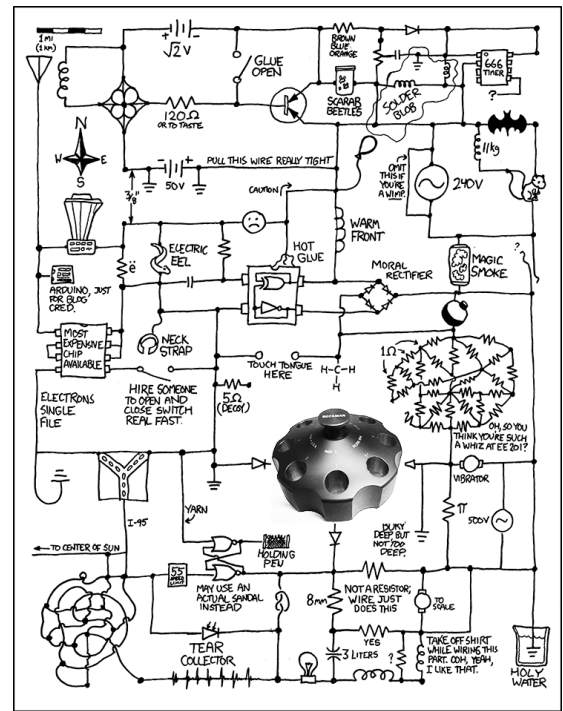


Techniques of Biophysical Chemistry
 MCB 4008 and 5008 - Spring 2016
 11:15am - 12:05 pm M/W/F Torrey 263

Instructor

James Cole
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 Office Hours: By appointment



Syllabus

Overview of biophysical techniques

Treatment of experimental data

- Example: Ligand binding
- Linear data transformation vs. direct fitting
- Parameter estimation by nonlinear least squares fitting

Optical spectroscopy

- General Principles and Instrumentation
- Absorption Spectroscopy
- Fluorescence Spectroscopy
- Circular Dichroism
- Vibrational Spectroscopy

Light scattering

- Static light scattering
- Dynamic light scattering

Small angle scattering

- Small Angle X-ray Scattering
- Small Angle Neutron Scattering

Analytical ultracentrifugation

- Sedimentation Velocity
- Sedimentation Equilibrium

Isothermal titration calorimetry

Differential scanning calorimetry

Surface plasmon resonance

Atomic force microscopy

Microscale thermophoresis

Exams:

There will be three exams: two in-class exams (February 19 and April 1) and a final exam. The exams for the undergraduate and graduate components of the course will be different. The final will be cumulative.

Homeworks

There will be three homeworks assigned during the semester.

Final Projects

Graduate students will do an oral presentation and write a review of an original research article which describes an application of one or more of the biophysical techniques described in class. Guidelines for the presentation and review will be provided. All students are responsible for the material in the presentations.

Undergraduates will be given a research problem and asked to write a brief proposal describing how they would solve the problem using one of the biophysical techniques discussed in class. Again, guidelines for the proposal will be given.

Grades

The final grades will be assigned based on the following formula:

Exams	65 %
Homeworks	15 %
Final Project	20 %

Academic Integrity and Community Standards

For definitions and policies regarding academic misconduct for undergraduate and graduate students at UCONN see: <http://www.community.uconn.edu/index.html>

Texts

Primary text: *Biophysical Techniques*, Campbell, I.D. 2012, Oxford.

Secondary texts:

Physical Chemistry: Principles and Applications in Biological Sciences. 5th Edition, Tinoco, I., Sauer, K., Wang, J.C., Puglisi, J.D., Harbison, G. and Rovnyak, D., 2014, Prentice-Hall.

Principles of Physical Biochemistry, 2nd Edition, Van Holde, K.E., Curtis Johnson, W. & Ho, P.S., 2006, Prentice Hall, Upper Saddle River, New Jersey.

Principles of Fluorescence Spectroscopy, 3rd Edition, Lakowicz, J., 2006, Springer.

BIOPHYSICAL CHEMISTRY, *Part II: Techniques for the study of biological structure and function*, Cantor, C.R. and Schimmel, P. R., 1980, W.H. Freeman.

Methods in Cell Biology Volume 84. *Biophysical Tools for Biologists: Vol. 1: In vitro Techniques*, Correia, J.J. and Detrich, J. W., Eds., 2008, Academic Press.

The Molecules of Life: Physical and Chemical Principles, 1st Edition, Kuriyan, J., Konforti, B. & Wemmer, D., Garland Science, New York, 2012.

Methods in Molecular Biophysics. Serdyuk, I.N., Zaccai, N.R. and Zaccai, J. 2007. Cambridge Press.

Physical Chemistry for the Life Sciences. 2nd Edition, Atkins, P. and de Paula, J., 2010, Freeman.

Articles

Research and review articles as well as book chapters will be used to highlight specific areas. Materials available in electronic form will be placed on HuskyCT.