


**School of Data Science and Analytics**

**MATH 8030: Applied Discrete and Combinatorial Mathematics for Data Analysts**

# Fall 2025

# Course Information

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Class meeting time: 1:25-2:40

Modality and Location: Atrium 1112
*Syllabus is posted at* https://facultyweb.kennesaw.edu/jdemaio/MATH\_8030\_Discrete\_home\_page.php

# Instructor and Course Information

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**Professor:** Dr. Joe DeMaio
**Office:** Atrium aka J 3437
Fall 2025 Office hours: MW 12:00-1:20
**Phone:** N/A Send email or contact through TEAMS
**e-mail:** Do not email me through D2L (reply function does not work). Send email to me directly atjdemaio@kennesaw.edu

**Coding: Ability to use SAS or R is expected for projects**

**Textbook:** Discrete and Combinatorial Mathematics, Grimaldi, 5th edition

Course Description

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***Prerequisite:*** Admission to the program or the department.

This course covers applied discrete mathematics and combinatorial tools for data analyst. Topics covered include principles of counting, set theory, mathematical induction, and functions. Examples using applied data analysis and associated computing are used throughout.

# Course Learning Outcomes

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The student will be able to differentiate between discrete and continuous values.

The student will be able to differentiate between different sizes of infinity.

The student will understand and apply techniques of enumeration.

The student will be able to manipulate the binomial and multinomial coefficients.

The student will demonstrate an understanding of discrete probability.

The student will gain an understanding of functions on discrete domains and ranges.

The student will be able to construct proofs using the technique of induction.

The student will be able to construct combinatorial proofs.

The student will understand and be able to manipulate the binomial theorem.

# Evaluation and Grading Policies

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There will be three tests and an Analytics Day project. Each count 25% towards your final grade. Letter grades will be assessed on a 10-point scale. However, tests will have more than 100 possible points available so extra points are available to be earned. The final exam will be cumulative. Cheating may result in a grade of an 'F' for the course! I do not report grades to students over the phone or through e-mail. I will not give your test to a friend. You must come to class or my office to pick up a test if you are not in class when I return it.

**I do not drop, nor do I replace any grades!
I do not give make-up tests, unless there is a good reason, and you must contact me prior to 48 hours after the test. A good reason includes uncontrollable and/or unforeseeable events beyond your control.
There are no extra credit projects!
I do not make deals at the end of the semester for grades!**

# Course Policies

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**Homework**

There will be homework problems for each section covered. This homework will not be taken up and graded. It is to give you a point of reference from which to work. Test problems are often slight variations of homework problems if not the exact problem. The only way to succeed in this class is by doing all of the assigned homework! Merely, attending class will not be enough. A student will encounter a large number of techniques and examples in this course. It is vital to know and understand these new concepts. Successive lectures will assume the knowledge of previously stated techniques and examples. One must keep up with this material on a day-to-day basis! Because homework problems are not graded, you are allowed and strongly encouraged to work together on homework problems. I believe that it is very beneficial to regularly work problems in small groups of two to four people. This will decrease your chances of getting stuck on a problem and give you someone, other than your instructor, with whom to discuss homework problems. Obviously, however, you must also be able to work problems without guidance for testing situations and when presenting at the board.

**Homework is mandatory (if you want a good grade) even though there is no homework grade!**

**Attendance**

Every mathematics class is a building process from day one (actually, even from grade one). A student who misses classes has seriously compromised his or her knowledge of the material and will begin to feel an effect on their final grade. Attendance and class participation are important elements to incorporate into your study habits. I will distribute a sign-in sheet to document attendance at the beginning of each class. During the summer term I may, from time to time, distribute a second sign-in sheet after the break. Signing for another student will be treated as an honor code violation. A student who misses a class is responsible for all material missed. Due to time constraints your instructor cannot re-present the lecture in a one-on-one setting. If circumstances dictate that a student will miss numerous class meetings, perhaps now is not the semester to take this course. You are permitted 3 unexcused absences from this course. After those three, one loses 3 points for every additional unexcused absence from your final course average. Excused absences include health reasons as documented by a physician and conference attendance related to your Data Science program, among others. Sponsored lab meetings are not excused. If you are double-booked for such meetings let me know ASAP.

**Students with poor attendance will be reminded of such during discussions of their grade or special requests and will likely be the subject of discussion with your Program Director.**

**Discrete Project**

Each student will complete a project that utilizes discrete mathematics in a significant way. You may work in pairs. Should there be an odd number of students we can negotiate on a project group of size three or one. Each group will present their project in poster format at Analytics Day and the KSU Symposium of Student Scholars. Each group member is equally responsible regarding the project. Should it appear to me that a group member is not carrying their weight, I reserve the right to assign different grades to different group members. Each project should be original and be the foundation of a talk/paper of interest to the Data Science community. This project represents 25% of your grade. Ideally, projects transform themselves into papers for publication. During class presentations of project work when I or other students give suggestions (that I verbally agree with) regarding “how to improve your project”, you should interpret such as “how to improve your project grade.”

**Important Dates**
**9/10/2025 Test 1**
**10/15/2025 Test 2**
**11/21/2025 Analytics' Day**
**12/15/2025 Final Exam**

**Instructional Continuity Plan**

Kennesaw State University (KSU) may decide to close campuses, operate on a delayed schedule, or transition to remote instruction for inclement weather or in case of emergency.

The University will announce campus closures, delayed schedules, or remote instruction through KSU Alerts sent to your cell number on file and to your university email account. In addition, announcements will be posted on KSU’s home page: www.kennesaw.edu.

Typical class continuity plans include:

1. Communication: Please check e-mail for necessary instructions.
2. Virtual Classes: If in-person classes are not possible, we may transition to virtual classes using MS Teams.
3. Assignments and Assessments: Deadlines for assignments and assessments may be adjusted to accommodate the emergency.

**Always be safe.** Given that you are high achieving graduate students with access to online communication tools, study/project time can occur anywhere.

I understand that emergencies create unique challenges. Individual emergencies will be handled on a case-by-case basis. Please reach out to me via e-mail as soon as is reasonably possible. The university also offers resources such as counseling and academic support, which can be accessed remotely.

**Policy on the Usage of Artificial Intelligence**

*AI Use Allowed, but Not Required:*

*In this class, you are welcome to use AI for homework and study. It can be a helpful tool. AI is not to be used as a calculator. Also, you should note that all AI generative tools still tend to make up incorrect facts and fake citations, code generation models tend to produce inaccurate outputs, and image/art generation tools can produce copied work or offensive products. You will be responsible for any inaccurate, biased, offensive, or otherwise unethical content you submit regardless of whether it originally comes from you or an AI tool. You may not use AI on a test. The use of an AI tool without acknowledgement is cheating and constitutes a violation of the KSU Code of Academic Integrity.*

# Institutional Syllabus Policies, Procedures, and Resources

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[Federal, BOR, & KSU Required Syllabus Policies and Student Resources](https://www.kennesaw.edu/curriculum-instruction-assessment/academic-program-planning-development/resources/student-syllabus-resources.php)