

Chemistry 488, (01:160:488), Spring 2013

Special Topics: Physical Chemistry of Biochemical Systems

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Spring 2013, Wednesdays and Fridays, 9:15 to 10:35am, Foran 138B

This is a one-semester physical chemistry course with an emphasis on applications to biochemical systems and to life sciences. It will cover three main areas: thermodynamics, biochemical kinetics and biochemical spectroscopy. This course is essentially the same course as I taught last year as Chem 342; the number has been changed to reflect the fact that it is not a good substitute for Chemistry 328 for Chemistry majors.

The course text is *Physical Chemistry for the Life Sciences, 2nd edition*, by Peter Atkins and Julio de Paula, (W.H. Freeman, 2011). The text is available in both hard-copy and e-book formats. We will pretty much follow the book straight through, but will most of skip Chapters 10 and 13. The table below gives an approximate time schedule; detailed reading assignments will be made as the class proceeds.

| Week starting | Subject | Chapter |
|---------------|---------------------------------------|----------|
| Jan 23 | First law of thermodynamics | 1 |
| Jan 30, Feb 6 | Second law of thermodynamics | 2 |
| Feb 13, 20 | Chemical & phase equilibria | 3,4 |
| Feb 27 | Ion and electron transport | 5 |
| Mar 6 | Chemical reaction rates | 6,7 |
| Mar 13 | Enzyme reactions, allostery | 8 |
| Mar 27, Apr 3 | Basic quantum mechanics | 9,(10) |
| Apr 10, 17 | Methods for studying macromolecules | 11 |
| Apr 24, May 1 | Optical spectroscopy and photobiology | 12, (13) |

The course website is <http://casegroup.rutgers.edu/lnotes.html>. Reading and homework assignments and additional course materials will be posted there. There will be three exams: Mar. 13 and Apr. 17 (in-class), and the final exam (May 10, 8 to 11am). The course grade will be determined by homework (20%), the mid-term exams (each 20%) and the final examination (40%). Office hours initially will be Fridays after class; additional hours will be scheduled based on input from students.