Syllabus
MAT616 Fall 2025

Course: MAT616 CRN 2619 Elements of Math for Data Analytics
Time and location: T&Th 4:30 PM – 5:45 PM SAMC 393
Instructor: Dr. Joaquin Carbonara, SAMC 379

Learning modality: Flipped Classroom, In-Person

Catalog Description: Introductory topics in calculus, optimization, linear algebra and discrete mathematics useful for data scientists; Networking concepts relevant to data analytics approached from a mathematical point of view; Mathematical programming to implement a variety of numerical methods.

Intended audience and overarching goals: This course provides beginning graduate students in Data Analytics programs with the necessary background on important mathematics concepts and their implementation on computers and networks.

Learning outcomes:

1. Know, comprehend and apply effectively in Data Science and Analytics (DS&A), the technical mathematical language in the areas of Calculus, Linear Algebra, Graph Theory, Discrete Mathematics, Algorithms, and Statistics.
2. Write and analyze computer programs to solve a variety of applied math problems.
3. Analyze data using mathematical and computational techniques.
4. Find appropriate models for real world big data.
5. Explore data using Principal Component Analysis and linear algebra
6. Create DS&A models to predict and classify new data.
7. Apply decision trees, basic graph algorithms and other basic graph theoretic concepts to solve problems in DS&A.
8. Diagnose and solve problems and paradigms in DS&A using concepts from computer networking.

Textbook and other requirements: We will use Google Drive, Colab, Overleaf and other Open-Source learning materials provided by the instructor.

Schedule: The schedule for the class will be updated regularly on the website for the class (http://3.230.252.179/MAT616/MAT616F25/pmwiki.php or equivalently http://joaquincourses.fun)

Assignments and assessment:

1. In class presentations (20%): Each class several students will each make a 10-minute presentation in person.
2. Homework assignments (20%): There will be assignments due the following class meeting, including readings and problems.
3. Quizzes (20%): There will be quizzes during class frequently.
4. Midterm (20%): There will be a midterm based on the homework and reading.
5. Final (20%): There will be a final day activity.

Accommodations:
Students requiring accommodations due to a disability should contact the **Student Accessibility Services (SAS) Office** located in E. H. Butler Library 160. You can call them at (716) 878-4500, email at sas@buffalostate.edu, or complete their request by filling out the Initial Accommodation Request form.

Asynchronous Important Remark:

1. Weekly assignments due Sunday before midnight and graded on Monday. Look for feedback in the posted grades and comments.
2. Presentations will be recorded and shown in class.
3. Office hours are scheduled online each week after consulting with students about their availability. Attendance is strongly encouraged. The faculty is available by email at all times, with a response time of at most 24 hrs.
4. Classes will be recorded and posted before the end of the day.

5. The website for the class will have the agenda for each and announcements. Students must read that agenda on Tuesdays and Thursdays by the time the class start (4:30PM) or later.
6. The class uses the flipped-classroom interactivity style. Students work on the assignments by researching on their own the basics of the material, which will be discussed in class the following week (viewed in the recording).