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

**Fall Semester 2024**

**Instructor – Joe DeMaio**

**CATALOG COURSE DESCRIPTION**

Prerequisite: Admission to the Analytics and Data Science, PhD program or permission by the department.
This course covers applied discrete mathematics and combinatorial tools for data analyst. Topics covered include principles of counting, set theory, mathematical induction, functions. Examples using applied data analysis and associated computing are used throughout.

**Expected Learning Outcomes**:

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.

**Professor:** Dr. Joe DeMaio
**Office:** Atrium 349
**Office Hours:** 12:30PM - 1:20 PM MW and by appointment
**Phone:** (770) 423-6568
**e-mail:** Do not email me through D2L (reply function does not work). Send email to me directly atjdemaio@kennesaw.edu
**Web Page: http://facultyweb.kennesaw.edu/jdemaio/**

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

**Grading**

There will be two tests, an Analytics Day project and a final exam. Each counts 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 the 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 them.

**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)
There are no extra credit projects!
I do not make deals at the end of the semester for grades!**

**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 the assigned homework! Merely, attending class will not be enough. A student will encounter many 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.

**Attendance is mandatory (if you want a good grade) even though there is no attendance**