Meeting times:  Tue, Thu 3.30 PM – 4.45 PM  
Location:  Silver 506  
Instructor:  Alexej Jerschow, alexej.jerschow@nyu.edu  
Contact information:  212 998 8451, Silver 710  
Office hours:  by appointment / zoom  

**Description:**  
This course will provide you with the mathematical foundations needed to progress into Quantum Mechanics, Thermodynamics, Physical Chemistry Laboratory, and other advanced areas of chemistry. Topics include a brief review of Calculus I and Calculus II, algebra of complex numbers, vectors and matrices, calculus of several variables, basis expansions and integral transforms, ordinary differential equations, partial differential equations. Emphasizes applications to real chemical problems.

**Course Goals:**  
By the end of the course, you should be able to solve succinctly stated mathematical problems. You should be able to translate a complex chemical problem into an appropriate mathematical formulation and apply appropriate techniques to solve it.
Textbook:

J.E. Straub, Mathematical Methods for Chemists; John E. Straub, 2019. This is an eBook for which there is no charge, currently available at: http://people.bu.edu/straub/pdffiles/Mathematical-Methods-For-Molecular-Science-V2.2.pdf

A print version is available for about $30.

Homework

Problems will be assigned for each chapter from the textbook. These problems, together with class lectures, will serve as a basis for quizzes and exams.

Exams

There will be approximately 8-10 quizzes, two exams, and a cumulative final. There are no make-up exams, but they may be taken early only for valid reasons. At the discretion of the instructor, the score for a missed quiz will be the average of your other quiz scores. If you have a conflict with an upcoming quiz or exam, please contact me. If you had an emergency situation which caused you to miss a quiz or exam, please contact me ASAP.

Grading

30% quizzes
40% for the two midterm exams
30% for the final exam

Academic Integrity

Cheating/plagiarism will not be tolerated. Students are expected to conduct themselves in an ethical manner in all their classes. This means avoiding all forms of plagiarism, direct copying from other students, using others to take exams or help in assignments, and any kind of inappropriate behavior during exams, quizzes or class. Students suspected of cheating can expect to fail the course, face disciplinary charges with the college, and possibly face expulsion.

Recitation:

Wednesdays, 2-3:15 pm, 25 West 4th Street room C-18.
Recitation instructor: Terrance Hopkins, tmh8460@nyu.edu.

Note:

- March 14 – 20: Spring break

Course schedule

(subject to change depending on how quickly we move through the material)

Weeks 1-2: Ch 1: Functions and coordinate systems
Week 3: Ch 2: Complex numbers and logarithms
Week 4: Ch 3: Differentiation in one and many dimensions
Week 5: Ch 8: Integration in one and many dimensions
Weeks 6-7: Ch 4: Vectors, scalars, and vector algebra
Ch 5: Scalar and vector operators
Weeks 8-9: Ch 14: Matrices and matrix algebra
Week 10: Ch 15: Eigenvalues and eigenvectors
Week 11: Ch 7: Sequences, series, and expansions
Week 12: Ch 10: Ordinary differential equations
Week 13: Ch 11: More ordinary differential equations
Week 14: loose ends and supplementary materials depending on time, most likely including: Ch 6 (extremizing functions of many variables), Ch 9: Fundamental probability and statistics

Midterm 1: Thu, Feb 24, 2022
Midterm 2: Tue, Mar 22, 2022
Final Exam: Date to be announced.

Office hours:
Can be arranged flexibly upon request