Extended Syllabus

Course Title	Biochemsitry I	Course Number	CHM2601
Credit	3	Enrollment Eligibility	3rd or 4th year students
Class Time	Mon 12:00~13:15, Fri 10:30~11:45	Classroom	

Instructor's Photo	Name: Lee, Hyun Soo	Homepage:
	E-mail:	Telephone:
	Office: R307 Office Hours: Tue, Wed, Thur 8:00-11:30AM	

Ⅰ. Course Overview

1. Description

This course explores the roles of essential biological molecules focusing on protein and nucleic acid chemistry. It provides a systematic and methodical application of general and organic chemistry principles. Students examine the structure of proteins, their function, their binding to other molecules and the methodologies for the purification and characterization of proteins. Enzymes and their kinetics and mechanisms are covered in detail. Metabolic pathways are examined from thermodynamic and regulatory perspectives. This course provides the linkage between the inanimate world of chemistry and the living world of biology.

2. Prerequisites

General chemistry I, II and organic chemistry I, II

3. Course Format (%)

Lecture	Discussion	Experiment/Practicum	Field study	Presentations	Other
95%	5%	%	%	%	%

4. Evaluation (%)

mid-term Exam	final exam	Quizzes	Presentations	Projects	Assignments	Participation	Other
50%	25%	%	%	%	15%	10%	%

Ⅱ. Course Objectives

1. To explain the basics of nucleic acids, DNA and RNA.
2. To describe the flow of genetic information from DNA to proteins.
3. To understand the specificity of enzymes and describe catalytic mechanisms of selected enzymes.

Ⅲ. Course Format

(* In detail)

This course is designed to let the students learn the basics of biochemistry. Most of the class time will be spent for lecture presented by the professor. For some chapters, videos will be played to help the student understand the textbook.

Ⅳ. Course Requirements and Grading Criteria

Evaluation will be performed by

- two midterms (100 pts each)
- one final exam (100 pts)
- assignments (60 pts)
- participation (40 pts)

Ⅴ. Course Policies

General things for this course will be managed by school policies.
Special things will be announced by the professor.

Ⅵ. Materials and References

Textbook: Biochemistry 7th ed. by Berg, Tymoczko, Stryer
Lecture materials will be uploaded in the Cyber Campus by 9pm on Sun and Thur.

Ⅶ. Course Schedule

(* Subject to change)

Week 1	**Learning Objectives**	Chapter 1. To understand the biochemical unity and diversity in biological systems and to learn basic chemical principles to explain the properties of biological molecules
	Topics	Biochemical unity, structure and function of DNA, and chemical concepts used to explain the properties of biological molecules.
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 1.
	Assignments	
Week 2	**Learning Objectives**	Chapter 2. To explain key properties of proteins
	Topics	Protein composition, and primary and secondary structure of proteins
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 2.
	Assignments	
Week 3	**Learning Objectives**	Chapter 2. To explain key properties of proteins
	Topics	Tertiary and quaternary structure of proteins, and amino acid sequence and three-dimensional structure of proteins
	Materials (Required Readings)	Lecture and discussions
	Class Work (Methods)	PPT files uploaded in the Cyber Campus, textbook chapter 2.
	Assignments	
Week 4	**Learning Objectives**	Chapter 3. To learn various experimental techniques for protein studies
	Materials (Required Readings)	Protein purification, protein sequence determination, and immunology-related protein analysis.
	Topics	Lecture and discussions
	Class Work (Methods)	PPT files uploaded in the Cyber Campus, textbook chapter 3.

	Assignments	
Week 5	**Learning Objectives**	Chapter 3. To learn various experimental techniques for protein studies
	Topics	Protein mass spectrometry, solid-phase peptide synthesis, and X-ray crystallography and NMR spectroscopy for protein structure determination
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 3.
	Assignments	
Week 6	**Learning Objectives**	Chapter 4. To describe the flow of genetic information from DNA to proteins
	Topics	Properties of DNA, DNA replication, gene expression, genetic code, and exon and intron.
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 4.
	Assignments	
Week 7	**Learning Objectives**	Chapter 5. To learn tools for genome studies
	Topics	Tools of gene exploration, recombinant DNA technology, and genome sequencing and analysis.
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 5.
	Assignments	
Week 8	**Learning Objectives**	중간고사
	Topics	
	Class Work (Methods)	

	Materials (Required Readings)	
	Assignments	
Week 9	**Learning Objectives**	Chapter 6. To learn evolution and bioinformatics of proteins
	Topics	Homologs, analysis of sequence fragments, examination of three-dimensional structure, evolutionary trees, and molecular exploration of evolution
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 6.
	Assignments	
Week 10	**Learning Objectives**	Chapter 7. To describe biochemical characteristics of hemoglobin
	Topics	Myoglobin and hemoglobin as an oxygen binder
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 7.
	Assignments	
Week 11	**Learning Objectives**	Chapter 7. To describe biochemical characteristics of hemoglobin
	Topics	Cooperative binding of oxygen, the Bohr effect, and mutations in genes encoding hemoglobin
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 7.
	Assignments	
Week 12	**Learning Objectives**	Chapter 8. To describe basic concepts and kinetics of enzymes
	Topics	Basics of enzymes, understanding of enzymes by free energy, and the transition state

	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 8.
	Assignments	
Week 13	**Learning Objectives**	Chapter 8. To describe basic concepts and kinetics of enzymes
	Topics	The Michaelis-Menten Model and enzyme inhibition,
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 8.
	Assignments	
Week 14	**Learning Objectives**	Chapter 9. To describe catalytic strategies of enzymes
	Topics	Proteases, carbonic anhydrases, restriction enzymes, and myosins
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 9.
	Assignments	
Week 15	**Learning Objectives**	Chapter 10. To describe ragulatory strategies of enzymes
	Topics	Allosteric regulation, isozymes, covalent modification, and proteolytic cleavage
	Class Work (Methods)	Lecture and discussions
	Materials (Required Readings)	PPT files uploaded in the Cyber Campus, textbook chapter 10.
	Assignments	
Week 16	**Learning Objectives**	Final exam
	Topics	

	Class Work (Methods)	
	Materials (Required Readings)	
	Assignments	

Ⅷ. Special Accommodations

In cases you want to request special accommodations to take courses and exams due to a temporary or permanent physical, sensory, psychological/emotional or learning disability, contact the school office at 02-705-7833. The Instructor will take necessary measure to accommodate any needs that can be acknowledged by the school policy.

※ Please write support plans or notices for special students such as the challenged, foreigners and North Korean defectors.