Syllabus for CHEM501900 BIOPHYSICAL CHEMISTRY, Fall 2009

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Lecture:

Time: M7M8F6   Room: CHEM325   Method: Lecture, 3 credits

Course Outline:

Part I:

- Amino Acids and Protein Structures
  - Review properties of amino acids
  - Secondary structures
  - Supersecondary structures
  - Noncovalent interactions in proteins
  - Globular and fibrous proteins
- Protein Folding and Unfolding
  - Protein stability and thermodynamics
  - Folding kinetics
  - Protein design
  - Protein misfolding
  - Spectroscopic techniques for folding study

Part II.

- Statistical Thermodynamics
  - Boltzmann Distribution Law
  - The partition function and statistical thermodynamics
  - Biological applications of statistical thermodynamics
- Dynamics of Biomolecules
  - Brownian motion
  - Transport processes
  - Kinetics of a conformational change

Grading:

Seminar report × 2	10%
Homework & Problem set	20%
Mid-term exam	30%
Final exam	40%

Test Schedule:

     Mid-term exam: 11/30/09

     Final exam: 1/11/10

Seminar report:

     Two bio-related seminar reports

     One page only and written in English

     Turn in your reports by 1/15/10

References (* indicates important books):

- *T. Engel, G. Drobny, P. Reid, Physical Chemistry for the Life Sciences.*
- *K.E. van Holde, W.C. Johnson, P.S. Ho, Principles of Physical Biochemistry*.*
- *D. Eisenberg, D. Crothers, Physical Chemistry with Applications to the Life Sciences*.*
- *T.E. Creighton, Proteins – Structures and Molecular Properties*.*
- *M. Daune, Molecular Biophysics – Structures in Motion.*
- *P. Atkins and J. Paula, Physical Chemistry for the Life Sciences*
- *A.V. Finkelstein, O.B. Ptitsyn, Protein Physics*.*
- *A. Fersht, Structure and Mechanism in Protein Science*.*
- *C. Branden, J. Tooze, Introduction to Protein Structure, 2nd Ed.*
- *I. Tinoco, K. Sauer, J.C. Wang, J.D. Puglisi, Physical Chemistry: Principles and Applications in Biological Sciences*