

Discrete Mathematics, MAT* K210, CRN 32035

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Office Hours: Tuesday/Thursday 10:00-12:00pm and Monday/Wednesday 9:30am-10:30am,
or by appointment.

Class Hours: Tuesday/Thursday 2:00pm-3:15pm

Class Room: D212

Prerequisite

MAT* K186 or permission of the instructor.

Required Material

In order to succeed in this class, the following items are **NECESSARY**;

1. Discrete Mathematics and Its Applications, 7th edition by Kenneth H Rosen. ISBN : 9780073383095
2. Please note, the use of Cell phones, tablets, or any sorts of electronic devices during class times, are **STRONGLY PROHIBITED**.
3. A notebook and something to write with is **REQUIRED**.

Course Description

This course provides an introduction to set theory, logic and number theory. The ideas of algorithms and proof will be developed through the content.

Evaluations

Homework 35% Attendance 15%, Midterm 25%, and Final exam 25%.

Support Services

T.A.S.C, peers, or me during my office hours or by appointment.

Grading Policy

This is how the grade will be scale in the class. There will be **NO CURVE**. However, I will **not stop and deny you** if you want to improve your grade, meaning you are allow to do retakes as many times as you want, (just be aware that it will be harder compare to your previous one). Below is the measurements for the minimum/maximum for each letter grade.

- From $93 \rightarrow 100 \implies A$ $92 \rightarrow 90 \implies A-$
- From $89 \rightarrow 87 \implies B+$ $86 \rightarrow 83 \implies B$ $82 \rightarrow 80 \implies B-$
- From $79 \rightarrow 77 \implies C+$ $76 \rightarrow 73 \implies C$ $72 \rightarrow 70 \implies C-$
- From $69 \rightarrow 67 \implies D+$ $66 \rightarrow 63 \implies D$ $62 \rightarrow 60 \implies D-$
- From $59 \rightarrow 0 \implies F$

Class Cancellation

In case of increment weather, check the college website for class cancellations or call 860-215-9000 for recorded message.

During Class

I **WILL NOT TOLERATE** the use of electronics in this class, **EXCEPT** if this is an accomadation. Please refrain from using computers for anything but activities related to the class. Phones are prohibited as they are rarely useful for anything in the course. Eating and drinking are allowed in class but please refrain from it affecting the course. Try not to eat your lunch in class as the classes are typically active.

Attendance Policy

It is **VERY IMPORTANT** you attend class because if you do not you will see the outcome of it at the end of the semester and also it might impact your **FINANCIAL AID**, so please be mindful of that. Attendance is expected in all lecture. Valid excuses for absence will be accepted before class. In extenuating circumstances, valid excuses with proof will be accepted after class. For every class missed your knowledge about the subject will be decreasing, and in term of moving forward it will be difficult in your part. It is **YOUR RESPONSIBILITY** to find what you miss **NOT MINE**. Your life, your choice, and your education.

Academic Integrity and Honesty

At TRCC, we expect the highest standards of academic honesty. All students are expect to demonstrate integrity in the completion of their coursework. Academic integrity means doing one's own work and giving proper credit to the work and ideas of others. It is the responsibility of each student to become familiar with what constitutes academic dishonesty and plagiarism and to avoid all forms of cheating and plagiarism. Students who engage in plagiarism and other forms of academic misconduct will face academic and possibly disciplinary consequences. Academic sanctions can range from a reduced grade for the assignment to a failing grade for the course. From a disciplinary standpoint, an Academic Misconduct Report may be fill and a Faculty Hearing Board may impose sanctions such as probation, suspension or expulsion.

Accommodations for Disabilities

If you have a disability that may affect your progress in this course, please meet with a Disability Service Provider (DSP) as soon as possible. Please note that accommodations cannot be provided until you provide written authorization from a DSP.

College Disabilities Service Provider:

- Matt Liscum, Counselor he can be reach at (860) 215-9265, and his office is at Room A113. He will be able to provide service for people that has learning disabilities, ADD/ADHD, Autism Spectrum, and Mental Health Disabilities.
- Elizabeth Wilcox, Advisor, she can be reach at (860) 215-9289, and her office is at Room A113 as well. She will be able to help people with medical, mobility, and sensory disabilities.

Discrimination based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation is a violation of state and federal law and TRCC policy and will not be tolerated. Harassment of any person (either in the form of quid pro quo or creation of a hostile environment) based on race, color, religion, creed, sex, national origin, age, disability, veteran status, or sexual orientation also is a violation of state and federal law and TRCC policy and will not be tolerated. Retaliation against any person who complains about discrimination is also prohibited. CT State's policies and regulations covering discrimination, harassment, and retaliation may be accessed at **STUDENT HANDBOOK** Any person who feels that he or she has been the subject of prohibited discrimination, harassment, or retaliation should contact the Office.

Digication Statement

All students are required to maintain an online learning portfolio in Digication that uses the college template. Through this electronic tool, students will have the opportunity to monitor their own growth in college-wide learning. The student will keep his/her earning portfolio and may continue to use the Digication account after graduation. A Three Rivers General Education Assessment Team will select and review random works to improve the college experience for all. Student work reviewed for assessment purposes will not include names and all student work will remain private and anonymous for college improvement purposes. Students will have the ability to integrate learning from the classroom, college, and life in general, which will provide additional learning opportu-

nities. If desired, students will have the option to create multiple portfolios.

Few things you need to be aware of

1. If I caught you on your cell phone during lecture or assessment time, the instructor will immediately will expel you from the class for that day. As a result you will not get any credit for the day and worse you will fail the assessment automatically.
2. If you are being disruptive lots of time wether during class period or during assessment time, **I will be ask you to leave the classroom.** Again you will get no credit for the day, or worse you fail the assessment automatically.
3. **I will not accept late work.**
4. If you miss an assignment wether it is a quiz, exam, or anything in particular that was graded. Without a proper excuse, **I will not** let you make it up.

Words of Wisdom

"My philosophy about teaching is simple, I am here to help you develop your own idea not through show you how to solve a problem step by step, rather by your own way of thinking."

Let's face the truth, Math is simply learning by doing it yourself.

Course Outcomes

Upon completion of the course, student should be able to:

1. Understand and write basic proofs (direct, contradiction, exhaustion, induction, etc.);
2. Explain and solve problems involving logic, Boolean algebra, sets, relations, functions, and recurrence relations;
3. Explain and solve problems involving counting techniques including permutations, combinations, binomial theorem, and probability;
4. Use logical notation to define and reason about fundamental mathematical concepts such as sets, relations, functions, and integers;
5. Evaluate elementary mathematical arguments and identify fallacious reasoning as well as fallacious conclusions;
6. Prove elementary properties of modular arithmetic and explain their applications in Computer Science, for example, in cryptography and hashing algorithms.

Course Content

Chapter 1 The Foundations: Logic and Proofs

1. Sec. 1.1 Propositional Logic
2. Sec. 1.2 Applications of Propositional Logic
3. Sec. 1.3 Propositional Equivalence
4. Sec. 1.4 Predicates and Quantifiers
5. Sec. 1.5 Nested Quantifiers
6. Sec. 1.6 Rules of Inference
7. Sec. 1.7 Introduction to Proofs
8. Sec. 1.8 Proof Methods and Strategy

Chapter 2 Basic Structures: Sets, Functions, Sequences, Sums, and Matrices

1. Sec. 2.1 Sets
2. Sec. 2.2 Sets Operations
3. Sec. 2.3 Functions
4. Sec. 2.4 Sequences and Summations
5. Sec. 2.5 Cardinality of Sets
6. Sec. 2.6 Matrices

Chapter 3 Algorithms

1. Sec. 3.1 Algorithms
2. Sec. 3.2 The Growth of Functions
3. Sec. 3.3 Complexity of Algorithms

Chapter 4 Number Theory and Cryptography

1. Sec. 4.1 Divisibility and Modular Arithmetic

2. Sec. 4.2 Integer Representations and Algorithms
3. Sec. 4.3 Primes and Greatest Common Divisors
4. Sec. 4.6 Solving Congruences
5. Sec. 4.7 Cryptography

Chapter 5 Induction and Recursion

1. Sec. 5.1 Mathematical Induction
2. Sec. 5.2 Strong Induction and Well-ordering
3. Sec. 5.4 Recursive Algorithms
4. Sec. 5.5 Program Correctness

Chapter 6 Counting

1. Sec. 6.1 The Basic of Counting
2. Sec. 6.2 The Pigeonhole Principle
3. Sec. 6.3 Permutations and Combinations
4. Sec. 6.4 Binomial Coefficients and Identities
5. Sec. 6.5 Generalized Permutations and Combinations
6. Sec. 6.6 Generating Permutations and Combinations

Chapter 8 Advance Counting Techniques

1. Sec. 8.1 Applications or Recurrence Relations
2. Sec. 8.3 Solving Linear Recurrence Relations

Chapter 9 Relation

1. Sec. 9.2 n -ary Relations and their Applications

Chapter 10 Graphs

1. Sec. 10.1 Graphs and Graphs Model
2. Sec. 10.3 Representing Graphs and Graphs Isomorphism
3. Sec. 10.5 Euler and Hamilton Paths
4. Sec. 10.6 Shortest Paths Problems