

Syllabus for CHEM501900 BIOPHYSICAL CHEMISTRY, Fall 2014

Instructor: (Part I) Jia-Cherng Horng (洪嘉呈) jchorng@mx.nthu.edu.tw

(Part II) Yun-Wei Chiang (江昀緯) ywchiang@mx.nthu.edu.tw

(Part III) Carmay Lim (林小喬) carmay@gate.sinica.edu.tw

Lecture:

Time: M7M8M9

Room: CHEM325

Method: Lecture, 3 credits

Course Outline:

Part I. (9/15-10/20 by Horng)

- Protein Folding
 - Basic principles
 - Protein stability and thermodynamics
 - Folding kinetics
 - Spectroscopic methods
 - Circular dichroism
 - Emission spectroscopy
 - Other spectroscopy for biophysical studies
- Exam on 10/20

Part II. (10/27-12/1 by Chiang)

- Spin-Label Electron Spin Resonance for Biophysical Study
 - Fundamental principles;
 - Magnetic resonance of the hydrogen atom; Spin dipolar interactions; Distance measurement of doubly labeled spins by CW-ESR;
 - Studying protein and membranes by cw- and Pulsed-ESR.
 - Electron Spin-Echo Envelop Modulation (ESEEM) for Metalloproteins
- Exam on 12/1

Part III. (12/8-1/5 by Lim)

- Ligand Binding by Protein
 - General properties of protein-ligand interactions
 - Metalloproteins
 - Calcium-binding proteins; NAS- and nucleotide-binding proteins
 - Allostery: interactions between different binding sites

Grading:

Hornig (1/3), Chiang (1/3), Lim (1/3)

Exams or presentations

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*

