

# SYLLABUS

Classification	Required	Course No.	9503	Cr. Hrs.	4	Instructor	Soo Hyun Eom
Course Title	Korean	고급 생화학					
	English	Advanced Biochemistry					
<u>Course Outline</u> : This course will cover the molecular design of life focusing on not only its components such as DNA, RNA, protein, carbohydrate and lipid but also its strategy to use them as enzyme, building blocks etc. This course will cover how living organism produces its own energy							
Prerequisite		None					
Textbook and References		Biochemistry (6 <sup>th</sup> Edition) Berg, J.M., Tymoczko, J.L., and Stryer, L. (2006)					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week (Mar 3, 5)	Chapter 1. Biochemistry : An Evolving Science Chapter 4. DNA, RNA, and the Flow of Genetic Information					Zee-Yong Park Sin-Hyeog Im	
2nd week (Mar 10, 12)	Chapter 5. Exploring Genes and Genomes					Sin-Hyeog Im	
3rd week (Mar 17, 19)	Chapter 28. DNA Replication, Repair, and Recombination Chapter 29. RNA Synthesis and Processing					Haihong Shen Haihong Shen	
4th week (Mar 24, 26)	Chapter 30. Protein Synthesis					Haihong Shen	
5th week (Mar31, Apr2)	Chapter 2. Protein Composition and Structure Chapter 3. Exploring Proteins and Proteomes					Soo Hyun Eom Soo Hyun Eom	
6th week (Apr 7, 9)	Chapter 3a. Protein Structure Determination Methods Chapter 6. Exploring Evolution and Bioinformatics					Soo Hyun Eom Zee-Yong Park	
7th week (Apr 14, 16)	Chapter 7. Hemoglobin: Portrait of a Protein in Action Chapter 8. Enzymes: Basic Concepts and Kinetics					Zee-Yong Park Sangyong Jon	
8th week (Apr 23)	Mid-term Exam					Soo Hyun Eom	
9th week (Apr28, 30)	Chapter 9. Catalytic Strategies Chapter 10. Regulatory Strategies					Yong-Chul Kim Yong-Chul Kim	
10th week (May 7)	Chapter 11. Carbohydrates					Sangyong Jon	
11th week (May 12, 14)	Chapter 14. Signal-Transduction Pathways Chapter 15. Metabolism: Basic Concepts and Design					Yong-Chul Kim Sangyong Jon	
12th week (May 19, 21)	Chapter 12. Lipids and Cell Membranes					Chul-Seung Park	
13th week (May 26, 28)	Chapter 13. Membrane Channels and Pumps					Chul-Seung Park	
14th week (Jun 2, 4)	Chapter 16. Glycolysis and Gluconeogenesis Chapter 17. The Citric Acid Cycle					Yung Joon Yoo	
15th week (Jun 9, 11)	Chapter 18. Oxidative Phosphorylation					Yung Joon Yoo	
16th week (Jun 18)	Final Exam					Soo Hyun Eom	

\* If there will be experiments, mark it in the "Remarks".

Coordinator    Soo Hyun Eom

Dept. Chair    Chul Seung Park



# SYLLABUS

Classification	Required	Course No.	9505	Cr. Hrs.	3	Instructor	Team Teaching
Course Title	Korean	분자생물실험학					
	English	Methods in Molecular Biology					
<b>Course Outline</b> : In order to review experimental techniques required for conducting a modern biological research, basic and detailed procedures of molecular biology, protein chemistry and cell biology will be discussed.							
Prerequisite		No					
Textbook and References		No					
Weekly Course Schedule							
Calendar	Description						Lecturers
1st week							
2nd week	General Techniques I (3/11, 3/13)						C. S. Park
3rd week	Techniques related to cells and tissues (3/18, 3/20)						J. Y. Lee
4th week	DNA Techniques (3/25, 3/27)						S. H. Im
5th week	RNA Technology (4/1, 4/3)						H. Shen
6th week	Protein Purification (4/8, 4/10)						S. H. Eom
7th week	Proteomics and 2-dimensional electrophoresis (4/15, 4/17)						Y. J. Yoo
8th week	Mass Spectrometry (4/22, 4/24)						Z. Y. Park
9th week	Midterm Exam (5/1)						
10th week	Use of Laboratory Mice (5/6, 5/8)						C. Cho
11th week	Rapid kinetics/Spectrophotometry (5/13, 5/15)						D. H. Kim
12th week	Immunohistochemistry techniques (5/20, 5/22)						M. Song
13th week	HPLC (5/27, 5/29)						Y. C. Kim
14th week	Flow cytometry (6/3, 6/5)						C. D. Jun
15th week	Bio Chips (6/10, 6/12)						S. Y. Jon
16th week	Final Exam (6/17)						

Coordinator Haihong Shen

Dept. Chair Chul Seung Park



# SYLLABUS

Classification	Elective	Course No.	9601	Cr. Hrs.	3	Instructor	Do Han Kim
Course Title	Korean	분자생리학					
	English	Molecular Physiology					
<u>Course Outline :</u> It is a seminar course to review recent publications concerning molecular and physiological functions of organized biological systems such as cell organelles and specialized macromolecules.							
Prerequisite							
Textbook and References		Recently published review papers and the source book "Cell Physiology" edited by N.Sperelakis					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week	Introduction					Do Han Kim	
2nd week	Calcium signaling					"	
3rd week	Na-pump					"	
4th week	Ca <sup>2+</sup> -ATPase					"	
5th week	Na-Ca Exchanger					"	
6th week	Cell volume regulation					"	
7th week	Cell PH regulation					"	
8th week	Midterm Exam					"	
9th week	Na Channel					"	
10th week	Ca Channel					"	
11th week	K Channel					"	
12th week	Toxins, drugs, genetic diseases					"	
13th week	Synaptic transmission					"	
14th week	Skeletal muscle physiology					"	
15th week	Cardiac muscle physiology					"	
16th week	Final Exam					"	

\* If there will be experiments, mark it in the "Remarks".

Coordinator Do Han Kim (seal)

Dept. Chair Chul Seung Park (seal)

# SYLLABUS

Classification	Elective	Course No.	9605	Cr. Hrs.	3	Instructor	Chul-Seung Park
Course Title	Korean	신경생물학					
	English	Neurobiology					
<u>Course Outline</u> We will discuss the cell and molecular biology of nervous system, and the elementary interactions between neurons via synaptic transmission.							
Prerequisite							
Textbook and References		Principles of Neural Science (4 <sup>th</sup> Ed., Kandal, Schwartz, & Jessell)					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1 <sup>st</sup> week	Introduction					Chul-Seung Park	
2 <sup>nd</sup> week	The cytology of neurons					"	
3 <sup>rd</sup> week	Synthesis and tranfficking of neuronal proteins					"	
4 <sup>th</sup> week	Ion channels					"	
5 <sup>th</sup> week	Membrane potential					"	
6 <sup>th</sup> week	Local signaling: Passive electrical properties of the neuron					"	
7 <sup>th</sup> week	Propagated signaling: The action potential					"	
8 <sup>th</sup> week	Mid-term Exam					x	
9 <sup>th</sup> week	Overview of synaptic transmission					x	
10 <sup>th</sup> week	Signaling at the nerve-muscle synapse					x	
11 <sup>th</sup> week	Synaptic integration					"	
12 <sup>th</sup> week	Modulation of synaptic transmission					"	
13 <sup>th</sup> week	Transmitter release					"	
14 <sup>th</sup> week	Neurotransmitters					"	
15 <sup>th</sup> week	Diseases of chemical transmission					"	
16 <sup>th</sup> week	Final Exam					"	

\* If there will be experiments, mark it in the "Remarks".

Coordinator    Chul-Seung Park    (seal)  
 Dept. Chair    Chul-Seung Park    (seal)

# SYLLABUS

Classification	Elective	Course No.	9612	Cr. Hrs.	3	Instructor	Yong-Chul Kim
Course Title	Korean	의약화학 I					
	English	Medicinal Chemistry I					
<b>Course Outline</b> : Basic principles and techniques of medicinal chemistry for drug design and the molecular mechanisms by which drugs act in the body, will be covered.							
Prerequisite							
Textbook and References		An Introduction to Medicinal Chemistry (by L. Patrick)					
Weekly Course Schedule							
Calendar	Description						Lecturers
1st week	개강일(9.1) Introduction						Yong-Chul Kim
2nd week	Protein Structure						"
3rd week	Drug Action at Enzymes						"
4th week	Drug Action at Receptors						"
5th week	Receptor Structure and Signal Transduction						"
6th week	Nucleic Acids						"
7th week	Drug Discovery and Drug Development						"
8th week	Mid-Term Exam						"
9th week	Drug Design and Drug-Target Interactions						"
10th week	Pharmacokinetics						"
11th week	Quantitative Structure-Activity Relationships						"
12th week	Combinatorial Synthesis						"
13th week	"						"
14th week	Computers in Medicinal Chemistry						"
15th week	"						"
16th week	Final Exam						"

\* If there will be experiments, mark it in the "Remarks".

Coordinator Yong Chul Kim  
Dept. Chair Chul Seung Park



# SYLLABUS

Classification	Elective	Course No.	9621	Cr. Hrs.	3	Instructor	Sangyong Jon
Course Title	Korean	바이오큐제이트 화학 I					
	English	Bioconjugate Chemistry I					
Course Outline : Bioconjugate chemistry will be divided into two independent courses: I and II during spring and fall semester, respectively. The course I is intended for students who want to acquire essential knowledge of organic chemistry and reaction. There is no prerequisite for this course because it covers general organic chemistry with the undergraduate level learned in department of chemistry. On the other hand, the course II will cover the principles and actual examples of bioconjugation that has been used in a variety of biological study to date.							
Prerequisite		None					
Textbook and References		To be announced later					
Weekly Course Schedule							
Calendar	Description						Lecturers
1st week	Structure and Bonding : Acids and Bases						Sangyong Jon
2nd week	The Nature of Organic Compounds – Alkane						Sangyong Jon
3rd week	Alkenes and Alkynes						Sangyong Jon
4th week	Aromatic Compounds						Sangyong Jon
5th week	Stereochemistry						Sangyong Jon
6th week	Alkyl Halide						Sangyong Jon
7th week	Alcohols, Ethers, and Phenol						Sangyong Jon
8th week	Aldehydes and Ketones – Nucleophilic Addition Reactions						Sangyong Jon
9th week	Carboxylic Acids and Derivatives						Sangyong Jon
10th week	Amines						Sangyong Jon
11th week	Structure Determination						Sangyong Jon
12th week	Carbohydrate						Sangyong Jon
13th week	Amino Acids, Peptides, and Proteins						Sangyong Jon
14th week	Lipids and Nucleic Acids						Sangyong Jon
15th week	The Organic Chemistry of Metabolic Pathways						Sangyong Jon
16th week	Final Exam						Sangyong Jon

\* If there will be experiments, mark it in the "Remarks".

Coordinator    Sangyong Jon  
Dept. Chair    Chul Seung Park



# SYLLABUS

Classification	Elective	Course No.	9632	Cr. Hrs.	3	Instructor	Chung hee Cho
Course Title	Korean	분자유전학 기법론					
	English	Methods in Molecular Genetics					
<b>Course Outline :</b> The course will focus on mammalian genomics. Especially recent findings from human genome sequencing projects and application of genome information from the projects will be discussed in this course							
Prerequisite							
Textbook and References		Nature Vol 409 (2001)					
<b>Weekly Course Schedule</b>							
<i>Calendar</i>	<i>Description</i>						<i>Lecturers</i>
<i>1st week</i>	Introduction						C. Cho
<i>2nd week</i>	History of human genome sequencing						C. Cho
<i>3rd week</i>	Initial sequencing and analysis of the human genome I						C. Cho
<i>4th week</i>	Initial sequencing and analysis of the human genome II						C. Cho
<i>5th week</i>	Initial sequencing and analysis of the human genome III						C. Cho
<i>6th week</i>	Human genome by Celera I						C. Cho
<i>7th week</i>	Human genome by Celera II						C. Cho
<i>8th week</i>	Midterm Exam						C. Cho
<i>9th week</i>	Human genome by Celera III						C. Cho
<i>10th week</i>	Guide to the draft human genome						C. Cho
<i>11th week</i>	Mining the draft human genome						C. Cho
<i>12th week</i>	Expressing the human genome						C. Cho
<i>13th week</i>	Evolutionary analysis of the human genome						C. Cho
<i>14th week</i>	Human disease genes						C. Cho
<i>15th week</i>	Computational comparison of draft sequences						C. Cho
<i>16th week</i>	Final Exam						C. Cho

\* If there will be experiments, mark it in the "Remarks".

Coordinator Chunghee Cho

Dept. Chair Chul Seung Park



# SYLLABUS

<i>Classification</i>	Elective	<i>Course No.</i>	9646	<i>Cr. Hrs.</i>	3	<i>Instructor</i>	Soo Hyun Eom
<i>Course Title</i>	<i>Korean</i>	생체고분자X-선결정					
	<i>English</i>	X-Ray crystallography of biomacromolecules					
<i>Course Outline</i> Methods of the cloning, protein purification, crystallization, and the structure determination using the X-ray crystallography will be performed.							
<i>Prerequisite</i>							
<i>Textbook and References</i>		Methods in Enzymology Vol.276, 277 Macromolecular crystallography, Edited by Carter & Sweet					
<i>Weekly Course Schedule</i>							
<i>Calendar</i>	<i>Description</i>					<i>Lecturers</i>	
<i>1st week</i>	Introduction					Soo Hyun Eom	
<i>2nd week</i>	Cloning					"	
<i>3rd week</i>	Protein Purification I					"	
<i>4th week</i>	Protein Purification II					"	
<i>5th week</i>	Crystallization I					"	
<i>6th week</i>	Crystallization II					"	
<i>7th week</i>	Data collection strategy					"	
<i>8th week</i>	Mid-term exam					"	
<i>9th week</i>	Data collection						
<i>10th week</i>	Phase determination by MR					"	
<i>11th week</i>	Phase determination by MIR					"	
<i>12th week</i>	Phase determination by MAD I					"	
<i>13th week</i>	Phase determination by MAD II					"	
<i>14th week</i>	Model building					"	
<i>15th week</i>	Structure refinement					"	
<i>16th week</i>	Final-exam					"	

\* If there will be experiments, mark it in the "Remarks".

Coordinator **Soo Hyun Eom**

Dept. Chair **Chul Seung Park**





# SYLLABUS

Classification	Elective	Course No.	9647	Cr. Hrs.	3	Instructor	Jae Il Kim
Course Title	Korean	생체고분자 NMR 분광학					
	English	Biomolecular NMR Spectroscopy					
<u>Course Outline</u> : Biomolecular NMR information on three-dimensional structures, on conformational dynamics and on both structural and kinetic aspects of interactions with small molecules.							
Prerequisite							
Textbook and References		NMR of proteins and Nucleic Acids					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week	Basic theory of NMR					Jae Il Kim	
2nd week	"					"	
3rd week	Multidimensional NMR					"	
4th week	"					"	
5th week	"					"	
6th week	Obtaining NMR Structure;from spectrum to structure					"	
7th week	"					"	
8th week	Peptide and protein structure					"	
9th week	Midterm exam						
10th week	"					"	
11th week	"					"	
12th week	Protein-ligand interaction					"	
13th week	"					"	
14th week	"					"	
15th week	Protein folding					"	
16th week	Final Exam						

\* If there will be experiments, mark it in the "Remarks".

Coordinator    Jae Il Kim    (seal)  
 Dept. Chair    Chul Seung Park    (seal)

# SYLLABUS

Classification	Elective	Course No.	9658	Cr. Hrs.	3	Instructor	Im, SH
Course Title	Korean	면역학 최근 연구 동향					
	English	Trends in Immunology					
<u>Course Outline</u> : Our main goals in this course are to provide information about current issues in immunology and to make students to think critically and logically when dealing with challenging new questions in immunity and tolerance. Topics include important current issues in innate immunity (TLRS), chemokines and cytokines, APCs, bioinformatics and comparative genomics, regulatory cells and molecules, chromatin remodeling in lymphocyte, epigenetics in T cell biology and new directions in immuno therapeutics.							
Prerequisite		There are no prerequisites for this course. However, some background in basic immunology will be necessary.					
Textbook and References		Articles published in journals such as: Cell, Science, Nature, Trends in Immunology, Immunity, Nature Immunology, J Clin. Invest, J Exp. Med.					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week	Course Overview: Currents issues in immunology					Im, SH	
2nd week	Innate Immunity: TLRs					Im, SH	
3rd week	Chemokines and cytokines					Im, SH	
4th week	Antigen processing and presentation: Activation and tolerance					Im, SH	
5th week	Bioinformatics in immunogy: trends and applications					Im, SH	
6th week	Signal regulators in immunity and tolerance					Im, SH	
7th week	Regulatory T cells					Im, SH	
8th week	Mid term Exam						
9th week	Mucosal immune system					Im, SH	
10th week	Chromatin remodeling-I: T cell differentiation					Im, SH	
11th week	Chromatin remodeling-II: Gene silencing					Im, SH	
12th week	Chromatin remodeling-III: IL-4 and IFN-gamma					Im, SH	
13th week	New Directions in immuno therapeutics-I: HIV					Im, SH	
14th week	New Directions in immuno therapeutics-II: Cancer					Im, SH	
15th week	New Directions in immuno therapeutics-III: Autoimmune					Im, SH	
16th week	Final Exam					Im, SH	

\* If there will be experiments, mark it in the "Remarks".

Coordinator

Sin-Hyeog Im

(seal)

Dept. Chair

Chul Seung Park

(seal)

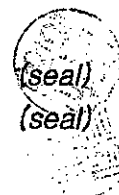
# SYLLABUS

Classification	Selective	Course No.	09661	Cr. Hrs.	3	Instructor	Joo Young Lee
Course Title	Korean	생체방어론					
	English	Host Defense System					
Course Outline : To study host defense mechanism against external/internal stress and danger to maintain physiological homeostasis and to understand the regulatory devices and underlying mechanism.							
Prerequisite		n/a					
Textbook and References		Innate immunity, Immunobiology, published review articles					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week	Introduction of host defense system						
2nd week	Defense against External danger: Host-pathogen interaction						
3rd week	pathogen recognition molecules I						
4th week	pathogen recognition molecules II						
5th week	Pathogen-mediated signaling						
6th week	Anti-viral host response						
7th week	Host responses against Internal danger: tissue injury						
8th week	Mid-term Exam						
9th week	tissue injury-released substances						
10th week	tissue injury-mediated signaling						
11th week	Spring Break						
12th week	Oxidative stress I: regulatory devices						
13th week	Oxidative stress II: signaling						
14th week	Cancer initiating factors and promoters						
15th week	Chemoprevention						
16th week	Final Exam						

\* If there will be experiments, mark it in the "Remarks".

Coordinator  
Dept. Chair

Joo Young Lee  
Chul-Seung Park



# SYLLABUS

Classification	Elective	Course No.	9666	Cr. Hrs.	3	Instructor	Chang-Duk Jun
Course Title	Korean	면역세포 동력학					
	English	Immune cell dynamics					
Course Outline : Understanding the molecular mechanism of immune cell recirculation in human body and its related diseases							
Prerequisite		Immunology & Microbiology					
Textbook and References		Immunology, fifth edition, Richard A Goldsby					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week	Historical perspective					Chang-Duk Jun	
2nd week	Innate immunity					Chang-Duk Jun	
3rd week	adaptive immunity					Chang-Duk Jun	
4th week	comparative immunity					Chang-Duk Jun	
5th week	hematopoiesis					Chang-Duk Jun	
6th week	cells of the immune system					Chang-Duk Jun	
7th week	organs of the immune system					Chang-Duk Jun	
8th week	Mid-term Exam					Chang-Duk Jun	
9th week	lymphocyte recirculation					Chang-Duk Jun	
10th week	cell-cell adhesion molecule					Chang-Duk Jun	
11th week	lymphocyte extravasation					Chang-Duk Jun	
12th week	chemokines					Chang-Duk Jun	
13th week	other mediator of inflammation					Chang-Duk Jun	
14th week	the inflammatory process					Chang-Duk Jun	
15th week	anti-inflammatory agents					Chang-Duk Jun	
16th week	Final Exam					Chang-Duk Jun	

\* If there will be experiments, mark it in the "Remarks".

Coordinator    Chang-Duk Jun  
Dept. Chair    Chul Seung Park



# SYLLABUS

Classification	Elective	Course No.	9679	Cr.Hrs.	3	Instructor	Yung Joon Yoo
Course Title	Korean	유비퀴틴					
	English	Ubiquitin					
Course Outline : Ubiquitin is a modulator in many cellular functions. This course will cover the Ubiquitin System and its involvements in cells.							
Prerequisite		고급 생화학					
Textbook and References		- Ubiquitin and the Biology of the cell - Current Papers.					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week	The Ubiquitin System					Yung Joon Yoo	
2nd week	PolyUbiquitin Chains					"	
3rd week	The Ubiquitin-Conjugation System					"	
4th week	Deubigaitinating Enzymes					"	
5th week	The 20S Proteasome					"	
6th week	The 26S Proteasome					"	
7th week	Function of the Proteasome in Antigen Presentation					"	
8th week	The N-end Rule Pathway					"	
9th week	Ub-dependent Degradation of Transcrintin Regulators					"	
10th week	Role of Ub system in NF-KB activation					"	
11th week	Ubiquitination of the p53 Tumor Suppressor					"	
12th week	Cell cycle control by Ubiquitin System					"	
13th week	Ubiquitination of Integral membrane Proteins					"	
14th week	Ubiquitin and Apoptosis					"	
15th week	Ubiquitin and human disease					"	
16th week	Final exam						

\* If there will be experiments, mark it in the "Remarks".

Coordinator Yung Joon Yoo

Dept. Chair Chul Seung Park



(seal)

# SYLLABUS

Classification	Elective	Course No.	9693	Cr. Hrs.	3	Instructor	Zee-Yong Park
Course Title	Korean	생물 정보학적 기술과 전단백질체학					
	English	Bioinformatics Tools in Proteomics					
<u>Course Outline</u> : There are many different types of computer algorithms currently available for proteomic data analysis. In this class, working principles of widely used proteomic data analysis programs will be discussed and actual demonstrations will be followed to help the understanding of students.							
Prerequisite		none					
Textbook and References		handouts					
Weekly Course Schedule							
Calendar	Description					Lecturers	
1st week	Introduction					Zee-Yong Park	
2nd week	Understanding of Proteomic Data Formats					Zee-Yong Park	
3rd week	Protein Identification Algorithms					Zee-Yong Park	
4th week	Peptide Identification Algorithms I					Zee-Yong Park	
5th week	Peptide Identification Algorithms II					Zee-Yong Park	
6th week	Posttranslational Modification Search Algorithm					Zee-Yong Park	
7th week	Algorithms for Large Scale Data Analysis					Zee-Yong Park	
8th week	Midterm Exam					Zee-Yong Park	
9th week	Validation Tools of Protein Identification					Zee-Yong Park	
10th week	Validation Tools of Peptide Identification					Zee-Yong Park	
11th week	Proteomic Data Presentation Algorithm I					Zee-Yong Park	
12th week	Proteomic Data Presentation Algorithm II					Zee-Yong Park	
13th week	Linux Cluster Based Proteomic Data Analysis					Zee-Yong Park	
14th week	Algorithms for Quantitative Proteomics					Zee-Yong Park	
15th week	Algorithms for Biomarker Discovery					Zee-Yong Park	
16th week	Final Exam					Zee-Yong Park	

\* If there will be experiments, mark it in the "Remarks".

Coordinator    Zee-Yong Park  
Dept. Chair    Chul Seung Park

