

South Plains College
Common Course Syllabus: MATH 2305
Revised December 2019

Department: Mathematics, Engineering, and Computer Science

Discipline: Mathematics

Course Number: MATH 2305

Course Title: Discrete Mathematics and Its Applications

Available Formats: conventional

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 be able to store your projects so that they are accessible from anywhere. It is recommended that you purchase a USB flash drive to bring to class. It is recommended that you back up your files on this drive to a home computer or other media.

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, and 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 Policy: Attendance and effort are the most important activities for success in this course. Records of your attendance are maintained throughout the semester. Five (5) absences, **for any reason**, are allotted to the student for the semester. Tardies count as one-half (1/2) of an absence. Tardies will be applied for consistently being late to class, as deemed by the instructor and leaving class early. If this number is exceeded, the instructor has the right to drop you with a grade of F or an X, depending on their discretion.

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.

Student Code of Conduct Policy: Any successful learning experience requires mutual respect on the part of the student and the instructor. Neither instructor nor student should be subject to others' behavior that is rude, disruptive, intimidating, aggressive, or demeaning. 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.

Diversity Statement: In this class, the teacher will establish and support an environment that values and nurtures individual and group differences and encourages engagement and interaction. Understanding and respecting multiple experiences and perspectives will serve to challenge and stimulate all of us to learn about others, about the larger world and about ourselves. By promoting diversity and intellectual exchange, we will not only mirror society as it is, but also model society as it should and can be.

Disability Statement: Students with disabilities, including but not limited to physical, psychiatric, or learning disabilities, who wish to request accommodations in this class should notify the Disability Services Office early in the semester so that the appropriate arrangements may be made. In accordance with federal law, a student requesting accommodations must provide acceptable documentation of his/her disability to the Disability Services Office. For more information, call or visit the Disability Services Office at Levelland (Student Health & Wellness Office) 806-716-2577, Reese Center (Building 8) 806-716-4675, or Plainview Center (Main Office) 806-716-4302 or 806-296-9611.

Nondiscrimination Policy: South Plains College does not discriminate on the basis of race, color, national origin, sex, disability or age in its programs and activities. The following person has been designated to handle inquiries regarding the non-discrimination policies: Vice President for Student Affairs, South Plains College, 1401 College Avenue, Box 5, Levelland, TX 79336. Phone number 806-716-2360.

Title IX Pregnancy Accommodations Statement: If you are pregnant, or have given birth within six months, Under Title IX you have a right to reasonable accommodations to help continue your education. To [activate](#) accommodations you must submit a Title IX pregnancy accommodations request, along with specific medical documentation, to the Director of Health and Wellness. Once approved, notification will be sent to the student and instructors. It is the student's responsibility to work with the instructor to arrange accommodations. Contact the Director of Health and Wellness at 806-716-2362 or [email cqilster@southplainscollege.edu](mailto:cqilster@southplainscollege.edu) for assistance.

Campus Concealed Carry: Texas Senate Bill - 11 (Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in South Plains College buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and South Plains College policy, license holders may not carry a concealed handgun in restricted locations. For a list of locations and Frequently Asked Questions, please refer to the Campus Carry page at: <http://www.southplainscollege.edu/campuscarry.php>
Pursuant to PC 46.035, the open carrying of handguns is prohibited on all South Plains College campuses. Report violations to the College Police Department at 806-716-2396 or 9-1-1.

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 has to 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 price match if it is in stock on a competitor's website at 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.

Instructor Course Information: Spring 2020

Time: MW 11:00 - 12:15

Course Title: Discrete Mathematics and Its Applications

Instructor: Dr. Don Pathirage

Room: Levelland Math Building 125B

Phone: 806-716-2666 (voice mail capable)

Email: dpathirage@southplainscollege.edu

Office Hours:

Mon	Tues	Weds	Thurs	Or by appointment
9:00AM-9:30AM 12:15PM-1:00PM	9:00AM-9:30AM 12:00PM-1:00PM	9:00AM-9:30AM 12:15PM-1:00PM 3:30PM-4:00PM	9:00AM-9:30AM 12:00PM-1:00PM 2:15PM-4:15PM	

Assignment Policy: Current assignments and due dates will be announced in the class. If you are absent, you are still responsible for the assignment for the next class. Students are to read the assigned reading material before coming to class. Quizzes will be to assess if the student is practicing and mastering the materials. **No makeup short quizzes will be given - an absence equals a zero quiz grade.**

All assignments will be given a Due Date. Assignments turned in late will have 10 points deducted for each day and will be accepted **no later** than one week past the due date.

Grading Policy: There will be 3 major exams and a comprehensive final. Your lab grade will be calculated from short quiz grades, notebook grades, and programming assignments. Your final grade will be computed as follows:

Major Exams (3):	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 that miss an exam due to a collage-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.

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 2020 Course Outline

This proposed schedule will change as the semester progresses! Always refer to Blackboard for exact dates.

Week Start date	Topics
1 Jan 13	Introduction 1.1 Propositional Logic
2 Jan 20	<i>Martin Luther King Holiday – Mon January 20, 2020</i> 1.2 Applications of Propositional Logic
3 Jan 27	1.3 Propositional Equivalences
4 Feb 03	1.4 Predicates and Quantifiers
5 Feb 10	1.5 Nested Quantifiers
6 Feb 17	Exam 1 1.6 Rules of Inference
7 Feb 24	1.7 Intro to Proofs
8 Mar 02	2.1 Sets
9 Mar 09	2.2 Set Operations
10 Mar 16	Spring Break
11 Mar 23	2.3 Functions
12 Mar 30	Exam 2 2.4 Sequences and Summations
13 Apr 06	3.1 Algorithms 3.2 The Growth of Functions
14 Apr 13	<i>Mon April 13, 2020 Easter Holiday</i> 3.3 Complexity of Algorithms
15 Apr 20	4.1 Number Theory: Divisibility and Modular Arithmetic Exam 3 <i>Thurs April 23, 2020 Last Drop Day</i>
16 Apr 27	4.2 Integer Representations and Algorithms 4.3 Primes and GCDs
17 Apr 04	Final Exams: May 4, 10:15 a.m.-12:15 p.m.

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