*. Online marketplaces such as *Other Sellers* on Amazon, Amazon's Warehouse Deals, *fulfilled by* Amazon, BN.com Marketplace, and peer-to-peer pricing are not eligible. They will price match the exact textbook, in the same edition and format, including all accompanying materials, like workbooks and CDs.

A textbook is only eligible for a price match if it is in stock on a competitor's website at the time of the price match request. Additional membership discounts and offers cannot be applied to the student's refund.

Price matching is only available on in-store purchases. Digital books, access codes sold via publisher sites, rentals and special orders are not eligible. Only one price match per title per customer is allowed.

Note: The instructor reserves the right to modify the course syllabus and policies, as well as notify students of any changes, at any point during the semester.

SPC Tutors
Tutoring is FREE for all currently enrolled students. Make an appointment or drop-in for help at any SPC location or online! Visit the link below to learn more about how to book an appointment, view the tutoring schedule, get to know the tutors, and view tutoring locations.
http://www.southplainscollege.edu/exploreprograms/artsandsciences/teacheredtutoring.php

Online Tutors
You receive 180 free minutes of Brainfuse tutoring each week, with hours resetting every Monday morning. To access Brainfuse, log in to Blackboard, select Tools from the left-hand menu, and click the Brainfuse link. You will be automatically logged in for free tutoring.

Instructor Course Information: Spring 2026

Time: T/TH 11:00 AM - 12:15 PM (Tuesday Face to Face, Thursday Online)

Course Title: Discrete Mathematics and Its Applications

Instructor: Dr. Don Pathirage

Room: Levelland Math Building 125B

Email: dpathirage@southplainscollege.edu

Office Hours:

Mon (F2F)	Tues (F2F)	Weds (Online)	Thurs (Online)	Friday (Online)
12:00PM - 1:00PM	12:00PM -1:00PM 3:30PM - 5:00PM	12:00PM - 1:00PM	12:00PM - 1:00PM 3:45PM - 5:00PM	12:00PM - 1:30PM Or by appointment

Assignment Policy: All homework due dates, as well as exam dates, are listed on the last page of the syllabus. Homework not submitted by the due date or failure to attend class on a scheduled exam day will result in a zero for the missed work. If a student has already taken an exam or completed homework, under no circumstances will they be allowed to retake that exam/homework (not even a different version of that assignment).

All homework assignments have been given a *Due Date*. Homework turned in late will have 10 points deducted for each day and will be accepted ***no later*** than three days past the due date.

Grading Policy: There will be 3 major exams and a comprehensive final. All exams **must** be taken in person. Your lab grade will be calculated from short quiz grades and homework assignments. Your final grade will be computed as follows:

Major Exams (2):	50%
Final Exam	20%
Lab Grade:	30%

All tests will count towards the final grade; i.e., no exam grades will be "dropped". Only students who miss an exam due to a college-approved absence are eligible to take the makeup exam. If you miss an exam, it is your responsibility to contact me as soon as possible using email. If permission is granted for a makeup exam, I will want it to be taken before the next class meeting. Missing an exam is a serious matter, and it is up to the student to take the proper action; otherwise, a zero will be recorded for that exam. **Your work schedule or any other schedule must not overlap with the class schedule.** When sending an email, please include your course number and section number in the subject line. For example: **MATH2305: [Specify the reason for the contact]**.

Additional Course Objectives:

- To give computer science students the mathematical foundations for future computer science courses.
- To give a foundation in mathematical logic and to explore mathematical reasoning and methods of proof.
- To work with discrete structures, which are abstract mathematical structures used to represent discrete objects and relationships between those objects. These discrete structures include sets, permutations, relations, and graphs.
- To teach algorithmic thinking and the specification, verification, and analysis of algorithms, which can then be implemented by a computer program.
- To explore applications of discrete mathematics, especially in the area of computer science.

MATH2305 Spring 2026 Course Outline

Week	Topics
1 Jan 12 - Jan 16	Introduction & Syllabus
2 Jan 19 - Jan 23	1.1 Propositional Logic 1.2 Applications of Propositional Logic
3 Jan 26 - Jan 30	1.3 Propositional Equivalences
4 Feb 02 - Feb 06	Homework 1 – Due Tuesday by 11:59 PM 1.4 Predicates and Quantifiers
5 Feb 09 - Feb 13	Homework 2 – Due Tuesday by 11:59 PM 1.5 Nested Quantifiers
6 Feb 16 - Feb 20	Homework 3 – Due Tuesday by 11:59 PM 1.6 Rules of Inference
7 Feb 23 - Feb 27	**Exam 1 (Tuesday in-person: Room M125)** Homework 4 – Due Tuesday by 11:59 PM 1.7 Intro to Proofs
8 Mar 02 - Mar 06	Homework 5 – Due Saturday by 11:59 PM 2.1 Sets
9 Mar 09 - Mar 13	2.2 Set Operations
10 Mar 16 - Mar 20	Spring Break - All campuses are closed
11 Mar 23 - Mar 27	Homework 6 – Due Tuesday by 11:59 PM 2.3 Functions
12 Mar 30 - Apr 03	Homework 7 – Due Saturday by 11:59 PM 2.4 Sequences and Summations
13 Apr 06 - Apr 10	**Exam 2 (Tuesday in-person: Room M125)** 3.1 Algorithms 3.2 The Growth of Functions
14 Apr 13 - Apr 17	3.3 Complexity of Algorithms
15 Apr 20 - Apr 24	Homework 8 – Due Saturday by 11:59 PM 4.1 Number Theory: Divisibility and Modular Arithmetic
16 Apr 27 - May 01	Homework 9 – Due Saturday by 11:59 PM 4.2 Integer Representations and Algorithms 4.3 Primes and GCDs
17 May 04 - May 08	***Final Exams (in-person: Room M125):*** May 5th (Tuesday) at 10:15 AM

Missing any listed due dates or failing to attend class on the scheduled exam date, as defined in the syllabus, will result in a grade of zero for the missed work