

Chemistry 882: Spectroscopy with Applications to Biomolecules

TuTh, 10:20 a.m. – 11:40 a.m.

<https://www2.chemistry.msu.edu/courses/CEM882/cem882.htm>

Instructor

Dr. David Weliky

Room 41 Chemistry

517-353-1177

weliky@chemistry.msu.edu

Reference Books (on reserve in Main Library)

1. K. E. van Holde, W. C. Johnson, and P. S. Ho, Principles of Physical Biochemistry, second edition (2006)
2. P. W. Atkins and R. S. Friedman, Molecular Quantum Mechanics, fourth edition (2005)
3. Donald Voet and Judith G. Voet, Biochemistry, fourth edition (2011)

Other Reference Books

4. Donald A. McQuarrie and John D. Simon, Physical Chemistry: A Molecular Approach
5. James R. Barrante, Applied Mathematics for Physical Chemistry
6. Charles R. Cantor and Paul R. Schimmel, Biophysical Chemistry (volumes 1-3)
7. Michel Daune, Molecular Biophysics, Structures in Motion
8. Rodney Cotterill, Biophysics: An Introduction
9. Claude Cohen-Tannoudji, Bernard Diu, Franck Laloe, Quantum Mechanics (vols. 1,2)
10. Jack D. Graybeal, Molecular Spectroscopy
11. Thomas C. Farrar and Edwin D. Becker, Pulse and Fourier Transform NMR
12. Charles P. Slichter, Principles of Magnetic Resonance
13. P. W. Atkins, Quanta: A Handbook of Concepts

Syllabus (approximate)

Week	Topic	Reading
Jan. 13 – 17	Review of Protein, Nucleic Acid, and Membrane Structure	Voet, Chapter 4, 5.1-5.3, 8.1, 8.3-8.5 VJH, 1.5
Jan. 20 – Feb. 14	Orders of Magnitude of Atoms and Molecules	VJH, 8.1 AF, 7.3
Feb. 17 – 28	Quantum Mechanical Background	VJH, 8.2 AF, 1.1-1.20
Mar. 10 – Apr. 4	Electronic Spectroscopy, Angular Momentum, Magnetic Resonance	VJH, 8.3, 9.1, 12.1-12.4, 12.6-12.8 AF, 3.9-3.14, 7.1-7.2, Fur. Inf. 8
Apr. 7 – 25	Absorption and Emission of Radiation, Fluorescence	VJH, 8.4, 8.5, Chapter 11 AF, 10.1, Fur. Inf. 16, 17

Homework

There will be about five homework assignments in the course. You can work with your classmates on solving the problems but what you hand in should not be a direct copy of another student's work.

Exams

There will be two exams in the course.

I will provide a review sheet prior to each exam. In addition, fundamental constants will be provided on the exam. You can also bring in one page to each exam with any information that you think is important.

You should show all of your work and explain your reasoning on homework and exams. Most of the grading credit will be based on your reasoning.

Grading

The final grade will be a combination of exam grades (~2/3 contribution) and homework grades (~1/3 contribution).

The approximate final grading scale will be:

4.0	80% – 100%
3.5	70% – 80%
3.0	60% – 70%
2.5	50% – 60%
2.0	40% – 50%
1.5	30% – 40%
1.0	20% – 30%
0.0	0% – 20%