

August 2025

Chemistry 1000: *Mathematics for Chemistry*

Instructor: Rob Coalson

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Lectures: MWF: 3:00 - 3:50pm; G36 Benedum Hall

Recitation Section: Wed.: 4:00-4:50pm, 226 Benedum Hall

Teaching Assistant: Ian Ramsier [ier8@pitt.edu]

Required Textbook: John E. Straub, *Mathematical Methods for Molecular Science: Theory and Applications, Visualizations and Narrative* [ISBN:978-1-940380-13-1 Publisher: University Science Books]

Grading: Two hourlies (25%+25%), final exam (30%), homework (10%), recitation session (10%).

Office Hours: R. Coalson, time/date TBD. I. Ramsier, time/date TBD.

Computational Software:

1) Wolfram Alpha: <https://www.wolframalpha.com>

A free and versatile on-line platform that performs numerical and symbolic mathematical analysis. [An enhanced version of Wolfram Alpha, Wolfram Alpha Pro, requires a license which can be obtained free of charge through Pitt.]

2) GeoGebra: <https://www.geogebra.org/calculator>

A useful free on-line graphing package.

Tentative Syllabus:

Part 1 (Some basics, and Multivariate Calculus), Weeks 1-6

- 1) Functions and coordinate systems [Chapt. 1]
- 2) Complex numbers and logarithms [Chapt. 2]
- 3) Differentiation in one and many dimensions [Chapt. 3]
- 4) Scalars, vectors and vector algebra [Chapt. 4]
- 5) Scalar and vector operators [Chapt. 5]
- 6) Integration in one and many dimensions [Chapt. 7]

Part 2 (Matrix Theory and Differential Equations), Weeks 7-12

- 1) Matrices and matrix algebra [Chapt. 14]
- 2) Eigenvalues and eigenvectors [Chapt. 15]
- 3) Ordinary differential equations [Chapt. 10,11]
- 4) Partial differential equations [Chapt. 12]

Part 3 (additional topics). Weeks 13-14

- 1) Fundamentals of probability and statistics [Chapt. 9]
- 2) Extremizing functions of many variables [Chapt. 6]

Tentative Exam Schedule:

- i) Hour Exam 1, Sept. 25
- ii) Hour Exam 2, Nov. 6
- iii) Final Exam, week of Dec. 8

Academic Integrity

Students in this course will be expected to comply with the [University of Pittsburgh's Policy on Academic Integrity](#). Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process, initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, the confiscation of the examination of any individual suspected of violating University Policy. Furthermore, no student may bring any unauthorized materials to an exam, including dictionaries and programmable calculators. To learn more about Academic Integrity, visit the [Academic Integrity Guide](#) for an overview of the topic. For hands- on practice, complete the [Academic Integrity Modules](#).

Disability Services

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and [Disability Resources and Services](#) (DRS), 140 William Pitt Union, (412) 648-7890, drsrecep@pitt.edu, (412) 228-5347 for P3 ASL users, as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.