

Curriculum 2013

Classification		Subject number	Subjects	Semester and Credit		Note
				Credit-Theory-Exp	Year-Semester	
Major	Basic	LB16385	Introduction of Biomaterials I	3-3-0	1-1	
		LB16390	Bioscience I and Lab	3-2-2	1-1	
		LB15845	General Chemistry(I)	3-3-0	1-1	
		LB16391	Introduction of Biomaterials II	3-3-0	1-2	
		LB15510	Bioscience II	3-3-0	1-2	
		LB15665	Mathematics	3-3-0	1-2	
		LB15847	General Chemistry(II)	3-3-0	1-2	
	Required	LB25969	Polymer Science	3-3-0	2-1	
		LB25971	©Biomaterial Mechanics	3-3-0	2-1	
		LB26974	biochemistry I	3-3-0	2-1	
		LB32251	©Application of bioactive materials	3-3-0	2-2	
		LB26015	Material Science	3-3-0	2-2	
		LB32298	Physiology I	3-3-0	3-1	
		LB26973	©Medical Biomaterials I	3-3-0	3-1	
		LB28272	Biomaterial Process	3-3-0	3-2	
		LB27777	Molecular Biology and experiment	3-2-2	4-1	
	LB26099	Surface Modification & Lab	3-2-2	4-1		
	Optional	LB28222	Microbiology and experiment	3-2-2	2-1	
		LB32296	Biotechnology	3-3-0	2-1	
		LB23158	Organic Chemistry	3-3-0	2-1	
		LB15376	Physical Chemistry	3-3-0	2-2	
		LB32253	biochemistry II and Lab	3-2-2	2-2	
		LB21782	Medical Polymers	3-3-0	2-2	
		LB32363	Stem cells	3-3-0	2-2	
		LB26098	Membrane Science	3-3-0	3-1	
		LB26083	Biosensor	3-3-0	3-1	
		LB26074	Biotechnology	3-3-0	3-1	
		LB26088	Tissue Engineering	3-3-0	3-1	
		LB26079	Natural Products Chemistry	3-3-0	3-1	
		LB26007	Interface Chemistry	3-3-0	3-2	
LB32257		Microencapsulation & Lab	3-2-2	3-2		
LB23015		Immunology	3-3-0	3-2		
LB28277		Biomaterial Process Lab	1-0-2	3-2		
LB26975		Medical Biomaterials II	3-3-0	3-2		
LB32262		Biorelated Polymer	3-3-0	4-1		
LB31721		Capstone design for biomaterials	3-3-0	4-1		
LB26979		Fabrication of Biomaterials & Lab.	3-2-2	4-1		
LB26977		Anti-bacteria finishing	3-3-0	4-1		
LB23149		Enzymology	3-3-0	4-1		
LB25875		Instrumental Analysis & Lab.	3-2-2	4-2		
LB32336	Toxicology	3-3-0	4-2			
LB32265	Medical Membrane Technology & Lab	3-2-2	4-2			
LB32297	Physiology II	3-3-0	4-2			
LB28269	Plasma Chemistry	3-3-0	4-2			

학부 교육과정(영문)Undergraduate Curriculum

Introduction of Biomaterials I

A goal of this course is to acquire the advanced knowledge and information about biomaterials including basic concept, terminology, principal of design, polymer synthesis and biology concept.

Bioscience I and Lab

To learn basic structure and physiological background of animal and plant. In the Lab course, basic biological experiments are applicable

General Chemistry(I)

Chemistry is the study of the nanoworld, the world of atoms and molecules spanning dimensions from one to several thousand angstroms. Chemists study the architecture of this miniature universe, explore the changes which occur, unravel the principles which govern these chemical changes, and devise ways to create entirely new compounds and materials

Introduction of Biomaterials II

A goal of this course is to acquire the advanced knowledge and information about application of biomaterials in medical field, industrial field, food field and nanomaterials field.

Bioscience II

To be continued with Bioscience I, students will learn cellular- and tissue- structures and functions. By understanding maintenance of living organisms, knowledge of bioscience will be studied

Mathematics

To learn calculation, principle and application of mathematics, and thereby help students to apply math in the fields.

General Chemistry(II)

The aim of this course is to introduce and motivate the research of science and chemistry for first year undergraduate students. So, this introductory course is to establish the basic concepts of chemistry, thermochemistry, solution, gaseous chemical equilibrium, acids and base, rate of reaction, electrochemistry, equilibria in acid and base solution.

Polymer Science

The Lecture pursues the effective comprehension of concepts and basic theories on polymer science which are foundation for polymeric biomaterials; lectures on the concept and classification of polymeric compounds including fundamental theories of polymerization method, basic reaction and characteristics of polymer, and the properties of polymer solution and polymeric materials.

Biomaterial Mechanics

The objective of this course is to gain knowledge of the mechanical properties and characteristics of biomaterials. This knowledge will contribute to the evaluation of biomaterials. We will discuss the kinds and characteristics of mechanical properties of biomaterials.

biochemistry I

To learn structures and functions of organic chemical compositions. The DNA replication, transcription,

and translation and the regulation of gene expression will be lectured

Application of bioactive materials

This course was introduced a various skills which widely used to develop a novel biomaterials from bioresources and included screening technique, purification/identification, safety test, synthesis, and efficacy test. Especially, some biomaterials having the therapeutic effects against human chronic disease will be showed as a important examples.

Material Science

Material science involves investigating the relationships that exist between the structures and properties of materials.

The in-service conditions must be characterized, for these will dictate the properties required of the material.

Physiology I

A goal of this course is to acquire the advanced knowledge and information about human physiology including cell structure/function, the tissue level of organization as well as the structure and functions of various organ systems such as instrumentary system, skeletal muscle and nervous system.

Medical Biomaterials I

Biomedical materials are important factors on a progress of medical technology. Classification, fundamental knowledge, and application are explained, emphasizing the structures and the properties of the biomaterials, and focusing on physiological characterization to the chemical/structural property; lecture on physical and physiological properties of organic and inorganic materials for biomedical materials.

Biomaterial Process

Manufacturing of Biomaterials with wish physical properties Explain the manufacturing process and method for various biomaterials, and possible to manufacture biomaterial with physical properties by comparison of physical properties based on manufacture method.

Molecular Biology and experiment

A goal of this course is to acquire the advanced knowledge and information about molecular biology including DNA & chromosome structure, cell membrane & protein feature, central dogma, and regulation of gene expression.

Surface Modification & Lab

-Improvements in surface modification techniques cannot be made without an in-depth understanding of the chemical and physical properties of polymer surfaces. The nature and the concentration of the functional groups introduced by different surface modification techniques must be determined. Such results will advance our understanding of various surface modification mechanisms. The level of surface treatment also must be controlled if optimal results are to be obtained.

Microbiology and experiment

A goal of this course is to acquire the advanced knowledge and information about bacteriology and microbiology including metabolism, growth, environment, genetics, and biosynthesis.

Biotechnology

A goal of this course is to acquire the advanced knowledge and information about biotechnology including recombinant technology, immunological application, microbiological application, medicinal application, plant biotechnology, and animal biotechnology.

Organic Chemistry

To learn chemical composition and structure of organic compounds, and understand characteristics of the compounds and their reactions

Physical Chemistry

Physical Chemistry seeks to provide material for a first course in physical chemistry. We have tried to study fundamental principles and to give glimpses of the frontiers of physical chemistry. The purpose of the study of physical chemistry is to understand the laws of chemistry and physics and to predict and control chemical phenomena.

Biochemistry II and Lab

The metabolism and utilization of biochemical compositions will be lectured. To learn application of biochemistry, Lab course will be given.

Medical Polymers

Lectures on fundamental science of biopolymers for biomedical materials and on functional properties of biomedical polymers in various use. Instruction in the theories & technologies for application of biomedical polymers; Polysaccharides such as cellulose, starch, lectins, alginate, chitosan, etc; proteins as collagen, fibroin, etc. application of biocompatible materials and biomimetics

Stem cells

Learning definition and characteristics of stem cells, and understand stem cells in a aspect of molecular biology and cell biology to apply the cells to tissue engineering field.

Membrane Science

To learn basic knowledge of material, manipulation and function of membrane.

Biosensor

The objectives of this course are to understand the principle and device of Biosensors, and to acquire advanced knowledge and information about Biosensors.

Biotechnology

Drug delivery has now become a multidisciplinary science consisting of biopharmaceutics and pharmacokinetics. Drug delivery, which takes into consideration agents such as the carrier as well as the route and the target, has evolved into a strategy using processes or devices designed to enhance the efficacy of therapeutic agents through controlled release.

Tissue Engineering

Tissue engineering is aimed to regenerate damaged tissues by using in vitro and in vivo applications of cells and biomaterials. To learn basic concepts of tissue engineering, the kinds of biomaterials, characteristics of artificial organs, and cell-based therapy will be lectured

Natural Products Chemistry

To learn structure for physiological action, isolation, and purification of natural chemical products, and thereby develop novel compounds in the practical fields

Interface Chemistry

By learning chemical and physical reactions on the material interface, basic knowledge for manufacture and development of biomaterials will be lectured.

Microencapsulation & Lab

The resultant product of the microencapsulation process is termed a "microcapsule".

Microencapsulation provides the possibility of combining the properties of different types of materials (e.g., inorganic and organic)—a process which is difficult to achieve using other technique. This technology is mainly used for the purpose of protection, controlled release, and compatibility of the core materials.

Immunology

A goal of this course is to acquire the advanced knowledge and information about animal immunology including immune system structure & function, cells and organs of the immune system, generation of B-cell and T-cell response and the immune effector mechanism.

Biomaterial Process Lab

The experiments are carried out on achieving the general knowledge of fabrication methods, chemical modifications, structural characteristics, properties and functionalities of polymer materials as well as biomaterials.

Medical Biomaterials II

Lectures on physical and physiological properties of in vitro or in vivo biomedical materials. Instruction in the practical characterization of biomaterials through comprehending an interaction between materials and organism; discussion on application of the functional biomaterials, background concepts of biomaterials, biological and medical roles. cell-biomaterial response in the biological environment, host reactions to biomaterials, biological testing of biomaterials, and degradation of materials, and application in medicine and artificial organs.

Biorelated Polymer

Biopolymers and their derivatives are diverse, abundant, importance for life, they exhibit fascinating properties and are of increasing importance for various applications. Living matter is able to synthesize an overwhelming variety of polymers, which can be divided into eight major classes according to their chemical structure: nucleic acids, polyamides, polysaccharides, organic and inorganic polyesters and so on.

Capstone design for biomaterials

A goal of this course is to draw appropriate results and produce the scientific paper based on the advanced knowledge and information about application of biomaterials including design, purification-synthesis, toxicity and efficacy test.

Fabrication of Biomaterials & Lab

The structural fabrication of material are introduced for using a biomaterials. The principle of fabrication

and the method are lectured, and are practiced for cultivating a technology and an experimental faculty on production of biomaterial; lectures on classification of useful macro-structure for medical biomaterials, theories on various fabrication protocols, and experimental course for the essential fabricating technology.

Anti-bacteria finishing

The objectives of this course are to understand the types of antibacteria and antimold agents and their effects, and to acquire the application and finishing method of Antibacteria and antimold agents based on a use and antibacterial effect.

Enzymology

To learn basic knowledge of structure, related-coenzymes, mechanisms of the reaction, reaction velocity, specificity, biosynthesis and regulation regarding with enzymes. Therefore, students can understand application of enzymes in the cosmetic, food, and medical industries.

Instrumental Analysis & Lab

Lectures for theory and technique of precision instrumental analysis in order to understanding of compositions, structure, and property by experiment and practice; lectures on theory and technique of instrumental analysis for qualitative analysis of chemical compositions, quantitative analysis of concentration, viscosity analysis of molecular weights, crystalline analysis of micro-structures, tenacity analysis of tensile property, etc.

Toxicology

Toxicology is defined as studying toxicity of certain substances in our body, and principle and mechanism of the toxicity. Evaluation of safety and risk in our body by testing absorption, distribution, and metabolization of substances

Medical Membrane Technology & Lab

Membrane processes are rather new as methods of separation. Thus membrane filtration was not a technically important separation process until 25 years ago. Today membrane processes are used in a wide range of applications and the number of such applications is still growing.

Physiology II

A goal of this course is to acquire the advanced knowledge and information about human physiology and anatomy including the structure and function of organ system. These information will be contributed the development and evaluation of a biomaterial.

Plasma Chemistry

This lecture provides a fundamental introduction to all aspects of modern plasma chemistry. It describes mechanisms and kinetics of chemical processes in plasma, plasma statistics, thermodynamics, fluid mechanics, and electrodynamics, as well as all major electric discharges applied in plasma chemistry.