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

**Fall Semester 2023**

**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:** Clendenin 3011
**Office Hours:** 3:30PM - 4:30 PM TTh 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. You will be allowed to use a single 3” x 5” index card of notes on each test. Notes in any other form will not be allowed and will be confiscated. 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 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) despite the fact that 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) despite the fact that there is no attendance grade.**

Required Syllabus information as of 8/8/2023

The information below constitutes the Federal, BOR, and KSU course syllabus policies and procedures and must be included by faculty members in their course syllabi. These policies are updated on this site annually.

## Course Delivery

KSU may shift the method of course delivery at any time during the semester in compliance with University System of Georgia health and safety guidelines.  In this case, alternate teaching modalities that may be adopted include hyflex, hybrid, synchronous online, or asynchronous online instruction.

## Face Coverings

Based on guidance from the University System of Georgia (USG), masks are encouraged based on individual preference and assessment of personal risk. Disposable face coverings can be picked up at the Office of Emergency Management at Chastain Pointe on the Kennesaw campus and Norton Hall Police Precinct on the Marietta campus. Please email oem@kennesaw.edu if you have questions.

## KSU Academic Integrity Statement

Every KSU student is responsible for upholding the provisions of the [Student Code of Conduct](https://web.kennesaw.edu/scai/content/ksu-student-code-conduct), as published in the Undergraduate and Graduate Catalogs. Section 5c of the Student Code of Conduct addresses the university’s policy on academic honesty, including provisions regarding plagiarism and cheating, unauthorized access to university materials, misrepresentation/falsification of university records or academic work, malicious removal, retention, or destruction of library materials, malicious/intentional misuse of computer facilities and/or services, and misuse of student identification cards. Incidents of alleged academic misconduct will be handled through the established procedures of the Department of Student Conduct and Academic Integrity (SCAI), which includes either an “informal” resolution by a faculty member, resulting in a grade adjustment, or a formal hearing procedure, which may subject a student to the Code of Conduct’s minimum one semester suspension requirement.

Note to Faculty: The KSU faculty handbook requires the Academic Integrity Policy in the course syllabus.

## KSU Disruption of Campus Life Policy

All students are responsible for knowing the information, policies and procedures outlined in the Kennesaw State University Codes of Conduct. [Student Conduct and Academic Integrity](http://scai.kennesaw.edu/) (SCAI) includes: the general Student Code of Conduct, the Residential Code of Conduct, and the Code of Academic Integrity.

## KSU Web Accessibility Policy Statement

Federal law Section 508 Subsection 1194.22 of the Rehabilitation Act and the Board of Regents (BOR) of the University System of Georgia (USG) Web Accessibility Guidelines require that all web content meet the federal government’s accessibility guidelines. As such, KSU complies with USG guidelines.

University accessibility assistance is provided by several offices as noted below. Staff in these offices work to accommodate requests for access or assistance with access as soon as possible in order to either accommodate the request or identify an effective alternative for the requestor.

* **REQUEST FOR**

**OFFICE**

**CONTACT NUMBER**

**CONTACT EMAIL**

##### Student Support Services

##### Student Disability Services

##### 470-578-2666

##### studentdisability@kennesaw.edu

##### Student Technology Assistance

##### University Information Technology Services

##### 470-578-3555

##### studenthelpdesk@kennesaw.edu

##### Third Party Technology Assistance

##### University Information Technology Services

##### 470-578-6999

##### service@kennesaw.edu

## KSU Reasonable Accommodations Policy

Students with qualifying disabilities under the Americans with Disabilities Act (ADA) and/or Section 504 of the Rehabilitation Act who require “reasonable accommodation(s)” to complete the course may request those from Office of Student Disability Services. Students requiring such accommodations are required to work with the University’s Office of Student Disability Services rather than engaging in this discussion with individual faculty members or academic departments. If, after reviewing the course syllabus, a student anticipates or should have anticipated a need for accommodation, he or she must submit documentation requesting an accommodation and permitting time for a determination prior to submitting assignments or taking course quizzes or exams. Students may not request retroactive accommodation for needs that were or should have been foreseeable. Students should contact the office as soon as possible in the term for which they are seeking accommodations. Student Disability Services is located in the Carmichael Student Center in Suite 267 on the Kennesaw campus or Building A in Suite 160G on the Marietta campus. Please visit the [Student Disability Services (SDS) website](https://sds.kennesaw.edu/)for more information, or call the office at 470-578-2666 (Kennesaw campus) or 470-578-9111 (Marietta campus).

## KSU Enrollment Management/Course Attendance Policy

Students are solely responsible for managing their enrollment status in a class; nonattendance does not constitute a withdrawal.

## Copyright Law

It is the responsibility KSU faculty and students to respect the rights of copyright holders and complying with copyright law. The University System of Georgia recognizes that the exclusive rights of copyright holders are balanced by limitations on those rights under federal copyright law, including the right to make a fair use of copyrighted materials and the right to perform or display works in the course of face-to-face teaching activities.

The University System of Georgia facilitates compliance with copyright law and, where appropriate, the exercise in good faith of full fair use rights by faculty and staff in teaching, research, and service activities. The University System of Georgia ensure compliance with copyright law in the following ways.

1. The USG informs and educates students, faculty, and staff about copyright law, including the limited exclusive rights of copyright holders as set forth in 17 U.S.C. § 106, the application of the four fair use factors in 17 U.S.C. § 107, and other copyright exceptions.
2. The USG develops and makes available tools and resources for faculty and staff to assist in determining copyright status and ownership and determining whether use of a work in a specific situation would be a fair use and, therefore, not an infringement under copyright law;
3. The USG facilitates use of materials currently licensed by the University System of Georgia and provides information on licensing of third-party materials by the University System; and
4. The USG identifies individuals at the University System and member institutions who can counsel faculty and staff regarding application of copyright law.

## Protecting Students' Privacy (FERPA)

Students have certain rights to privacy. These rights are mandated by federal policy. Leaving their work in an unsecured area such as outside your office door (unless agreed upon with each student) means that the students’ names and grades and possibly social security numbers are accessible to everyone. Additionally, research papers can be taken and used by other individuals. It is recommended that you permit students to retrieve their work from your office if you don’t return it to them in class. Information should not be made public in any way in which a student’s grades, social security number, or other personal information may be identified. Grade information may be shared with members of the KSU community who also have a legitimate educational interest in student success (e.g. academic advisors or members of the Behavioral Response Team). Faculty may be asked to provide early alert information if there is a concern that a student is at risk, academically or otherwise.

As a member of the Kennesaw State University community of scholars, I understand that my actions are not only a reflection on myself, but also a reflection on the University and the larger body of scholars of which it is a part. Acting unethically, no matter how minor the offense, will be detrimental to my academic progress and self-image. It will also adversely affect all students, faculty, staff, the reputation of this University, and the value of the degrees it awards. Whether on campus or online, I understand that it is not only my personal responsibility, but also a duty to the entire KSU community that I act in a manner consistent with the highest level of academic integrity. Therefore, I promise that as a member of the Kennesaw State University community, I will not participate in any form of academic misconduct.

The [Student Handbook](http://catalog.kennesaw.edu/content.php?catoid=56&navoid=4171) contains information regarding Rights Pertaining to Student Records, and FERPA specific details are available on the [Registrar's website](https://registrar.kennesaw.edu/academic-records/personal-information.php).

Privacy in the Education Process. A key requirement of the formal evaluation process is the protection of individual privacy rights concerning educational grading. The University’s online learning system and email system is designed to prevent unauthorized individuals from gaining access to sensitive information or information protected by federal or state law. Consequently, faculty and students are strongly encouraged to only communicate regarding course matters through the University’s designated technology learning system.

## KSU Sexual Misconduct Policy

In accordance with federal and state law including, Title IX of the Education Amendments of 1972 (“Title IX”) and Title VII of the Civil Rights Act of 1964 (Title VII), the University System of Georgia (USG), including Kennesaw State University, prohibits discrimination on the basis of sex in any of its education programs or activities or in employment. The USG is committed to ensuring the highest ethical conduct of the members of its community by promoting a safe learning and working environment. To that end, Kennesaw State University follows USG Board of Regents Policy Manual, Section 6.7.  See <https://equity.kennesaw.edu/titleix/title-ix.php>.

## Withdrawl from Classes

Withdrawal from Classes
Students who withdraw from courses before the withdrawal deadline, as specified by the academic calendar will receive a grade of W. A student who officially withdraws from a course by the end of the last day to withdraw without academic penalty will receive a grade of “W” and receive no credit.

A student who officially withdraws from a course after the last day to withdraw without academic penalty and before the last week of classes during the semester will receive a grade of “WF,” which will be counted as an “F” in the grade point average calculation.

Students may drop one, some, or all of their classes during the drop/add period. Courses dropped in this manner do not appear on a student’s transcript and are not considered as hours attempted for financial aid purposes. No grade is assigned for such courses. However, a student who wishes to withdraw from a course after the last day of the drop period for a term must withdraw through Owl Express. Students with an active registration hold on their record must clear that hold before being able to withdraw from their coursework.

If a student experiences significant personal hardship (e.g., medical or family emergency, prolonged illness), the Dean of Students can approve a hardship withdrawal from all courses in the term for which the student is currently registered. In the case of an approved hardship withdrawal from all courses, the Registrar will assign grades of “W” for those classes. The deadline for final approval of a hardship withdrawal by Dean of Students is the last day of class for which the hardship withdrawal is sought. If the hardship withdrawal process is not complete by the last day of class for which the hardship withdrawal is sought, a student must appeal for a retroactive hardship withdrawal from the Academic Appeals Committee.

Appeals for retroactive hardship withdrawals must be directed to the Academic Standing Committee. Retroactive hardship withdrawals are rarely granted if it has been more than one year since the last day of class for which the withdrawal is sought. Extraordinary justification must be shown. In the case of approved retroactive hardship withdrawals, the Registrar will assign a grade of “W.”

If a student is suspended by the Office of Student Conduct following a violation of the University’s Code of Conduct not related to academic dishonesty, the Office of Student Conduct may facilitate a University-initiated withdrawal from courses for which a student is registered for the term. The Registrar will assign grades of “W” for those classes.

A student will receive a refund only when the student withdraws from ALL courses for the applicable semester and only by the schedule outlined in the University refund policy.

Students should be aware that a reduction in their hours might result in the loss of full-time student status and thus affect their financial aid, scholarships, athletic and ticket eligibility, University housing accommodations, use of University resources and access to University facilities, immigration status for international students, and Veterans Educational Benefits. Students should contact the appropriate office and their academic advisor with questions about the impact of their withdrawal from a course before initiating a withdrawal. Veterans and dependents of veterans who receive educational benefits must notify the Veterans Education Benefits Area in the Office of the Registrar of any course load reductions.

### Military Withdrawals

A student will receive a “WM” symbol for all courses and a full refund of tuition and mandatory fees and a pro rata refund of other fees for military and other service, as defined by BOR Policy Manual, Section 7.3.5.3. To request a military withdrawal, the student must submit a copy of official orders to the Office of the Registrar.

## KSU Graduate Course Auditing Policy (Graduate Courses Only)

Auditing of courses will be permitted for regularly enrolled graduate students, as well as on a space-available basis for those who hold a graduate degree from Kennesaw State. Auditing courses is not allowed in the Coles Doctor of Business Administration, the Coles Executive MBA, the Master of Science in Conflict Management (MSCM), the Master of Science in Information Systems (MSIS), or any of KSU’s Master of Education (M.Ed.) programs. Students must have completed all prerequisites necessary for the course to be audited and are expected to complete all course requirements as noted on the course syllabus. A student may audit no more than 6 credit hours of graduate course work in a given term.

The grade of “V” will be given for successfully completed audited courses. This grade will have no effect upon the student’s grade-point average, and students will not be permitted to have the audit grade changed at any future date. Audited courses will not count toward degree completion for any of KSU’s graduate programs.

The permission to audit form, available in the Office of the Registrar, must be submitted before the end of final registration. The form must be signed by the Graduate Program Director of the program offering the course to be audited. Audited courses count at full value in computing the student’s course load and fees. The student’s name will appear on the official class rolls of the courses audited, as well as the student’s approved schedule of courses. No credit is granted for audited courses, and students are not permitted to change to or from an auditing status except through the regular procedures for schedule changes.

## Academic Feedback

Institutional Chief Academic Officers will encourage faculty to clarify for students, at the beginning of each course, the basis on which grades will be determined and to provide timely academic feedback as the course progresses ([BOR Academic and Student handbook policy 2.18](http://www.usg.edu/academic_affairs_handbook/section2/C783)).

## Netiquette: Communication Courtesy

All members of the class are expected to follow [rules of common courtesy in all email messages](http://www.albion.com/netiquette/), threaded discussions and chats.

## Inclement Weather Policy

During the course of the year, Kennesaw State University may decide to close campus or operate on a delayed schedule in cases of inclement weather.

The University will announce campus closures and delayed schedules in several ways. The cell phone number on file with the university will automatically receive KSU Alerts, so make sure your information in OwlExpress is accurate at all times. An email will also be sent to your university account.

In addition, announcements will be made by a notice on the [Kennesaw State University home page](http://www.kennesaw.edu/).