Instructor: Prof. David Y. Lee
Office: 118 Fulmer Hall
Phone: 5-9773
Office Hours: Monday and Friday 3-4 pm or by appointment.
Prerequisites: Chem 116 and Math 273 or 283 with a C or better.
Learning Goal: To develop familiarity and facility with the mathematics tools required for Physical Chemistry. Students will review topics from mathematics and become proficient with those tools as they are applied in the studies of Physical Chemistry.

Textbook:
Mathematical Methods for Scientists and Engineers by D. A. McQuarrie

Evaluation:
Chem 330:
Homework (about 4): 50%
Peer reviewing: 20%
Cumulative Final: 30%

Chem 490:
Homework (about 8): 40%
Peer reviewing: 20%
Cumulative Mid-term: 20%
Cumulative Final: 20%

Grading Scale:
While some scaling of grades may occur, students earning 85% of the points are guaranteed an A-, those gaining 75% a B-, and those earning 65% a C.

Homework: The key to learning physical chemistry is working and thinking about problems. Normally, students find that they learn and retain more if they discuss challenging problems with one another. Since this is a review course, every student is responsible for his/her own work without discussion with peers. However, you are encouraged to discuss problems with me before the due dates. Computer methods (e.g. MATLAB or MATHEMATICA) will be used in some of the problems.
The ground rules are:

You may NOT copy and/or edit another students work and submit it as your own, either in full or in part. You may NOT jointly edit or compose solutions with another student. Homework sets will be due in lecture. Late homework sets will not be accepted.

Exams: No make-up exams will be given. If an exam is missed because of illness or a pre-approved absence, an estimated grade will be assigned on the basis of other performances in this course. Unless otherwise indicated, no notes, calculators, or books should be seen during an exam.

WSU Academic Integrity Statement

“As an institution of higher education, Washington State University is committed to principles of truth and academic honesty. All members of the University community share the responsibility for maintaining and supporting these principles. When a student enrolls in Washington State University, the student assumes an obligation to pursue academic endeavors in a manner consistent with the standards of academic integrity adopted by the University. To maintain the academic integrity of the community, the University cannot tolerate acts of academic dishonesty including any forms of cheating, plagiarism, or fabrication. Washington State University reserves the right and the power to discipline or to exclude students who engage in academic dishonesty.”

Students found responsible for academic integrity violations may receive an **F** on the particular assignment or exam, as well as an **F** for the course. Repeated and/or serious offenses may result in referral to the conduct board and expulsion from WSU. For graduate students, academic integrity violations may also result in the loss of teaching and/or research assistantships.

Students with Disabilities
Reasonable accommodations are available for students with a documented disability. If you have a disability and need accommodations to fully participate in this class, please either visit or call the Access Center (Washington Building 217; 509-335-3417) to schedule an appointment with an Access Advisor. All accommodations MUST be approved through the Access Center.
Course Outline (tentative):

1. **General Review of Calculus and Infinite Series**
   - Ch. 1
   - Ch. 2

2. **Vectors**
   - Ch. 5
   - Ch. 7.1 vector fields

3. **Functions of Several Variables**
   - Ch. 6

4. **Curvilinear coordinates**
   - Ch. 8
   - Transformation of volume element.
   - div, grad, curl and $\nabla^2$ in general orthogonal coordinate systems.

5. **Matrix Algebra**
   - Ch. 9 & Ch. 10
   - The 2D Rotation Matrix
   - Inverse and Orthogonal Transformation
   - Eigenvalues and Eigenvectors; Matrix Diagonalization
   - Hermitian Matrices

6. **Differential Equations**
   - Ch. 11 Ordinary Diff-Eq
   - Ch. 16 Partial Diff-Eq (ideal ending of Chem 330)

7. **Break from lecture**
   - User-defined functions in MATLAB or MATHEMATICA.
   - Example task: Write your own code to compute the determinant of an $n \times n$ array.

8. **Functions defined as integrals**
   - Ch. 3
   - Gamma and Error functions; Streling’s approx.
   - Dirac delta function
9. **Orthogonal polynomials and Sturm-Liouville problems**
   - Ch. 14
   - Legendre polynomials
   - Orthogonal polynomials
   - Sturm-Liouville Theory
   - Green’s functions

10. **Fourier series**
    - Ch. 15
    - Fourier series as eigenfunction expansions.
    - Fourier series and ODEs.

    if time permits:

11. **Integral transforms**
    - Ch. 17
    - Fourier, Discrete Fourier and Fast Fourier transforms
    - Laplace and Inverse Laplace transforms