BRYANT UNIVERSITY
Mathematics Department
Syllabus – Spring 2025

<u>**Course**</u>: Math 110: Mathematical Analysis

<u>**Instructor**</u>: Kaitlyn Hughes
   Office: UNI 265
   Office Hours: Tuesday 12 – 2 pm, Wednesday 2 – 3 pm, or by appt on Zoom
   Email: khughes11@bryant.edu

<u>**Textbook:**</u> There is no required textbook for this course. You may find the following links helpful if you need additional explanation of the topics covered in class.

http://www.zweigmedia.com/tcpage.html#ed5#en#calc

https://mathstat.slu.edu/~may/ExcelCalculus/LandingPage.html

<u>**Course Description**</u> - This course offers a foundational understanding of mathematical functions and their applications in business, finance, and global contexts. Using Excel, students will explore tools such as Solver, engage in graphing, and apply marginal analysis, optimization, and linear programming techniques. Key topics include linear, quadratic, and exponential equations, as well as an introduction to derivatives and optimization methods. The course emphasizes practical applications and problem-solving in real-world scenarios.

<u>**Objectives**</u> - The primary goal of this course is to understand a variety of real-world uses of mathematical functions. After taking this course, the student should be able to do such things as:
- Better understand functions and their applications: linear, quadratic, and exponential
- Set up and solve linear programming problems
- Study marginal analysis and optimization using derivatives

<u>**Calculator:**</u> A scientific calculator is required for this course and should be brought to class every day. The following rules must be followed for all exams and quizzes:
- All students must have their own calculator.
- Calculators may not be shared under any circumstances.
- If you fail to bring a calculator, you will take the assessment without one.

<u>**Cell Phones:**</u> Cell phone use during class is strongly discouraged. Cell phone use during an exam/quiz is prohibited. It cannot be used as a calculator. **Use of cell phones or any electronic device during an assessment will result in a score of "0" for that assessment.**

<u>**Attendance Policy:**</u> Absence is discouraged because concepts in this course build upon earlier concepts and so continuity must be maintained. You are responsible for all the material covered in class. Also, it is your responsibility to be aware of what happens in class, including announcements. If you must miss a class, you need to ask your classmates for their notes.

Learning Environment: It is of the utmost importance to create a learning environment where all identities are welcomed, supported, and honored. In this class, we will recognize, respect, and support a diverse range of thoughts, perspectives, and experiences in effort to honor and respect your identities (including, but not limited to race, gender, sexual orientation/identity, neurodivergence, class, religion, age, mental/physical ability, socio-economic status, etc.)

To help accomplish this:
- We will establish community norms in the beginning of the semester to help create a safe and welcoming learning environment.
- If you use pronouns and/or a name which is different than what may be listed, please do not hesitate to inform me.
- If you are struggling outside the classroom and it is impacting your performance within the class, please connect with me so I can serve as a resource for you.
- If something said or done in class offends you, please feel encouraged and safe to connect with me so we may be able to address it.

Assessments and Grading Policies:

Case Studies (3)	10%
Homework (8)	10%
Quizzes (3)	30%
Exams (3)	50%
Total	**100%**

When the final average has been determined, grades will be assigned as follows:

A	93-100	B+	87-89	C+	77-79	D+	67-69
A-	90-92	B	83-86	C	73-76	D	60-66
		B-	80-82	C-	70-72	F	less than 60

I reserve the right to use attendance, punctuality, participation, and other evidence of level of effort to adjust the final grade. Grades are not negotiable, and no extra credit will be offered under any circumstances.

Exam and Quiz Policies:
- All students are expected to be prepared for and take the assessment in class on the day it is given.
- You must contact me by email *before the assessment* if you will not be present for the assessment. Failure to notify me *before* the scheduled assessment will result in revocation of the privilege to a make-up quiz/exam. The format of the make-up quiz/exam may be different from the original quiz/exam.
- All quiz/exams must be made-up within one week of the day it was originally given.
- You cannot retake a quiz/exam for any reason.
- Final exam is not cumulative.

Homework:
You will have 10 homework assignments throughout the semester, all with 10 questions. These will be on myOpenMath. Homework assignments will be due by 11:59 pm. If you need an extension, please reach out ahead of the due date.

Go to myopenath.com and create an account.
course ID: 257611
enrollment key: Hughes110

Extra Help: In addition to taking advantage of my office hours for extra help, you are strongly encouraged to utilize ACE. ACE provides 3 options for extra help. **(ext-6746)**

- *Math Lab* - a drop-in center where you can get answers to all your questions or just sit and do your homework
- *Math Specialist* - work with a math faculty/staff member in a 30/60 minute private session (appointment required)
- *Math Peer Tutors* - schedule a 30-60 minute session with a student tutor (appointment required)

 Academic Honesty Policy:
Cheating and plagiarism will not be tolerated in any Bryant University course. **They will result in an "F" for the particular assignment or exam and may result in an "F" for the entire course and may lead to disciplinary actions.** Please take the time to review the Academic Honesty Policy, which can be found in the Student Handbook.

General Education Program: At Bryant University, the General Education Program goes a step beyond the typical disciplines and skills to prepare students to make a social impact by engaging students with the United Nations' Sustainable Development Goals (SDGs), using these as a lens to introduce students to local and global needs to improve people's lives. Students will gain insight into how to take on broad workplace challenges, culminating in addressing a concrete problem in the Gen Ed Capstone.

This course will look at small datasets and emphasize at least one of the following goals (SDG) through the use of data analysis, problem-solving, and critical thinking:
- Good health and well-being
- Quality education
- Decent work and economic growth
- Affordable and clean energy
- Industry, innovation, and infrastructure
- Sustainable cities and communities

Excel: We will be using Excel on a regular basis to explore different case studies. Excel is located on your Bryant issued laptop. Access Excel before our first use, to make sure the license has not expired. If it has, bring it to the Help Desk or Laptop Central. It is expected that you bring your fully charged computer to class on Excel days (denoted in the course schedule).

Course Outline by Topic (subject to change)

I. LINEAR FUNCTIONS
   A. Slope
   B. Slope-intercept form, writing equations
   C. Graphing lines, intercepts
   D. Applications: profit, revenue, cost, depreciation, appreciation, supply, demand
   E. Scatterplots, line of best fit, residuals
   F. Excel: trendline, regression, estimation

II. QUADRATIC FUNCTIONS
   A. Solving quadratic equations: factoring and quadratic formula
   B. Graphing parabola, vertex, intercepts
   C. Applications: profit, revenue, cost, gravity, supply, demand
   D. Excel: trendline, regression, estimation

III. EXPONENTIAL FUNCTIONS
   A. Exponential functions, e
   B. Exponential growth and decay
   C. Exponential graphing
   D. Solving exponential equations
   E. Compound and continuous interest
   F. Annuities and loans
   G. Excel: Financial math

IV. LINEAR PROGRAMMING
   A. Graphing systems of inequalities
   B. Graphing with maximization and constraints
   C. Applications
   D. Excel: Linear programing, solver, and slack variable analysis

V. DERIVATIVES
   A. Derivative power rule
   B. Derivative exponential rule
   C. Finding maximum and minimums from derivatives
   D. Application: revenue, cost, profit, business models
   E. Excel: Optimization