



WACO, TEXAS

**COURSE SYLLABUS
AND
INSTRUCTOR PLAN**

DISCRETE MATHEMATICS

MATH 2305 H045

DR. APRIL K. ANDREAS

NOTE: This is a 16-week, Hyflex course.

DISCRETE MATHEMATICS

MATH 2305 H045

Course Description:

A course designed to prepare math, computer science, and engineering majors for a background in abstraction, notation, critical thinking for the mathematics most directly related to computer science, and computer applications of these concepts. 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.

Prerequisites and/or Corequisites:

MATH 2413 – Calculus I.

Instructor Information:

Instructor Name:	Dr. April K. Andreas
MCC E-mail:	aandreas@mclennan.edu
Contact information:	254-299-8130, Science 221
Office Hours:	https://calendly.com/akandreas
Department Website:	http://www.mclennan.edu/engr/

Required Text & Materials:

- *Concrete Mathematics*, Graham, Knuth, and Patashnik. ISBN: 978-0201558029
- Student Version of Matlab. If you prefer, you can purchase from The MathWorks at http://www.mathworks.com/academia/student_version/. Cost should be approximately \$49 or \$99 (recommended for EEs) when purchasing online. No additional toolboxes should be required for this class

MCC Bookstore Website: <http://www.mclennan.edu/bookstore/>

Additional Requirements:

This class will use Slack for communication. All major course announcements will be posted in Slack – failure to check Slack will result in you missing important information. Also, anything we hear about jobs, scholarships, speakers, etc., will also be posted to Slack in the #general channel.

Slack is free and used in the professional community as a workflow management system, so it is good to gain experience with the tool. All “general questions” like “I’m stuck on problem 5” will be directed to Slack, which will allow you and your classmates to support each other, especially in “time-crunch” situations. (Your classmates are a lot more likely to be up at 3 am

DISCRETE MATHEMATICS

MATH 2305 H045

doing homework than I am going to be checking email.) Always be respectful and professional in your participation.

Please bear in mind that Slack is an open communication tool. Please do not ask for or reveal personal information through the tool. Note that anything you post in Slack in channels will be viewable by other channel participants. Do not post anything about personal grades, due dates, or personal issues. Do not post your own correct solutions to assignments, but you can post incorrect work and ask if anyone can see where you went wrong.

Slack can be used on both a desktop computer and as an app. For more information about Slack in general, visit <https://slack.com/>. You will be invited to our class channel via your MCC student account. Detailed guidelines for Slack are on Brightspace and on Slack itself.

Campus Carry Reminder: According to our new campus carry policy on concealed handguns: “A license holder may carry a handgun in a manner such that it must be close enough to the license holder that he or she can grasp it without materially changing position.” Keep this in mind on exam days, during group work, or at other times when moving about the classroom. During exams, you will have to put all backpacks, purses, etc., away from you and against the wall of the classroom for the duration of the exam.

Methods of Teaching and Learning:

Students will learn through lecture and reading, as well as through work on homework, labs, and exams. Additional methods may be used as opportunities present themselves.

I want this to be the class where you learn how to love the process of figuring something out. From a computer science perspective, what you should be getting from this is how you can reduce the number of computations by figuring out something more cleverly than before.

Course Objectives and/or Competencies:

Upon successful completion of Math 2305, the student will be able to:

1. Construct mathematical arguments using logical connectives and quantifiers. (*All work*)
2. Verify the correctness of an argument using propositional and predicate logic and truth tables. (*Supplemental Material*)
3. Demonstrate the ability to solve problems using counting techniques and combinatorics in the context of discrete probability. (*Chapters 3 and 8, Labs*)
4. Solve problems involving recurrence relations and generating functions. (*Chapter 1, Chapter 5*)

5. Use graphs and trees as tools to visualize and simplify situations. (*Supplemental Material*)
6. Perform operations on discrete structures such as sets, functions, relations, and sequences. (*Chapters 2 and 3*)
7. Construct proofs using direct proof, proof by contraposition, proof by contradiction, proof by cases, and mathematical induction. (*Chapter 2*)
8. Apply algorithms and use definitions to solve problems to prove statements in elementary number theory. (*All work*)
9. Utilize computer software to solve problems applying discrete mathematics concepts. (*Labs*)

Course Attendance/Participation Guidelines:

Since this course is Hyflex, you have three options for daily attendance (not including test days):

- **In Person.** Come to class, as you would for any other class.
- **Zoom.** Log into Zoom using the link provided on Brightspace.
- **Online, on your own time.**

For test and Scholar Day, all students must either be in the classroom or have made alternative arrangements at least two weeks in advance.

If a student is not in attendance in accordance with the policies/guidelines of the class as outlined in the course syllabus as of the course census date, faculty are required to drop students from their class roster prior to certifying the respective class roster. A student's financial aid will be re-evaluated accordingly and the student will only receive funding for those courses attended as of the course census date.

Before the 60% point of the semester, a student who is absent for 25% or more of a course will be withdrawn from the course with a grade of W. A student may also request to be withdrawn with a grade of W before the 60% point of the semester. After the 60% point of the semester, the student may request to be withdrawn if the student is passing, or be assigned the final grade earned at the end of the semester after grades have been updated to reflect missing work.

For this purpose, if you have a non-zero grade for any grade item for that week, you are considered Present. The 25% mark for this class is four weeks. If you have exceeded the maximum number of withdraws by state law, you will remain in the class and be assigned the final grade as earned.

DISCRETE MATHEMATICS

MATH 2305 H045

If you wish to withdraw from this class, you must email me from your MCC student account before 5 pm on the last day for student-initiated withdrawals, with the request "Please withdraw me from COURSE ID and SECTION NUMBER." If the email does not come from your student account, or if the request is verbal, I cannot withdraw you. Otherwise, you will stay on the roster for the rest of the semester and be awarded the grade earned. Withdrawing past the 60% date is only done in documented, extreme, life-crisis circumstances, which usually involve withdrawing from school entirely.

Course Outline or Schedule:

You are responsible for everything listed in the detailed calendar below. Refer to the Course Objectives above to see how they relate to assessments and assignments. Any changes in this schedule will be announced in class, on Slack, or through email. Lectures should be watched on or before the date indicated in the calendar.

Although this is a Hyflex class, you will be required to come to campus twice: once for Scholar Day and once for the final exam, which will be proctored on campus.

Week Starting	Lecture Presented Tuesday (notes due by Wednesday, 11:59 pm)	Lab Presented Thursday (due by Sunday, 11:59 pm)	Due by Friday, 11:59 pm
Aug 21	Project Assignment Lec 1: Discrete Math Practice	Lab 1: Towers of Hanoi Problem	
Aug 28	Lec 2: Recurrence (S 1.1-1.2) Test 1 signups open 7 am	Lab 2: Recursion	Project Topic Approved
Sep 4	Lec 3: The Repertoire Method (S 1.3)	Lab 3: Repertoire Method	Test 1 Problem Selection
Sep 11	Lec 4: Sums and recurrences (S 2.2)	Lab 4: Counting and Loops	First Test 1 Meeting + Bring 1/3 Poster Draft
Sep 18	Lec 5: More Sums and Recurrences (S 2.2)	Lab 5: Sums and Recurrences	Second Test 1 Meeting
Sep 25	Lec 6: Multiple Sums (S 2.4) Test 2 signups open 7 am	Lab 6: Multiple Sums	Test 1 YouTube Link
Oct 2	Lec 7: General Methods (S 2.5)	Lab 7: Integrals with Summations	Test 2 Problem Selection + Test 1 Reviews

DISCRETE MATHEMATICS

MATH 2305 H045

Week Starting	Lecture Presented Tuesday (notes due by Wednesday, 11:59 pm)	Lab Presented Thursday (due by Sunday, 11:59 pm)	Due by Friday, 11:59 pm
Oct 9	Lec 8: Proof by Induction (not in book)	Lab 8: Proof by Induction	First Test 2 Meeting + Bring 2/3 Poster Draft
Oct 16	Lec 9: Floor and Ceiling Recurrences (S 3.3)	Lab 9: Ceiling and Floor Applications	Second Test 2 Meeting (required if previous test grade was < 85)
Oct 23	Lec 10: Proofs with Mods (S 3.4) Test 3 signups open 7 am	Lab 10: Modulo	Test 2 YouTube Link
Oct 30	Lec 11: Derivation of RSA (not in book)	Lab 11: Programming RSA	Test 3 Problem Selection + Test 2 Reviews
Nov 6	Lec 12: Binomial Coefficients (S 5.1)	Lab 12: Binomial Distribution Lab	First Test 3 Meeting + Bring Final Poster Draft
Nov 13	Lec 13: Reverse Polish Notation Take-home final portion available	Lab 13: Dijkstra's Algorithm	Scholar Day 9 am - noon Second Test 3 Meeting (required if previous test grade was < 85)
Nov 20	Lab 14: Monte Carlo Analysis (due Sunday)	<u>No lab - Thanksgiving holiday</u>	Test 3 YouTube Link
Nov 27	In-class work on take-home final	In-class work on take-home final	Final Exam Part 1 (Take-home portion) + Test 3 Reviews

Final Exam: Tuesday, December 5, 1 pm – 3 pm, S 131

DISCRETE MATHEMATICS

MATH 2305 H045

Course Grading Information:

Item Type	Weight
Notebook	15%
Lab Work	15%
Research Project	20%
Tests	30%
Final Exam	20%

A: 90% + B: 80% – 89% C: 70% – 79% D: 60% – 69% F: 0% – 59%

Notebook: You will be expected to keep a notebook on the lecture material, with details to be provided in class. You'll turn them in online by 11:59 pm every Wednesday.

Lab Work: Labs relate the lecture material to programming and are due by 11:59 pm every Sunday.

Research Project: The research project will involve a poster presentation and will be done as an individual project. ***This project will require your attendance at MCC Scholar day.***

Tests: Students will be assigned challenge problems, which will need to be presented in detail. These will serve as tests for each chapter.

Comprehensive Final Exam: The final exam grade cannot be dropped or retaken. There will be an in-class portion and a take-home portion.

Learning Lab. The Learning Lab in the Science Building, room 135, has many reference books available, and you may find some success studying there. There are also five computers that have Matlab installed, which you can use to work on your homework.

Academic Dishonesty. Any student that is found guilty of academic dishonesty such as cheating, plagiarism, or collusion, will receive the zero grade on every test or assignment involved. For repeated or serious violations, a guilty student can be assigned a failing grade in this course and can be recommended for suspension from the McLennan Community College District.

Late Work, Attendance, and Make Up Work Policies:

MCC allows for “excused” absences under these circumstances: authorized participation in official College functions; personal illness, or the illness of a dependent (such as a child) that

DISCRETE MATHEMATICS

MATH 2305 H045

requires the student to serve as a caretaker; an illness or a death in the immediate family; the observance of a religious holy day. Additionally, accommodations can be made for special circumstances related to military service, changes in immigration status, pregnancy and parenting protection under Title IX. It is your responsibility to let me know the reason for an absence the day you return to campus and provide sufficient documentation (doctor's note, email from coach, etc.).

Whether you are in class or not, you are expected to meet all deadlines, unless you have documentation of an MCC-approved absence. Work ahead to stay on top of things.

Student Behavioral Expectations or Conduct Policy:

Students are expected to maintain classroom decorum that includes respect for other students and the instructor, prompt and regular attendance, and an attitude that seeks to take full advantage of this educational opportunity.

[Click Here for the MCC Attendance/Absences Policy](https://www.mclennan.edu/highlander-guide/policies.html)

(<https://www.mclennan.edu/highlander-guide/policies.html>)

Click on the link above for the college policies on attendance and absences. Your instructor may have additional guidelines specific to this course.

Updated 07/18/2023



ACADEMIC RESOURCES/POLICIES

Accommodations/ADA Statement:

Any student who is a qualified individual with a disability may request reasonable accommodations to assist with providing equal access to educational opportunities. Students should contact the Accommodations Coordinator as soon as possible to provide documentation and make necessary arrangements. Once that process is completed, appropriate verification will be provided to the student and instructor. Please note that instructors are not required to provide classroom accommodations to students until appropriate verification has been provided by the Accommodations Coordinator. For additional information, please visit www.mclennan.edu/disability.

Students with questions or who require assistance with disabilities involving physical, classroom, or testing accommodations should contact:

disabilities@mclennan.edu 2542998122 Room
319, Student Services Center

Title IX:

We care about your safety, and value an environment where students and instructors can successfully teach and learn together. If you or someone you know experiences unwelcomed behavior, we are here to help. Individuals who would like to report an incident of sexual misconduct are encouraged to immediately contact the acting Title IX Coordinator at titleix@mclennan.edu or by calling, Dr. Claudette Jackson, (Accommodations/Title IX) at (254) 299-8465. MCC employees are mandatory reporters and must report incidents immediately to the Title IX Coordinator. Individuals may also contact the MCC Police Department at (254) 299-8911 or the MCC Student Counseling Center at (254) 299-8210. The MCC Student Counseling Center is a

confidential resource for students. Any student or employee may report sexual harassment anonymously by visiting <http://www.lighthouse-services.com/mclennan/>. Go to McLennan's Title IX webpage at www.mclennan.edu/titleix/. It contains more information about definitions, reporting, confidentiality, resources, and what to do if you or someone you know is a victim of sexual misconduct, gender-based violence or the crimes of rape, acquaintance rape, sexual assault, sexual harassment, stalking, dating violence, or domestic violence.

Student Support/Resources:

MCC provides a variety of services to support student success in the classroom and in your academic pursuits to include counseling, tutors, technology help desk, advising, financial aid, etc. A listing of these and the many other services available to our students is available at <http://www.mclennan.edu/campus-resource-guide/>

Academic Support and Tutoring is here to help students with all their course-related needs. Specializing in one-on-one tutoring, developing study skills, and effectively writing essays. Academic Support and Tutoring can be found in the Library and main floor of the Learning Commons. This service is available to students in person or through Zoom. You can contact the Academic Support and Tutoring team via Zoom or email (ast@mclennan.edu) by going to our website (<https://www.mclennan.edu/academic-support-and-tutoring/>).

College personnel recognize that food, housing, and transportation are essential for student success. If you are having trouble securing these resources or want to explore strategies for balancing life and school, we encourage you to contact either MCC CREW – Campus Resources Education Web by calling (254) 299-8561 or by emailing crew@mclennan.edu or a Success Coach by calling (254) 299-8226 or emailing SuccessCoach@mclennan.edu. Both are located in the Completion Center located on the second floor of the Student Services Center (SSC) which is open Monday-Friday from 8 a.m.-5 p.m.

Paulanne's Pantry (MCC's food pantry) provides free food by appointment to students, faculty and staff. To schedule an appointment, go to https://mclennan.co1.qualtrics.com/jfe/form/SV_07byXd7eB8iTqJg. Both the Completion Center and Paulanne's Pantry are located on the second floor of the Student Services Center (SSC).

MCC Foundation Emergency Grant Fund:

Unanticipated expenses, such as car repairs, medical bills, housing, or job loss can affect us all. Should an unexpected expense arise, the MCC Foundation has an emergency grant fund that may be able to assist you. Please go to

<https://www.mclennan.edu/foundation/scholarships-and-resources/emergencygrant.html>

to find out more about the emergency grant. The application can be found at

https://www.mclennan.edu/foundation/docs/Emergency_Grant_Application.pdf.

MCC Academic Integrity Statement:

Go to www.mclennan.edu/academic-integrity for information about academic integrity, dishonesty, and cheating. The unauthorized use of artificial intelligence (AI) for classwork can be a violation of the College's General Conduct Policy. Whether AI is authorized in a course and the parameters in which AI can be used in a course will be outlined by each instructor.

Minimum System Requirements to Utilize MCC's D2L|Brightspace:

Go to <https://www.mclennan.edu/center-for-teachingandlearning/FacultyandStaffCommons/requirements.html> for information on the minimum system requirements needed to reliably access your courses in MCC's D2L|Brightspace learning management system.

Minimum Technical Skills:

Students should have basic computer skills, knowledge of word processing software, and a basic understanding of how to use search engines and common web browsers.

Backup Plan for Technology:

In the event MCC's technology systems are down, you will be notified via your MCC student email address. Please note that all assignments and activities will be due on the date specified in the Instructor Plan, unless otherwise noted by the instructor.

Email Policy:

McLennan Community College would like to remind you of the policy (<http://www.mclennan.edu/employees/policy-manual/docs/E-XXXI-B.pdf>) regarding college email. All students, faculty, and staff are encouraged to use their McLennan email addresses when conducting college business.

A student's McLennan email address is the preferred email address that college employees should use for official college information or business. Students are

expected to read and, if needed, respond in a timely manner to college emails. For more information about your student email account, go to www.mclennan.edu/studentemail.

Instructional Uses of Email:

Faculty members can determine classroom use of email or electronic communications. Faculty should expect and encourage students to check the college email on a regular basis. Faculty should inform students in the course syllabus if another communication method is to be used and of any special or unusual expectations for electronic communications.

If a faculty member prefers not to communicate by email with their students, it should be reflected in the course syllabus and information should be provided for the preferred form of communication.

Email on Mobile Devices:

The College recommends that you set up your mobile device to receive McLennan emails. If you need assistance with set-up, you may email Helpdesk@mclennan.edu for help.

You can find help on the McLennan website about connecting your McLennan email account to your mobile device:

- [Email Setup for iPhones and iPads](#)
- [Email Setup for Androids](#)

Forwarding Emails:

You may forward emails that come to your McLennan address to alternate email addresses; however, the College will not be held responsible for emails forwarded to an alternate address that may be lost or placed in junk or spam filters.

For more helpful information about technology at MCC, go to [MCC's Tech Support Cheat Sheet](#) or email helpdesk@mclennan.edu.

Disclaimer:

The resources and policies listed above are merely for informational purposes and are subject to change without notice or obligation. The College reserves the right to change policies and other requirements in compliance with State and Federal laws. The provisions of this document do not constitute a contract.