

Rob Gross
MATH4470.01: Mathematical Modeling
MWF 3PM, 209 Gasson Hall
Fall, 2022

OFFICE: 515 Maloney Hall, 617-552-3758

OFFICE HOURS: Monday, Wednesday, and Friday 2–3 and 4–5, and by appointment.

E-MAIL: gross@bc.edu

CLASS HOME PAGE: <http://fmwww.bc.edu/gross/MATH4470>

ALTERNATIVE: <http://sites.bc.edu/rob-gross/math4470>

TEXT: *A Course in Mathematical Modeling*, by Douglas Mooney and Randall Swift.

PREREQUISITES: MATH2202 (Multivariable Calculus) and MATH2210 (Linear Algebra)

This course introduces students to methods of mathematical modeling. The emphasis is on ways to analytically represent and study today's complex modeling problems, with cases from the natural and social sciences. Topics include the model building process, mathematical models of systems, and modeling data to discover properties and hidden characteristics. The calculus of finite differences and solutions to classes of difference equations will serve as the core mathematical theory taught in this course. The dynamics of certain linear and nonlinear models will be explored from various domains (e.g., population models, economic models, Markov models).

In addition to relying on the tools of multivariable calculus and linear algebra, we might use computer tools at various points during the semester. You are urged to familiarize yourself with Mathematica®.

Academic Integrity

You may discuss ideas when working on homework assignments, but you should write up your solutions individually. Sharing inspiration is good; copying someone else's work is plagiarism. Any violations of the College's policy on academic integrity will be dealt with severely. For more information, see

https://www.bc.edu/content/bc-web/academics/sites/university-catalog/policies-procedures.html#tab-academic_integrity_policies

Homework

Homework will be assigned and collected weekly. If you wish to turn in any homework longer than one page, **you must use a stapler**. Folding the edges of the pages over is unacceptable, and paper clips are unreliable. I will be grading your homework myself, and appreciate your cooperation. I typically will distribute an answer key when homework is due, and cannot give credit for work submitted after the answers are available.

All homework submitted in this class must be typeset in some way. Google Docs, Microsoft Office, and similar word processors are acceptable, but not the best way to type mathematics.

I strongly suggest that you install some version of \LaTeX on your computer and learn how to use it.

Macintosh users can download \MacTeX at <http://www.tug.org/mactex>. Macintosh and Windows users can download \MikTeX at <http://miktex.org>. There is plentiful documentation included in either of those downloads, but it is buried deep in various folders. One helpful guide is *The Not So Short Introduction to $\text{\LaTeX} 2_{\epsilon}$* , available at <http://tobi.oetiker.ch/lshort/lshort.pdf>. The Wikipedia entry for \LaTeX has links to many other introductory articles, including an excellent Wikibook at <http://en.wikibooks.org/wiki/LaTeX>. An interface called LyX is available at <http://www.lyx.org>.

As you prepare your solutions, I suggest that you store a copy on Google Drive, and also mail a copy to yourself every time you made any changes. Flash drives have been known to fail, and hard drives, particularly on laptops, are also less reliable than you might think.

Examinations

There will be three examinations during the semester, tentatively scheduled for Wednesday, October 5; Monday, November 7; and Wednesday, December 7. The final examination for MATH4470.01 is scheduled for Monday, December 19, at 12:30PM. Note that this time is fixed by the Registrar, and cannot be altered.

Grades

Homework will account for 20% of your grade. The three examinations during the semester account for 13%, 15%, and 17% respectively. The final will account for the remainder of your grade.

Note

If you are a student with a documented disability seeking reasonable accommodations in this course, please contact Kathy Duggan (617-552-8093, dugganka@bc.edu) at the Connors Family Learning Center regarding learning disabilities and ADHD, or the Disability Services Office, (617-552-3470, disabsrv@bc.edu) regarding other types of disabilities, including temporary disabilities. Advance notice and appropriate documentation are required for accommodations.