



# National Dong Hwa University

## Department of Chemistry

### Biophysical Chemistry:

Proteins: Structure, Thermodynamics, and Kinetics

Time: Wed 2:10 -5PM

Place: Sciences and engineering Building #3 B201

Teacher : Chia-Lin Chyan

Office: Science and Engineering Building #3 B31  
ext. 3589

Lab: Science and Engineering Building #3 A209  
ext. 3590

### 授課進度表 Teaching Schedule & Subjects

| 週次<br>week | 內容 ( Subject/Topics )                                                                                                      | 備註<br>Remarks |
|------------|----------------------------------------------------------------------------------------------------------------------------|---------------|
| 1          | Thermodynamics and kinetics: molecular forces that determine protein structures and their interactions                     |               |
| 2          | Thermodynamics and kinetics: molecular forces that determine protein structures and their interactions                     |               |
| 3          | Protein Structure: primary, secondary, tertiary, and quaternary structure; predictions of secondary and tertiary structure |               |
| 4          | Protein Folding and stability                                                                                              |               |
| 5          | Protein-protein interactions: protein-ligand interaction; enzyme catalysis                                                 |               |
| 6          | Bioinformatics: database searching and analysis tools                                                                      |               |
| 7          | Protein cloning, expression and purification technique                                                                     |               |
| 8          | Midterm Project presentation                                                                                               |               |
| 9          | Midterm Exam                                                                                                               |               |
| 10         | Characterization of protein-ligand and enzyme-inhibitor interaction                                                        |               |
| 11         | Characterization of the size of the protein                                                                                |               |
| 12         | Biomolecular spectroscopy: absorption and emission spectroscopy                                                            |               |
| 13         | Biomolecular spectroscopy: circular dichroism                                                                              |               |
| 14         | Biomolecular spectroscopy: nuclear magnetic resonance spectroscopy                                                         |               |
| 15         | Biomolecular spectroscopy: nuclear magnetic resonance spectroscopy                                                         |               |
| 16         | Structural calculation and modeling                                                                                        |               |
| 17         | Final Exam and project presentaion                                                                                         |               |

### II. Grading :

Homework (20%) 、Midterm and Final Exams (written; 40%) 、Midterm and Final Report (oral and written; 40%) 。

### III. Reference Materials

1. Handouts pdf
2. van Holde, Johnson, and Ho (1998), *Principles of Physical Biochemistry*, Prentice-Hall Inc.
3. Lesk (2010), *Introduction to Protein Science*, 2<sup>nd</sup> ed. Oxford.
4. Creighton (1997) *Protein Structure, a Practical Approach*, 2nd ed., Oxford University Press.
5. Branden & Tooze (1998) *Introduction to Protein Structure*, Garland Publishing.
6. Cavanagh, Fairbrother, Palmer & Rance *Protein NMR Spectroscopy*, Academic Press.
7. Wuthrich (1986) *NMR of Proteins and Nucleic Acids*, Wiley.
8. Leach (1996) *Molecular Modelling: Principles and Applications*, Longman.
9. Cantor & Shimmel (1980) *Biophysical Chemistry*, Parts I-III, Freeman Press.