

# MATH 105 Math for Modern Society

Section 003 (CRN 20455): Tuesdays 12:30 PM – 2:20 PM in Hemenway Hall 407  
Fridays 12:30 PM – 2:20 PM in Hemenway Hall 407



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The ability to think quantitatively is crucial in most every discipline as well as in everyday life. While most may understand the need for these skills for those who study or work in Biology, Chemistry and Food Science, Computer Science, Earth Sciences, Food and Nutrition, Mathematics, Nursing, and Physics, quantitative reasoning is valuable in other fields as well. An artist may use quantitative reasoning skills in understanding materials and design, planning, and creation of artistic works.<sup>i</sup> Wise decisions in business are based on quantitative analysis, for example, cost-benefit analysis, break-even analysis, feasibility studies, and statistical analysis of data.<sup>ii</sup> Reporting news stories with quantitative content involves more than writing: journalists need quantitative reasoning in order to analyze, accurately interpret, and communicate quantitative information in a meaningful way.<sup>iii</sup> Economists, even theorists, need quantitative reasoning in order to read and evaluate academic literature and determine its relevance to economic policy.<sup>iv</sup> Some use quantitative methods to analyze literature<sup>v</sup>, and some writers have used mathematics as the inspiration for their works.<sup>vi</sup> Quantitative reasoning is used in fashion design, from basic measurements to pattern design and creation, the analysis of fit and form, and determination of the costs and amounts of materials for creation of one item as well as mass production.<sup>vii</sup> Quantitative reasoning and knowledge of mathematics helps cartographers evaluate geographical information and use this information, for example, to determine coordinate systems and scales for maps as well as transformations to relate the coordinates of points on the earth, a curved surface, to coordinates of points on a plane, a map.<sup>viii</sup> A geographer uses quantitative reasoning and statistical analysis in the study of the physical environment, weather patterns, and climate patterns of the Earth and their effect on human and wildlife ecologies as well as economics and culture.<sup>ix</sup> Mathematics can be used to reveal trends in history, and historians use quantitative reasoning and statistics in research.<sup>x</sup> Political scientists study the population and use quantitative reasoning and statistical methods to analyze "the social, political, and monetary implications of a community's opinions and actions".<sup>xi</sup> Psychologists use statistical analysis to perform and assess behavioral research as well as quantitative reasoning, for example, to determine the dosage of medications prescribed to patients.<sup>xii</sup> Sociologists use quantitative reasoning and statistical analysis to study society as a whole and in groups, patterns of social interactions and relationships, and culture.<sup>xiii</sup> That is, quantitative reasoning skills are important in every discipline.

## Course Description and Learning Objectives

An immersion in quantitative problem-solving, as it relates to real-world scenarios, in order to facilitate making informed decisions. Topics related to numbers in the news, financial mathematics, mathematical modeling, and probability and statistics enable students to sharpen arithmetic and algebra skills. An emphasis is placed on critical reading, sound reasoning, and precise oral and written communication in various applied situations.

### General Education Domain II-A

**Analysis, Modeling, and Problem Solving:** The study of analytical, quantitative, and/or formal reasoning methods involving the manipulation of numbers or other symbols to solve problems.

### Learning Objectives:

**3** – Solve Problems Using Quantitative Thinking

**8** – Solve Problems Using Creative Thinking

By the end of the course, you should develop

- the confidence and the skills necessary to analyze a variety of real-world scenarios;
- the ability to discuss, both verbally and in writing, your analysis with others; and
- the ability to use and to interpret quantitative information presented in a variety of formats.

## What is in this syllabus?

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Any “correct answer” is a by-product of careful analysis of arguments, statements, and quantitative situations and their consequences and need not be a numerical value, a variable expression, or an equation, but must include supporting evidence. An “answer” for any problem or exercise includes all analysis, calculations, and explanation necessary for understanding and answering a question.

It is my hope that by the end of the semester all of you – especially those who are most fearful about your mathematical abilities – will realize that you have something constructive to contribute to the analysis of every problem that you encounter, that you have the knowledge and the skills to understand real-world problems and recognize a potential solution, and that on your own, with the help of others, or with a little research, you can determine and present an appropriate solution. Overall, you should gain the understanding that quantitative reasoning provides a basis for evaluating and determining the accuracy of information and makes it possible for individuals to draw knowledgeable conclusions as well as make decisions about real-world information presented in different contexts and in various forms.

## Attendance

**Attendance** at every course meeting is *expected* and will be *noted*. Lateness of more than ten (10) minutes counts toward an absence as does leaving early, *without an appropriate reason*.

- If you miss a course meeting, it is *your* responsibility **(i)** to access the *class notes* and *summary* posted on the *Notes* page on *Canvas* and **(ii)** to obtain information about assignments *from* your email, the course website, and *Canvas*. Absence does *not* entitle you to an extension for submitting assignments or for taking examinations.
- You may miss **no more than two (2) course meetings** without penalty to the participation component of your course grade. If you miss more than two (2) course meetings, your participation for those days will be recorded as a zero (0). Since it is your choice how you use these two (2) allowed absences, *no excuses or doctor’s notes will be accepted for absences*.

**CAUTION:** Missing course meetings jeopardizes your grade as you miss course material and topic discussions, class problem solving, examples, and information about assignments and examinations.

## Mask Policy

As stated on the [COVID-19 Information from the Health Center](#) page, “Any student with COVID symptoms, including mild cold or allergy symptoms, [should] test before coming to campus or going to class.” Although the use of masks is “optional in all settings at Framingham State with individuals choosing for themselves whether or not to wear a mask depending on the situation, medical reasons or their own comfort level”, I request that you wear a mask during any face-to-face meetings with me. I will wear a mask during my face-to-face meetings with you.

**NOTE:** The mask policy will be updated as needed.

## Course Etiquette

You are expected to pay attention, be respectful, and participate during course meetings. Do not talk over or interrupt others: wait your turn to contribute to discussions and analysis. Use respectful language at all times: use of profanity is unacceptable. Neither disruptive behavior nor disrespectful conduct will not be tolerated.

- All electronic devices not used for course work **MUST** be turned off and put away.
- You are expected to be *present* and *actively engaged* during course meetings. This includes contributing to course discussions and problem solving and asking questions.

You cannot make meaningful contributions during course meetings when you are, for example, texting, monitoring social media, watching videos, playing games, surfing the web, or doing assignments for other courses: such activities should be done on *your time*, not during *course time*. Those performing such activities during course meetings will be considered to be absent from class.

- Do not interrupt course meetings by announcing your late arrival or early departure – everyone can see.
- Do not disrupt course meetings with noise. Eating and crinkling wrappers, taking phone calls (which is totally inappropriate during course meetings), tapping, singing, humming, playing music (even with headphones), watching videos, having conversations, and other activities should be performed on *your time*, not during *class time*.

You are expected to conduct yourself in a mature, respectful, and professional manner at all times.

## Class Preparation and Participation

**Being prepared for class** includes, but is not limited to, doing assigned readings *before* each course meeting, working on assigned exercises (in the eBook, provided on course handouts, sent via email and/or posted online), reviewing class

notes and summaries of course meetings posted on the *Notes* page on *Canvas* prior to each class, maintaining and updating your course notebook (which should include class notes and the practice exercises on which you are working), and having appropriate materials such as your notebook, writing instruments, and calculator available for use during course meetings.

**Participation** can be contributions to course discussions, in-class problem solving, and analysis of real-world scenarios *as well as questions*. Questions are a very important component of the learning process: *your questions are significant contributions to each course meeting*. **There is no such thing as a stupid question.**

## Assignments

Via *written* assignments and *MyMathLab* assignments, you will apply the concepts, topics, and methods discussed and examined throughout the course. It is *your* responsibility to complete and submit assignments on time.

- **Written assignments**, including all supporting work, must be neatly *handwritten* and submitted at the beginning of the course meeting on the due date. If you cannot submit an assignment yourself then you must arrange for someone to deliver the assignment for you. Written assignments will not be accepted for grading after papers have been collected at the beginning of class on due date; assignments submitted after the due date as well as those slipped under my office door or sent via email will *not* be evaluated. *You are welcome to turn in written assignments early.*
- **MyMathLab (a.k.a. MyLab Math) assignments** are completed *entirely* online; no written work is submitted.

Unless stated otherwise, assignments are NOT group work: you are expected to submit your own analysis and your own work, rather than working together. Those submitting analysis and/or work procured through group efforts, whether in whole or in part, will earn zero (0) points for the *entire* assignment. **Copying the work of others is unacceptable: you are expected to do your own work.**

## Make-up and Late Submission Policy

**Neither make-up examinations nor make-up assignments will be administered.** Written assignments will *not* be accepted *after* the due date. Examinations will be administered only on the scheduled date. The grade for an examination or an assignment which is not submitted will be recorded as zero (0).

**NOTE:** The last day to withdraw from a course *without* a W-grade is Tuesday, January 23, 2024, and the last day to withdraw from a course *with* a W-grade is Friday, April 19, 2024. The last day to change a course grade-status to Credit/No Credit is Friday, April 19, 2024.

## Examination Dates

There will be two (2) examinations, a midterm examination and a *comprehensive/cumulative* final examination. The dates for these *mandatory* examinations are listed below.

Midterm Examination . . . . .	Friday, March 15, 2024
Final Exam . . . . .	Tuesday, May 7, 2024, 11:30 AM – 2:30 PM

Although the date for the midterm examination may be changed, if necessary, the date for the final examination, set by the University, **CANNOT** be changed.

## Course Grade Percentages

Your course **grade** will be determined by your participation during course meetings, work on the written assignments and MyMathLab assignments, score on the midterm examination, and score on the *cumulative* final examination.

The components of your course grade will be weighted as follows:

Course Participation . . . . .	10 %
Assignments . . . . .	55 %
Midterm Examination . . . . .	15 %
Final Examination . . . . .	20 %

The weights for the graded components of the course may be adjusted, if necessary, to reflect any changes in the workload during the semester.

## Required Textbook, Software, and Supplies

*Thinking Mathematically, 7th Edition*, by Robert F. Blitzer with [MyMathLab](#)

We will use the [MyMathLab](#) (also known as *MyLab Math*) system throughout the course for eBook access, practice exercises, online assignments, and a variety of resources.

The software for the course is MS Office, and you need a scientific calculator which must, at least, have built-in combination, permutation, and factorial functions. **You must install the Zoom app on your computer.**

## Academic Honesty

You are expected to read the sections of the Framingham State University [Undergraduate Catalog](#) that describe the *University Policy Regarding Academic Honesty* and the *Procedures for Handling Cases of Alleged Infractions of Academic Honesty*.

- *Examples* of infractions of the *University Policy Regarding Academic Honesty* include: giving or receiving help on assignments on which you are expected to do your own work (i.e. unauthorized collaboration); giving or receiving help during examinations; distribution, acceptance, or use of materials during examinations *without* the permission of the instructor; and altering work on graded materials in an attempt to obtain additional credit.
- Plagiarism, *looking at or copying from* another student's assignment or examination, allowing another student to *look at or copy from your* assignment or examination, doing an assignment or examination *for someone else*, and having someone do an assignment or examination for you are additional examples of breaches of the *University Policy Regarding Academic Honesty*.
- Not being truthful about your health, not being upright regarding the illness or death of a friend or family member, not being forthright regarding your availability to take an examination, not being honorable about the operation of your computer or your computer-access, and not being honest regarding the submission of an assignment or examination are examples of violations of the *University Policy Regarding Academic Honesty* as well.
- Submitting work for problems on other versions of an examination serves as *evidence* of violation of the *University Policy Regarding Academic Honesty* as does submitting work involving terminology, notation, and/or methods not used in this course or submitting work similar to that of another student.

All infractions of the *University Policy Regarding Academic Honesty* will be reported to the Dean of Students, the appropriate college dean(s), and the Office of Community Standards, and the appropriate University procedures will be followed.

## Communication

Course emails will be sent to the *student.framingham.edu* email address listed for each student on *myFramingham*.

- All email correspondence must be signed using your full name. The subject line for course communication is "**MATH 105 MMS:**" followed by a meaningful – *not blank* – reason for the communication (quotation marks are *not* used in subject lines for messages); do *NOT* put your name in the subject line.
- Replies will be sent to messages sent from *student.framingham.edu* email addresses or those generated via the *Canvas* message system only.
- Replies will *not* be sent to comments added to assignments on *Canvas*. Assignment facilities on *Canvas* are *not* a means for communication.
- When you communicate by **phone**, clearly identify yourself using your full name and state the course for which you are registered *at the beginning* of the conversation or voice message. If you leave a **voice message**, speak *slowly* and *clearly* so that your name, course information, contact information, and message can be understood. Note: Sending an email is a better means of communication.

## If you are feeling lost or overwhelmed ...

### 1. Meet with me

You are always welcome to meet with me during student hours: student hours are for you. You may speak with me after class, call me, or email me to set up an individual or group appointment. Your questions are important to me: questions are a valuable and important component in learning new concepts and exploring new methods.

To set up an appointment during which to meet via Zoom, send a request via email using your *student.framingham.edu* email address. Once the day and time have been determined, you will receive a Zoom meeting invitation containing the URL and meeting ID.

### 2. Use the resources available on Canvas, the course website, and MyMathLab

Class notes are posted on *Canvas* after each course meeting, and summaries of our in-class analysis are posted with the class notes. Course handouts and resources are available on the course website. Practice exercises with the view-a-similar-problem feature, additional examples, and videos are available via MyMathLab.

### 3. Meet with tutors available at CASA or via ThinkingStorm

The Center for Academic Success and Achievement (CASA) provides tutors from whom you may receive additional help. *ThinkingStorm Online Tutoring* may be accessed via the menu on *Canvas*. Additional information about tutoring can be accessed on the Extra Help page of the course website.

## FSU Notice of Non-Discrimination and Diversity

Framingham State University is committed to a policy of [non-discrimination](#), [equal opportunity](#), [diversity](#), and affirmative action. The University is dedicated to providing educational, working, and living environments that value the diverse backgrounds of all people. Furthermore, the Massachusetts Civil Rights Act (“MCRA”, M.G.L. c. 12, §§ 11H, 11I, 11J) protects the rights of all residents of and visitors to Massachusetts to be free from bias-motivated threats, intimidation, and coercion that interfere with their civil rights. The MCRA protects the right to attend school, live peacefully, and enjoy other basic rights.

## FSU Commitment to Antiracism

At Framingham State University, faculty, staff, and students work together to sustain a learning, working, and living community free from hate, discrimination, harassment, and intolerance. We recognize the damaging effects of systemic racism – including policies, structures, and historic practices – on the experience and success of communities of color. Coming from different backgrounds and different levels of privilege, we can all affirm and engage in antiracist work.

Diversity of voices, and of minds, strengthens our ability to solve problems and to ask and answer questions about the world we share. As your instructor, I commit to upholding community values of inclusion, civility, accessibility, and mutual respect. I expect *all course members* to commit to creating a community that affirms and welcomes all persons from diverse backgrounds and experiences, and supports the realization of everyone’s potential.

## Disability/Access Services

“Framingham State University offers equal opportunities to all qualified students, including those with disabilities. The University is committed to making reasonable accommodations as necessary to ensure that its programs and activities do not discriminate, or have the effect of discriminating, on the basis of disability. Disability/Access Services works with students with ADD/ADHD, learning and psychiatric disabilities, students with mobility disabilities, students who are blind or low vision, students who are d/Deaf or hard of hearing, and students with chronic medical conditions.”\*

“Disability/Access Services works to provide reasonable accommodations to qualified students. The purpose of accommodations, modification, and/or auxiliary aids is to reduce or eliminate any disadvantages that may exist because of a disability. Framingham State University is not mandated by law to waive specific courses or academic requirements considered essential to a particular program or degree. Rather, the University is mandated to modify existing requirements on a case-by-case basis in order to ensure that individuals are not discriminated against on the basis of their disability.”\*

- For further information, please visit the [Disability/Access Services](#) page on the Center for Academic Success and Achievement (CASA) section of the Framingham State University web site or contact LaDonna Bridges, Dean of Academic Success, at 508-626-4906 or [lbridges@framingham.edu](mailto:lbridges@framingham.edu), or Tanya Milette, Associate Director of Disability Access Services, at 508-626-4627 or [disabilityservices@framingham.edu](mailto:disabilityservices@framingham.edu).

## Final Comments

You are welcome and encouraged to meet with me if you have any concerns about the course. It may happen that our analysis and discussions of topics and methods seem clear as we work together during course meetings but *appear* foreign when you try to work practice exercises *on your own*. Try discussing and working on practice exercises with others, and *please* know that *you are always welcome to work with me*. I would be glad to work with you: I am here to help you to learn and **I want to help you**. When you learn new material, it is normal to have questions: *questions are a natural part of the learning process*. Asking questions helps you to identify concepts and methods that necessitate further exploration and helps you to incorporate new ideas, approaches, and strategies into your knowledge base. Always remember that **there is no such thing as a stupid question**.

<sup>1</sup> <http://mathcentral.uregina.ca/beyond/articles/art/art1.html> <http://www.mathaware.org/mam/03/essay3.html>

<sup>2</sup> <https://www.sciencenews.org/article/when-art-and-math-collide> <http://weusemath.org/?career=animator>

<sup>3</sup> <http://smallbusiness.chron.com/examples-quantitative-reasoning-business-30966.html>

<sup>4</sup> <http://weusemath.org/?career=budget-analyst> <http://weusemath.org/?career=cost-estimator>

<sup>5</sup> [http://www.cjr.org/behind\\_the\\_news/journalists\\_need\\_to\\_do\\_the\\_math.php](http://www.cjr.org/behind_the_news/journalists_need_to_do_the_math.php) <http://www.knightfoundation.org/blogs/knightblog/2015/7/31/10-basics-todays-journalists-need/>

<sup>6</sup> <http://gregmankiw.blogspot.com/2006/09/why-aspiring-economists-need-math.html>

<sup>7</sup> [http://rodrick.typepad.com/dani\\_rodricks\\_weblog/2007/09/why-we-use-math.html](http://rodrick.typepad.com/dani_rodricks_weblog/2007/09/why-we-use-math.html) <http://weusemath.org/?career=economist>

<sup>8</sup> [http://digitalhumanities.org/companion/view?docid=blackwell/9781405148641/9781405148641.xml&chunk.id=ss1-6-9&toc.id=0&brand=9781405148641\\_brand](http://digitalhumanities.org/companion/view?docid=blackwell/9781405148641/9781405148641.xml&chunk.id=ss1-6-9&toc.id=0&brand=9781405148641_brand)

<sup>9</sup> <http://link.springer.com/article/10.1007/BF00118600>

<sup>10</sup> [https://www.researchgate.net/post/Mathematics\\_and\\_literature\\_do\\_you\\_know\\_examples\\_of\\_mathematical\\_structure\\_or\\_concepts\\_leading\\_to\\_great\\_enduring\\_literary\\_works](https://www.researchgate.net/post/Mathematics_and_literature_do_you_know_examples_of_mathematical_structure_or_concepts_leading_to_great_enduring_literary_works)

<sup>11</sup> [https://www.maa.org/external\\_archive/devlin/devlin\\_03\\_10.html](https://www.maa.org/external_archive/devlin/devlin_03_10.html)

<sup>12</sup> <http://mathforgrownups.com/math-at-work-monday-sole-the-fashion-designer/> <https://www.youtube.com/watch?v=iY3cqChYels>

<sup>13</sup> <http://www.history.mcs.st-and.ac.uk/HistTopics/Cartography.html> <http://myjobsearch.com/careers/cartographer.html> <http://weusemath.org/?career=cartographer>

<sup>14</sup> <http://www.nap.edu/read/4913/chapter/5> <http://bedtimemath.org/interview-with-a-geographer/> <http://www.tandfonline.com/doi/full/10.11120/elss.2014.00035>

<sup>15</sup> <http://gis.stackexchange.com/questions/6535/how-much-math-does-a-gis-analyst-need-to-know> <http://weusemath.org/?career=geographer>

\* <https://www.framingham.edu/academics/center-for-academic-success-and-achievement/disability-access-services/>

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- <sup>8</sup> [https://www.ted.com/talks/jean\\_baptiste\\_michel\\_the\\_mathematics\\_of\\_history?language=en](https://www.ted.com/talks/jean_baptiste_michel_the_mathematics_of_history?language=en) <http://collegemouse.com/jobs/how-to-become-a-historian.html>
- <sup>xi</sup> <http://weusemath.org/?career=political-scientist> <https://www.quora.com/What-is-the-application-of-mathematics-in-political-science>  
<https://bigfuture.collegeboard.org/careers/social-science-political-scientists>
- <sup>xii</sup> <https://www.reference.com/world-view/math-used-psychology-c50e4663320ecd41> <https://www.quora.com/Do-psychologists-use-math-How>  
<https://www.verywell.com/why-are-statistics-necessary-in-psychology-2795146> [https://www.psychologicalscience.org/members/apssc/undergraduate\\_update/undergraduate-update-summer-2013/on-the-importance-of-learning-statistics-for-psychology-students](https://www.psychologicalscience.org/members/apssc/undergraduate_update/undergraduate-update-summer-2013/on-the-importance-of-learning-statistics-for-psychology-students)
- <sup>xiii</sup> <http://www.asanet.org/sites/default/files/savvy/introsociology/Documents/Field%20of%20sociology033108.htm>  
<https://www.britisoc.co.uk/what-is-sociology/what-do-sociologists-do.aspx>