



JOHN FELICE

**ROME
CENTER**

MATH 108: Real World Modeling Fall Semester 2024

Instructor: Joseph F. Wagner, SJ

Office: 127

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Class Meetings: TBD

TBD

Additional class meeting: Friday, 20 September

Office Hours: Available by drop-in, appointment, or chocolate.

Required text

B. Crauder, et al. (2022). *Quantitative Literacy: Thinking between the lines, 3rd edition* (digitally updated). With: *Achieve* 1-Term Access Card. W.H. Freeman & Co. ISBN 978-13194-1600-3.

Course description

An introduction to mathematical reasoning and modeling as it pertains to the “real world.” This course investigates mathematical modeling applied to a variety of topics such as analysis of change and growth, personal finance, probability and statistics, voting and social choice, and other selected topics.

Course overview

The goal of MATH 108 is for students to acquire critical thinking skills through mathematical and quantitative reasoning, in practical “real world” contexts. There will be an emphasis on developing skills to aid logical and critical thinking in our daily lives as we encounter finances, social media and advertising, and social, political, economic interests.

Learning outcomes

- Students will be able to demonstrate understanding of what it means to use mathematical models to describe and predict real world phenomena involving quantitative processes.
- Students will be able to apply analytical techniques to quantitative processes, financial systems and data sets, and correctly interpret the results.
- Students will be able to analyze and apply computer-generated mathematical output to solve real world problems involving the topics highlighted in this course.

Technology

We live in a world in which technology plays a vital role, and the availability of computers eases our ability to work with large sets of data and complex problems. Because of this, we will make use of Microsoft *Excel* as well as a handheld calculator and available online resources. I encourage you to think of both the calculator and *Excel* as always-available tools for your use on all assignments. Calculators will be permitted on all exams. We *will* discuss how to use both for the techniques of interest to us, but basic calculator and computer literacy on your part is expected at this point in your academic careers.

Mathematics is a social activity

Working together, both with me and with one another, will be emphasized (and at times required) in this class. Working with others has the (sometimes uncomfortable) effect of “stretching” us—sometimes to articulate ourselves better, sometimes to realize the limits of our understandings, sometimes to understand how someone else may approach a problem very differently. In addition to working together in class, you are encouraged to find study partners or to form study groups outside of class. If you’re trying to learn Italian (or some other non-native language), you know that coming to understand what you read and hear is often considerably less difficult than expressing yourself orally and in written word. So, too, with mathematics.

Course administration and communication

Most course materials will be posted on the course website at Loyola Sakai Learning Management System (*Sakai*).

I will also send email to you as a class. It will be important for you to check your Loyola email and the course website regularly. Unless the JFRC itself experiences a system crash, there will be no excuse for not having up-to-date knowledge of course announcements, assignments, etc.

Reading & Homework

Reading and homework assignments, both written and on-line (on *Achieve*), will be announced and made available on the course website, and they will be due **at the beginning of class** on the date indicated on each.

Each assignment will be scaled to be worth a total of 15 points. The *Achieve* portion will be worth 9 points, and the written portion will be worth 6 points. Written assignments must be neat, legible, preferably written in pencil, and stapled. Loose pages or sloppily prepared work that looks like scratch-paper will *not*, I repeat NOT, I repeat **NOT** be accepted. (If submitted, they will be returned to you ungraded.) Late homework will *not* be graded, however I will drop your two lowest *completed* homework scores in computing your final grade. An assignment completed and turned in late will be awarded a zero, but it may be dropped. Scores of zero for assignments not turned in or considerably incomplete may not be dropped.

Exams

There will be two regular exams and a semi-comprehensive final exam. The two regular exams are *very tentatively* scheduled for Wednesday, 2 October, and Wednesday, 13 November. A regular exam may be taken at an alternate time *only* for very good reasons (by my definition), and, except in cases of emergency, *only* if arrangements are made in advance. The final exam is scheduled for **XXXXX**, at **XXXXX** in our regular classroom. The time of the final exam is determined by the JFRC and, except in extraordinary circumstances, it cannot be taken at a different time.

Student Accessibility Center (SAC) Services

Any student who wishes to receive SAC-related accommodations must plan in advance and work through the SAC (see Carla Mollica here in Rome). To request academic accommodations, official documentation from the SAC is required, and it must come through the dean’s office. Please inform your instructor well in advance of your needs (at least two weeks before exams). Last-minute accommodations are not possible.

Grading

Your final grade will be based on the following point-distribution:

Homework	150 points
Participation and class work	75 points
Two regular exams	500 points
Final exam	275 points

Letter grades will be assigned according to the following scale: A/A- (900-1000 pts), B/B± (800-899 pts), C/C± (650-799 pts), D (500-649 pts), F (< 500 pts). I reserve the right to make it easier—but not more difficult—to earn a particular grade. Plus/minus grades reflect *approximately* the top and bottom 20 points of each the above ranges, respectively. I do not intend to use the grade of D+.

There is one possible exception to the above grading policy: In order to earn a particular letter grade for the course, you must have earned that letter grade or higher on at least one of the three course exams.

Academic integrity

Loyola University Chicago takes seriously the issues of plagiarism and academic integrity. Below is an excerpt from the university's statement on academic integrity:

The faculty and administration of Loyola University Chicago wish to make it clear that the following acts are regarded as serious violations of personal honesty and the academic ideal that binds the university into a learning community:

Submitting as one's own:

1. Material copied from a published source: print, internet, CD-ROM, audio, video, etc.
2. Another person's unpublished work or examination material.
3. Allowing another or paying another to write or research a paper for one's own benefit.
4. Purchasing, acquiring, and using for course credit a pre-written paper.

The critical issue is to give proper recognition to other sources. To do so is both an act of personal, professional courtesy and of intellectual honesty.

You are encouraged to work and study with other students in class and to learn from one another as opportunities provide. However, turning in the work of another, collaborating on assignments when prohibited, or providing your work to someone else will be considered academically dishonest. It is my practice to handle such cases with the severest penalties possible.

Attendance policy

In accordance with the JFRC mission to promote a higher level of academic rigor, all courses adhere to the following absence policy. Prompt attendance, preparation and active participation in course discussions are expected from every student. *For all classes meeting twice a week, students cannot incur more than two absences.* Thus a total of 2 absence(s) will be permitted. Additional absences beyond these will result in 1% lowering of the final course grade, for every absence after the approved limit.

Misuse of technology

Computers and any other electronic devices in our classroom are intended to be used ONLY for learning statistics. They are NOT to be used for any other purpose (email, messaging, social media, other assignments, etc.) during class time. Anyone found using the computer or *any other phone/messaging device* during class for purposes unrelated to the course will be asked to leave the room for the remainder of that class. Anyone found violating this policy a second time will receive a one-letter grade reduction of your final course grade.

The use of any electronic devices (other than your calculator or, when permitted, the computer) during an exam is strictly prohibited. If you use any such device during an exam *for any reason whatsoever* you may be awarded a grade of "0" for that exam.

Unless otherwise instructed, the use of any AI technologies or software to assist with or complete any work submitted for a grade is strictly prohibited.

Problems?

If you are anticipating any difficulties in this class (possibly because you've been known to have them before, you haven't taken a math course for quite some time, you have some type of learning difference, etc.), please let me know. It's a lot better to deal with potential problems before they occur rather than wait until it's too late. If at any time you have any suggestions or concerns with the way the class is progressing, please direct them to me (in person, or, if you prefer, anonymously). If, for any reason, you consider dropping this course, please discuss it with me beforehand. Students sometimes tend to think that they are not doing as well as they really are.

Anticipated course schedule

Week	Dates	Textbook Sections	Topic
1	Sep 2, 4	1.1, 1.5	Critical thinking and number sense
2	Sep 9, 11	2.1, 2.2, 2.3	Analyzing change and growth
3	Sep 16, Sep 20*	3.1, 3.2	Linear and exponential change
4	Sep 23, 25	4.1, 4.2	Personal finance: Interest and loans
5	30 Sep, 2 Oct	Review & Exam 1	
6	Oct 7, 9	4.3, 4.4	Savings & Credit cards
	<i>Oct 11-20</i>	<i>Fall Break</i>	
7	Oct 21, 23	4.5, 5.1	Inflation & taxes; Elementary probability
8	Oct 28, 30	5.2, 6.1	Conditional Probability; Displaying data
9	Nov 4, 6	6.2, 6.3	The normal distribution; Polling
10	Nov 11, 13	Review & Exam 2	
11	Nov 18, 20	7.1, 7.2	Elementary graph theory
12	Nov 25, 27	7.3, 8.1	Trees; Voting
13	Dec 2, 4	8.2	Voting systems; Review

*Note that there is no class on Wednesday, 18 September, but class will meet that week on Friday, 20 September. This accommodates the Papal Audience on Wednesday.

This class may deviate from the schedule outlined above. The instructor reserves the right to make changes as needed to the course syllabus.