



Course Description

1. General Description

The curriculum of SNU is derived from Article 56 of the Academic Regulations of the University. Various details prescribed in this curriculum are therefore effective as ancillary regulations of the Academic Regulations.

The undergraduate programs consist of general courses designated for general educations and major courses designated for specialization in various areas of study. The graduate programs comprise both the Master's program and the Doctoral program. However, such distinction is not made in the graduate curricula. In other words, departments may have their own requirements for the Master's or the Doctoral program. Nevertheless, both programs are integrated in the present curriculum.

Categories of Courses

There are two categories of courses: general courses, major courses.

1. General Courses

General courses are designed for the cultivation of the higher standards of intellectual attainment, and consist of courses which will equip the students with the tools of language and the basic concepts and procedures of academic inquiry needed for further study.

2. Major Courses

Major courses are directly connected with the intensive specialization in principal areas of concentration. In all the categories of general and major courses, there are required courses and electives, the former being specified as such in the curriculum. General courses are offered only in the undergraduate program.

2. Undergraduate Courses

The undergraduate course leading to the B.S. degree is a four-year program with 8 semester of actual attendance required. The number of credits required for the completion of the undergraduate program is 150 or more. This must include a minimum of 45 credits in general courses and a minimum of 100 credits in major courses, including 78 credits in required major courses for Department of Pharmacy and 72 credits in required major courses for Department of Manufacturing Pharmacy.

When all the credits earned satisfy the requirements for each category of courses but do not meet the total credit requirement for the completion of program, students are expected to take major electives to make up the deficiency.

Course Requirements in the Undergraduate Courses

1. General Course

There are required and elective general courses. The University regulation requires Korean and Composition. A certain number of credits is required of all students for the courses that are regarded as a vital part of the general education as well as necessary for the subsequent study, such as those courses providing the knowledge of foreign languages and the introductory courses in the humanities, social sciences, and natural sciences.

2. Major Courses

Major courses are listed in the curriculum of each department. There are required and elective major courses, designated by the department. Major courses which are offered by the department but are not specified as requirements are the elective major courses. Departments may also recognize courses offered by other departments as its elective major courses.

3. Undergraduate Courses at Glance

Freshman, First Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
010.001	Korean	3	3	
010.105	Calculus for Life Science 1	3	3	
010.117	Chemistry 1	2 Subject(6 credits) of Chemistry 1, Biology 1, Physics		
010.122	Biology 1			
010.116	Physics			
023.	The domain of Literature and Art	3	3	
025.	The domain of Society and Ideology	3	3	
010.317	Lab in Chemistry 1	2 Subject(2 credits) of Lab Chemistry 1, Lab in Biology 1, Lab Physics		
010.322	Lab Biology 1			
010.316	Lab Physics			



Course Description

Freshman, Second Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
010.003/	English/Advanced English			
010.004~009	(Select Subject According to TEPS Score)	3	3	
010.118	Chemistry 2	2 Subject(6 credits) of Chemistry 2, Biology 2, Physics		
010.123	Biology 2			
010.116	Physics			
024.	The domain of History and Philosophy		3	3
010.318	Chemistry Lab. 2	2 Subject(2 credits) of Chemistry Lab. 2, Biology Lab. 2, Physics Lab.		
010.323	Biology Lab. 2			
010.316	Physics Lab.			
010.067 [†]	Writing in Science & Technology			
001.027 [†]	Speech Communication	3	3	
370.202*	Introduction to Pharmacy	2	2	

*Required Course

[†]Select one

Department of Pharmacy Sophomore, First Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.208*	Physical Pharmacy 1	3	3	
375.201*	Pharmaceutical Chemistry 1	2	3	
375.203*	Lab in Pharmaceutical Chemistry	1		4
375.205*	Pharmaceutical Analysis 1	2	3	
375.207*	Lab in Pharmaceutical Analysis	1		4
801.002*	Anatomy	2	3	
370.212	Medicinal Plants and Practice	2	2	2
371.214	History of Pharmacy	2	2	
371.216	Introduction to Computers in Pharmacy	2	2	
375.213	Herbology and Laboratory	2	1	2
375.218	Functional Food Science	2	2	

*Required Course

Sophomore, Second Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.209*	Physical Pharmacy 2	2	3	
371.210*	Lab. in Physical Pharmacy	1		4
375.202*	Pharmaceutical Chemistry 2	3	3	
375.206*	Pharmaceutical Analysis 2	3	3	
801.001*	Physiology	3	3	
371.212A	Introduction to Nano Drug Delivery System	2	2	
371.215	Biotechnology in Pharmacy	2	2	
375.214	Natural Product Chemistry and Lab	2	1	2
375.217	Medicinal Plant Tissue Culture	2	2	
375.220	Pharmaceutical Radiochemistry	2	2	

*Reguired Course

Junior, First Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
370.301*	Biochemistry 1	2	3	
370.303*	Lab in Biochemistry	1		4
375.301*	Pharmacognosy 1	2	3	
375.309*	Pharmacal Microbiology 1	3	3	
375.318*	Pharmaceutical Synthetic Chemistry 1	3	3	
375.321*	Lab in Pharmacognosy	1		4
375.322A*	Preventive Pharmacy 1	3	3	
370.304	Oncology	2	2	
371.310	Instrumental Analysis	3	3	
371.322	Pharmaceutical Organic Synthesis 1	2	2	

*Reguired Course



Course Description

Junior, Second Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
370.302*	Biochemistry 2	3	3	
375.302*	Pharmacognosy 2	3	3	
375.310*	Pharmacial Microbiology 2	2	3	
375.311*	Lab in Pharmacial Microbiology	1		4
375.319*	Pharmaceutical Synthetic Chemistry 2	2	3	
375.320*	Lab in Pharmaceutical Manufacturing Chemistry	1		4
375.323A*	Preventive Pharmacy 2	2	3	
375.324A*	Preventive Pharmacy Lab.	1		4
371.217	Marine Natural Medicinal Resources and Practice	2	1	2
371.221	Cell Biology and Genetic in Pharmaceutics	3	3	
371.313	Environmental Hygiene	2	2	
371.323	Pharmaceutical Organic Synthesis 2	2	2	
375.313	Drug Assay	2	2	
375.316	Food Hygiene	2	2	
375.317	Legal Pharmacy	2	2	

*Required Course

Senior, First Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.401*	Pharmacology 1	2	3	
375.405*	Pharmaceutics 1	2	3	
375.407*	Lab in Pharmaceutics	1		4
375.409*	Hospital Pharmacy	1	2	
375.424*	Lab in Pharmacology	1		4
375.425*	Clinical Pharmacy and Practice 1	3	2	3
801.003*	Pathology	3	3	
371.408	Good Manufacturing Practice	2	2	
371.412	Tests of Pharmaceutical Preparations	2	2	
371.413	Cosmetics	2	2	
375.413	Endocrinological Chemistry	2	2	
375.417	Pharmacy Management	2	2	
375.418	Antibiotics	2	2	
375.420	Bioassay	2	2	
375.427	Pharmaceutical Molecular Biology	2	2	

*Required Course

Senior, Second Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.402*	Pharmacology 2	3	3	
375.406*	Pharmaceutics 2	3	3	
375.410*	Hospital Pharmacy Practice	1		8
375.411*	Pharmaceutical Jurisprudence	1	2	
375.426*	Clinical Pharmacy and Practice 2	3	2	3
371.409	Biological Products	2	2	
371.410	Drug Information Science	2	2	
371.414	Agricultural Pharmacy	2	2	
371.415	Introduction to Food Technology	2	2	
375.412	Introduction to Pharmacopoeia	2	2	
375.414	New Drugs	2	2	
375.419	Dispensing Pharmacy	2	2	
375.422	Toxicology	2	2	

*Required Course

**Department of Manufacturing Pharmacy
Sophomore, First Semester**

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.208*	Physical Pharmacy 1	3	3	
375.201*	Pharmaceutical Chemistry 1	3	3	
375.203*	Lab in Pharmaceutical Chemistry	1		4
375.205*	Pharmaceutical Analysis 1	2	3	
375.207*	Lab in Pharmaceutical Analysis	1		4
370.212	Medicinal Plants and Practice	2	2	2
371.214	History of Pharmacy	2	2	
371.216	Introduction to Computers in Pharmacy	2	2	
375.213	Herbology and Laboratory	2	1	2
375.218	Functional Food Science	2	2	
801.002	Anatomy	2	3	

*Required Course



Course Description

Sophomore, Second Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.209*	Physical Pharmacy 2	2	3	
371.210*	Lab. in Physical Pharmacy	1		4
375.202*	Pharmaceutical Chemistry 2	3	3	
375.206*	Pharmaceutical Analysis 2	3	3	
371.212A	Introduction to Nono Drug Delivery System	2	2	
371.215	Biotechnology in Pharmacy	2	2	
375.214	Natural Product Chemistry and Lab	2	1	2
375.217	Medicinal Plant Tissue Culture	2	2	
375.220	Radiopharmaceuticals	2	2	
801.001	Physiology	3	3	

*Required Course

Junior, First Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
370.301*	Biochemistry 1	2	3	
370.303*	Lab. in Biochemistry	1		4
371.301*	Chemistry of Microbial Pharmacals 1	3	3	
371.304*	Pharmaceutical Manufacturing Chemistry 1	3	3	
371.310*	Instrumental Analysis	3	3	
371.315*	Pharmacognosy in Manufacturing Pharmacy 1	2	3	
371.317*	Laboratory of Pharmacognosy in Manufacturing Pharmacy 1	1	4	
371.318*	Hygienic Chemistry 1	3	3	
370.304	Oncology	2	2	
371.322	Pharmaceutical Organic Synthesis 1	2	2	

*Required Course

Junior, Second Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
370.302*	Biochemistry 2	3	3	
371.302*	Chemistry of Microbial Pharmacals 2	2	3	
371.303*	Lab. in Chemistry of Microbial Pharmacals	1		4
371.305*	Pharmaceutical Manufacturing Chemistry 2	2	3	
371.316*	Pharmacognosy in Manufacturing Pharmacy 2	3	3	
371.319*	Hygienic Chemistry 2	2	3	
371.320*	Lab in Hygienic Chemistry	1		4
371.321*	Lab in Pharmaceutical manufacturing Chemistry	1		4
371.217	Marine Natural Medicinal Resources and Practice	2	1	
375.221	Cell Biology and Gemetis in Pharmaceutical	3	3	
371.313	Environmental Hygiene	2	2	
371.323	Pharmaceutical Organic Synthesis 2	2	2	
375.313	Drug Assay	2	2	
375.316	Food Hygiene	2	2	
375.317	Legal Pharmacy	2	2	

*Required Course

Senior, First Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.401*	Manufacturing Pharmacy 1	2	3	
371.403*	Lab in Manufacturing Pharmacy 1	1		4
371.404*	Industrial Pharmacy 1	2	2	
371.416*	Pharmacodynamics 1	2	3	
371.420*	Medicinal Chemistry 1	2	2	
375.425*	Clinical Pharmacy & Practice 1	3	2	3
371.408	Good Manufacturing Practice	2	2	
371.412	Tests of Pharmaceutical Preparations	2	2	
371.413	Cosmetics	2	2	
375.413	Endocrinological Chemistry	2	2	
375.417	Pharmacy Management	2	2	
375.418	Antibiotics	2	2	
375.420	Bioassay	2	2	
375.427	Pharmaceutical Molecular Biology	2	2	
801.003	Pathology	3	3	

*Reguired Course

Senior, Second Semester

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.402*	Manufacturing Pharmacy 2	3	3	
371.405*	Industrial Pharmacy 2	2	2	
371.407*	Field Practice in Pharmaceutical Plants	1		8
317.417*	Pharmacodynamics 2	3	3	
371.418*	Laboratory in Pharmacodynamics	1		4
371.421*	Medicinal Chemistry 2	2	2	
375.411*	Pharmaceutical jurisprudence	1	2	
375.426*	Clinical Pharmacy & Practice 2	3	2	3
371.409	Biological Products	2	2	
371.410	Drug Information Science	2	2	
371.414	Agricultural Pharmacy	2	2	
371.415	Introduction to Food Technology	2	2	
375.412	Introduction to Pharmacopeia	2	2	
375.414	New Drug	2	2	
375.419	Dispensing Pharmacy	2	2	
375.422	Toxicology	2	2	

*Reguired Course



Course Description

4. Undergraduate Course Description

1. Freshman Course

370.202 Introduction to Pharmacy

This course is designed to acquaint the students with the various fields of modern pharmaceutical practice, enabling him to make a more knowledgeable decision to his future place within the profession. The course begins with a broad definition of pharmacy and discussion of the many areas of specialization which fall within the definition.

2. Sophomore Course

370.212 Medicinal Plants and Practice

Medicinal plants are rapidly regaining the prominent position because they possess biologically active constituents, and are utilized to develop new drugs in the world. This course aims at historical development, taxonomy, uses and application of medicinal plants.

371.208 Physical Pharmacy I

Physical pharmacy has been associated with the area of pharmacy that deals with the quantitative and theoretical principles of science as they apply to the practice of pharmacy to develop new drug spectroscopic methods and X-ray crystallography and thermodynamics in pharmaceutical systems.

371.209 Physical Pharmacy 2

The course will cover the physicochemical properties of drugs, electrolytes, and theories of solutions, kinetics, surface phenomena, rheology, and fundamental principles of new drug design and evaluation. It is a continuation of the course Physical Pharmacy I

371.210 Laboratory in Physical Pharmacy

Selected techniques and methods currently used in studies on physical pharmacy such as heterogenous equilibria, solubility, buffer system, electrolytes, and theories of solutions, surface phenomena, thermodynamics, and kinetics, rheological properties of pharmaceuticals will be covered in this course. The courses Physical Pharmacy I and II are prerequisite

371.212A Introduction to Nano Drug Delivery System

In 'Introduction of Nano Drug Delivery System', students are introduced to the concept and kinds of nano drug carriers, as well as their physical, chemical and biological properties. Also, students learn the basic knowledge through being introduced to the concept and principles of current technologies, so that they can propose new principles of future technologies.

371.214 History of Pharmacy

This course will cover the development of pharmacy as a profession in Korea and abroad, history of drug discovery and development, and regulatory measures for pharmacy as a profession.

371.215 Biotechnology in Pharmacy

This course will provide students with applications of modern biotechnology to diverse areas including the development of pharmaceuticals, food production, control of environmental contamination, and forensic science. Topics will cover: introduction to the structures and functions of the DNA; basic principles and applications as well as historical perspectives of recombinant DNA technology; development and application of polymerase chain reaction and DNA finger printing; scientific, regulatory, and ethical issues related to the human genome project.

371.216 Introduction to Computers in Pharmacy

This course will cover the principles of computers; operating techniques for computer software and hardware; and basis of and application of computers to pharmacy including the development and analysis of drugs, clinical application to the human body, manufacture, management, and flow of medicine, and integration, management and supply of drug information.

375.201 Pharmaceutical Chemistry 1

This course will cover the physical and chemical properties, preparation methods, and uses of inorganic and organic substances. It will also cover the reactions of alkane, alkene, alkyne, benzene, arene, alkyl halide, alcohols, carboxylic acids, aldehyde, and ketone as well as stereoisomers, carbanion, carbonium, electrophile, aromatic substitutions, and spectroscopy.

375.202 Pharmaceutical Chemistry 2

This course will cover the physical and chemical properties, preparation methods, uses, and reactions of amine, phenol, alkyl halide, heterocyclic compounds, fats, carbohydrates, and polymerization.

375.203 Laboratory in Pharmaceutical Chemistry

This course will cover the laboratory practice of preparation, separation, identification, and related reactions of organic compounds according to classified unit processes such as esterification, dehydration, nitration, reduction, diazotization, chlorosulfonation, solvolysis (ammonolysis, alcoholysis, and hydrolysis), halogenation, and frequently applied reactions.

375.205 Pharmaceutical Analysis 1

This course will cover the basic principles of analytical chemistry including acid-base equilibrium, solubility, electrochemistry, and spectroscopy.

375.206 Pharmaceutical Analysis 2

This course will cover the principles and applications of volumetric analysis, gravimetric analysis, non-aqueous titrimetry, chelatometry, and chromatography.

375.207 Laboratory in Pharmaceutical Analysis

This course will consist of experiments on the contents of the courses Pharmaceutical Analysis I and II.

375.213 Herbalogy and Laboratory



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This course will cover the history, pharmaceutical properties, therapeutic effects, application for clinical use, and preparation of herbal medicine that can be applied to pharmaceutical science.

375.214 Natural Product Chemistry and Lab

This course will investigate secondary plant constituents as well as methods of separation, purification, and identification for various classes of plant components. The historical development, structures, reactions, and biosynthesis of active compounds will also be emphasized.

375.215 Prescription and Practice of Oriental Herbs

This course will provide lectures and practice on the clinical application of special treatments in classical Chinese medical books.

375.216 Chinese in Oriental Herbs

This course will provide lectures on Chinese characters and their abbreviated forms, which are very frequently used in herbal medicine.

375.217 Medicinal Plant Tissue Culture

It is very important to extract bioactive components from natural resources such as plants as sources of new drug development. Since the amount of secondary metabolites is limited, plant cell culture techniques have been introduced to overcome these problems. This course will provide lectures on the basic knowledge, application, and practical illustration of plant cell culture techniques.

375.218 Functional Food Science

Interest in health has grown. Although modern medical and pharmaceutical sciences can cure many diseases, incurable chronic diseases are increasing rapidly. To prevent these diseases, functional foods or nutraceuticals are increasingly consumed. Since the revision of the Food Hygiene Law on July 1, 1996, practicing pharmacists have been required to know the foods described in the Korea Foods Codex. This course will offer objective information on these foods.

375.220 Pharmaceutical Radiochemistry

This course will cover the physicochemical properties and practical uses of radiopharmaceuticals, which are used for diagnosis and therapy.

801.001 Physiology

An introduction to the study of the function of various tissues, organs and the cell. The physiology of the central and peripheral nervous system, the autonomic nervous system, connective tissue, muscle and the principles of hematology and immunology are discussed in this course.

801.002 Anatomy

A basic course in human anatomy. The structure of the various systems of the body is studied individually in detail, and although emphasis is placed on normal form, attention is directed toward various abnormalities with the system.

3. Junior Course

370.301 Biochemistry 1

In terms of biochemistry, which deals with the chemical processes that go on in living matters, this course will focus on the chemistry of biological materials and the dynamics and energetics of biological systems.

370.302 Biochemistry 2

This course concerns the metabolism of the organic constituents of living organisms, vitamins, coenzymes, biooxidation, metabolism of three essential nutrients (proteins, fats, and carbohydrates), and metabolic control by hormones as well as the basic principles of blood circulation, digestion, absorption by the gastrointestinal tract, functions of the liver and kidneys, metabolism of water and salts, chemistry of respiration, immunochemistry, and tissue chemistry.

370.303 Laboratory in Biochemistry

In this laboratory course, students will learn selected basic techniques essential for modern biochemistry and molecular biology such as the isolation and purification of eukaryotic DNA and bacterial plasmids, enzyme assays for the determination of kinetic parameters, and polymerase chain reactions (PCR). The course will help undergraduate pharmacy students and those in related disciplines understand fundamental biochemical principles better through practice in relevant methods and techniques.

370.304 Oncology

This course is designed to familiarize undergraduate students with the processes, through which normal cells are transformed into tumor cells, characteristics of cancer cells, environmental and genetic factors that can cause cancer, biochemical and molecular biological basis of carcinogenesis, roles of oncogenes and tumor suppressor genes in human cancer, and prevention and treatment of human cancer.

371.217 Marine Natural Medicinal Resources and Practice

Natural resources in marine environments are composed of very diverse biological elements, and they have attracted recent attentions for new chemical resources. In this lecture, biological resources comprising marine biological system will be introduced according to taxonomic systems. Biological and ecological characteristics of marine organisms as well as their industrial uses will be learned in the lecture. In addition, lecture will be composed of distribution of biologically active marine natural products, biosynthesis, and chemical characteristics. Recent achievement of researches on marine biological resources will be discussed.

371.301 Chemistry of Microbial Pharmacals 1

This course will deal with drugs made by using microorganisms: toxoids, vaccines, antibiotics, antitoxins, antisera, enzymes, amino acids, vitamins, carbohydrates, proteins, organic acids, alcohols, nucleic acids, food additives, and anticancer agents.

371.302 Chemistry of Microbial Pharmacals 2

This course is a continuation of the course Chemistry of Microbial Pharmaceuticals I.



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371.303 Laboratory in Chemistry of Microbial Pharmacals

This course will offer laboratory exercises on the sterilization, staining, culture, isolation and fermentation methods of microorganisms utilized for the production of drugs.

371.304 Pharmaceutical Manufacturing Chemistry 1

The application of inorganic reactions, halogenation, nitration, sulfonation, amination, amidation, reaction of aromatic diazonium salt, and oxidation to the synthesis of basic medicine will be covered in this course.

371.305 Pharmaceutical Manufacturing Chemistry 2

The application of the reduction, esterification, and cleavage of ether to the synthesis of basic medicine will be covered in this course.

371.310 Instrumental Analysis

This course will teach the basic physical methods of chemical analysis and qualitative and quantitative analysis of drugs by spectroscopy and chromatography.

371.313 Environmental Hygiene

This course will provide knowledge needed to identify and quantify individuals who, because of various biological factors, may be predisposed to the toxic or carcinogenic effects of specific environmental-occupational pollutants.

371.315 Pharmacognosy in Manufacturing Pharmacy 1

This course will cover all aspects of natural products used as the pharmaceuticals derived from plants and microbes. The chemistry, biosynthesis, and pharmacological activities of secondary metabolites derived from plants and microbes will be covered.

371.316 Pharmacognosy in Manufacturing Pharmacy 2

A continuation of the course Pharmacognosy 1, this course will focus on crude drugs derived from leaves, flowers, fruits, seeds, herbs, and extracts.

371.317 Laboratory of Pharmacognosy in Manufacturing Pharmacy

This course will offer laboratory exercises in the chromatography, bioassay, plant tissue culture, field observation, and microscopic analysis of medicinal plants.

371.318 Hygienic Chemistry 1

This course will provide general knowledge of toxicokinetics, mechanisms of actions, and toxicological evaluation of environmental chemicals in various media including foods, air, and drugs.

371.319 Hygienic Chemistry 2

This course will provide analytical methods for environmental contaminants that exist in environmental media such as air, water, and foods. In addition, exposure assessment and risk assessment in human beings will be introduced for these chemicals.

371.320 Laboratory in Hygienic Chemistry

This course will provide laboratory work on the environmental health of human beings exposed to various contaminants, which may exist in environmental media including water, air, and foods.

371.321 Laboratory in Pharmaceutical Manufacturing Chemistry

This course will cover the synthesis of organic pharmaceuticals in laboratories on the basis of synthetic chemical theories.

371.322 Pharmaceutical Organic Synthesis 1

This course will cover synthetic unit reactions for the synthesis of pharmaceuticals such as carbon-carbon, carbon-oxygen, and carbon-nitrogen bond formations.

371.323 Pharmaceutical Organic Synthesis 2

This course will cover synthetic unit reactions for the synthesis of pharmaceuticals such as carbon-carbon, carbon-oxygen, and carbon-nitrogen bond formations.

375.221 Cell Biology and Genetics in Pharmaceutics

The fundamental structures and functions of cells in higher organisms and the molecular mechanisms of intracellular signal transduction pathways which connect extracellular stimuli to gene expression, cell cycle progression and differentiation will be instructed. Also, the classical, molecular and population genetics, and their central importance in biological sciences, will be instructed. Human diseases that are associated with the aberrant expression of important cellular factors and the related therapy will be introduced in the aspects of broad range of pharmacy.

375.301 Pharmacognosy 1

The chemistry, biosynthesis, and pharmacological activities of secondary metabolites in crude drugs derived from wood, barks, rhizomes, and roots will be covered in this course.

375.302 Pharmacognosy 2

A continuation of the course Pharmacognosy I, this course will focus on crude drugs derived from leaves, flowers, fruits, seeds, herbs, and extracts.

375.309 Pharmacal Microbiology 1

This course will cover the essential knowledge of pathogenic microorganisms for pharmacists and microbes used to produce antibiotics and physiologically active constituents.

375.310 Pharmacal Microbiology 2

This course will cover the essential knowledge of pathogenic microorganisms for pharmacists and microbes used to produce antibiotics and physiologically active constituents.

375.311 Laboratory in Pharmacal Microbiology

Laboratory exercises for staining, sterilization, culture, production methods of pathogenic microorganisms, and antibiotics-producing microbes and other useful microbes will be covered in this course.

375.313 Drug Assay

This course will cover the structural identification of drugs and experimental planning for unknown samples on the basis of the skills and knowledge acquired in the courses Pharmaceutical Analysis I and II and explore the basic spectroscopic principles.



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375.316 Food Hygiene

This course will cover hygiene in the manufacturing processes for farm products, fermented foods, livestock-derived foods, and aquatic foods.

375.317 Legal Pharmacy

Legal pharmacy and related technology play a key role in the criminal justice process as evidence in court. This course will cover the relevant theory and information used to carry out scientific experiments in relation to criminal investigation and deterrence.

375.318 Pharmaceutical Synthetic Chemistry 1

This course will cover synthetic organic chemistry theories for the synthesis of general organic pharmaceuticals.

375.319 Pharmaceutical Synthetic Chemistry 2

This course will cover synthetic organic chemistry theories for the synthesis of new organic pharmaceuticals.

375.320 Laboratory in Pharmaceutical Synthetic Chemistry

This course will cover the synthesis of organic pharmaceuticals in laboratories based on synthetic chemical theories.

375.321 Laboratory in Pharmacognosy

This course will cover the background and practical methods of isolating active compounds from natural resources. Experiments on the isolation, quantification, and identification of active components from medicinal plants will be conducted using physicochemical analysis. Experiments on applicable techniques (plant tissue culture and screening of bioactivity assay) will also be conducted.

375.322A Preventive Pharmacy 1

“For the elucidation of cause and effect relationship between exposure to environmental toxic chemicals and their health effects, the comprehensive knowledge on the properties, biological interaction and their toxicity of xenobiotics are needed. In this lecture, students learn about the principles of the prevention of environmental disease.”

375.323A Preventive Pharmacy 2

“In this lecture students learn the importance of essential nutrients in human health. Disease prevention and health promotion through proper nutrition is another essential part of the lecture. The up to date information with regard to the nutrition and health is also introduced.”

375.324A Preventive Pharmacy Lab.

In this lecture, students learn about the experimental methods for the detection of environmental chemicals and food contaminants as well as the toxicological study methods.

801.003 Pathology

A fundamental consideration of disease process is done in this course. Emphasis is placed on causative mechanism, the progress and effects of disease, and the structural and functional changes association with pathological disturbance.

4. Senior Course

370.401 Distribution of Oriental Herbs

This course will provide lectures on the stable and constant supply of Oriental medicinal resources through standardization and reasonable circulation.

370.402 Preservation of Oriental Herbs

This course will provide lectures on the safe and effective storages of Oriental medicine, which is made from natural sources.

370.403 Pharmacology of Oriental Herbs

This course will provide an overview of the active agents found in commonly used Chinese herbs and their potential interactions with pharmaceuticals.

370.421 Introduction to Oriental Pharmacy

This course will cover the scientific knowledge of Oriental pharmacy. An orientation to Oriental pharmacy and an introduction to the concepts of basic substances, organ physiology, etiological factors will be included.

371.401 Manufacturing Pharmacy 1

This course will deal with the stability and stabilization of drugs, vehicles, physicochemical properties, and preparation techniques for dosage forms.

371.402 Manufacturing Pharmacy 2

This course will deal with food manufacturing practices, quality control, and design of dosage forms.

371.403 Manufacturing Pharmacy Lab.

The application of principles and practices of manufacturing, manufacturing plans and drug delivery systems are studied in this laboratory course.

371.404 Industrial Pharmacy 1

This course will deal with the principles and practices of pharmaceutical operations: extraction, sterilization, drying, evaporation, distillation, filtration, comminution, sizing and handling of powders, emulsions, tableting, and encapsulation.

371.405 Industrial Pharmacy 2

This course will deal with the principles and practices of the operation and planning of equipments used in pharmaceutical unit processes.

371.407 Field Practice in Pharmaceutical Plants

As future industrial pharmacists, students will be acquainted with the professional environment and practical operation of pharmaceutical manufacturing plants through various disciplines under the direction of a professionally competent and legally qualified industrial pharmacist. This course will cover GMP, quality control, manufacturing processes for various products, and related government regulations.

371.408 Good Manufacturing Practice

The technical implication of good manufacturing practices in Korea will be emphasized in this course. Topics will cover buildings and facilities, personnel, components, production



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and control of records, standard operation procedures, packaging and labeling operation, laboratory control, distribution records, stability, and expiration date.

371.409 Biological Products

This course will cover the physical and chemical properties and functions of body fluids. Knowledge thus acquired will be applied to preparation techniques for pharmaceuticals of serological origins.

371.410 Drug Information Science

This course will cover new drug information and methods of development according to chemical structures and physiological actions, and drug synthesis design.

371.412 Tests of Pharmaceutical Preparations

This course will deal with the evaluation of dosage forms: microbial test, disintegration test, dissolution test, melting temperature, congealing temperature, content uniformity, and friability.

371.413 Cosmetics

This course will cover the principles and practices, physicochemical properties, chemical formulations, prescriptions, and preparation methods of cosmetics as well as skin hygiene and beauty aids.

371.414 Agricultural Pharmacy

This course will cover the synthetic methods, properties, and uses of fungicides, insecticides, herbicides, plant-growth regulatory hormones, and adjuvants as well as information on the presence of pesticides in numerous foods.

371.415 Introduction to Food Technology

This course will cover food manufacturing equipments, water and energy, factory management, food freezing, drying, packing, milk manufacturing, fermentation industry, processing of garden plants, and oil industry.

371.416 Pharmacodynamics 1

Pharmacodynamics 1 is the integration of chemistry, anatomy, physiology, molecular biology, and pathology. The course of pharmacodynamics 1 is offered to provide information to pharmacy students (pharmaceutics major) on clinically and experimentally used medicine for the prevention, alleviation and treatment of diseases. This course will cover the following topics: basic principles including drug absorption, distribution, biotransformation, excretion and drug-receptor interactions; autonomic drugs; and central nervous system drugs.

371.417 Pharmacodynamics 2

Pharmacodynamics 2 is the integration of chemistry, anatomy, physiology, molecular biology, and pathology. The course of pharmacodynamic 2 is offered to pharmacy students (pharmaceutics major) in order to provide information on clinically and experimentally used medicine for the prevention, alleviation, and treatment of diseases. The topics for this course include the following: cardiovascular-renal drugs; drugs with important actions on smooth muscles; drugs used to treat inflammation and diseases of the blood; endocrine drugs; and

chemotherapeutic drugs.

371.418 Laboratory in Pharmacodynamics

The course of pharmacodynamics laboratory offers students laboratory practice. This course will help students practically understand the therapeutic and toxicologic actions of drugs with an emphasis on pharmacodynamics, toxicology, and drug-receptor interactions.

371.419 Dispensing Pharmacy

Various factors in formulations that affect physicochemical, pharmaceutical, and pharmacokinetic properties will be discussed. Lecture topics will include pharmaceutical theories that are applicable in dispensing drugs (including traditional herbal medicine), and practical topics such as techniques of dispensing, and applicable laws.

371.420 Medicinal Chemistry 1

This course will describe the molecular mechanisms of drugs according to their indication and the pharmacological profiles of drugs based on their structures.

371.421 Medicinal Chemistry 2

This course will describe the molecular mechanisms of drugs according to their indication and the pharmacological profiles of drugs based on their structures.

375.401 Pharmacology 1

In this course, students will learn the general principles and mechanisms of drug actions including those that influence the absorption, distribution, biotransformation (metabolism), and excretion of drugs. Clinical applications, adverse effects, drug toxicity, and structure-activity relationship will also be discussed. Focus will be on the pharmacology of the autonomic nervous system, central nervous system, inflammation and immunity.

375.402 Pharmacology 2

A continuation of the course Pharmacognosy I, this course will focus on the pharmacology of cardiovascular, renal and endocrine systems as well as the therapeutic basis of antimicrobial and anti-cancer agents,

375.405 Pharmaceutics 1

This course will deal with the principles and practices of dispensation, preparation, storage, and distribution of pharmaceuticals.

375.406 Pharmaceutics 2

This course will deal with drug disposition and drug availability to the human or animal body from a given dosage form. The time course of drugs in the body and the quantitation of drug concentration patterns will be explained through pharmacokinetics.

375.407 Laboratory in Pharmaceutics

The application of the principles and practices of dispensing techniques of drugs and pharmaceutical retailing will be covered in this course as laboratory exercises.

375.409 Hospital Pharmacy

This introductory course will cover the pharmacist's role in hospitals. The organization of hospital pharmacies, inventory control and drug distribution, IV admixtures, manufacturing



Course Description

and quality control, and drug information will be discussed.

375.410 Hospital Pharmacy Practice

In this course, students will undergo practical training under the direction of a professionally competent and legally qualified hospital pharmacist. The course will also cover familiarization with hospital and pharmacy policies, general pharmacy operations, drug distribution, IV admixtures, and manufacturing and quality control processes.

375.411 Pharmaceutical Jurisprudence

The fundamentals of laws of importance to pharmacists will be covered in this course: laws and regulations for pharmaceutical affairs pertaining to the manufacturing and distribution of drugs, cosmetics, hygienic materials, narcotics, poisons, and pharmaceutical preparations.

375.412 Introduction to Pharmacopeia

This course will cover pharmacopoeia, which is a collection of formularies that each nation standardizes to maintain the strength, purity, and quality of drugs.

375.413 Endocrinological Chemistry

About 40 different hormones have so far been discovered in higher vertebrates. Hormones chemically belong to a special class of amino acids, fatty acids, and steroids peptides. This course will deal with their extraction, chemistry, physiological action, section mechanism, estimation methods, and hyperfunction and deficiency syndromes. Since endocrine malfunction is very important to pathophysiology and constitutes a major part of abnormal metabolism, endocrinology and enzyme abnormality must be understood on the basis of the normal metabolism of living organisms.

375.414 New Drugs

This course will cover the synthetic methods, properties, and uses of the new drugs classified according to their pharmacological action as well as the relationship between chemical structures and physiological actions. It will also cover the investigation of new drugs.

375.417 Pharmacy Management

This course is designed to give future pharmacy practitioners a basic understanding of sound management principles and skills for the operation of pharmacies. Special lectures on marketing and management, with suitable case studies and field trips, will supplement regular class work.

375.418 Antibiotics

This course will deal with the history, definition, classification, antibacterial spectrum, action, mechanism, drug resistance, use, microbes, chemical structures, and semisynthetic derivatives of individual antibiotics.

375.420 Bioassay

As the tools to measure drug efficacy, experimental animals and microbes are used. This course will focus on the methodology of utilizing these living organisms and emphasize experimental design and statistical analysis.

375.422 Toxicology

The course concerns the study of adverse reactions to chemical substances and includes toxicology in drug evaluation, systemic toxicology, and environmental toxicology. The toxicology of household products, medicine, agricultural pollutants, environmental pollutants, and industrial toxic substances will also be discussed.

375.424 Laboratory in Pharmacology

This course on pharmacology laboratory offers students a chance for laboratory practice. It will help them practically to understand the therapeutic, pharmacologic and toxicological actions of drugs, with an emphasis on pharmacodynamics, toxicology, drug metabolism, and drug-receptor interactions.

375.425 Clinical Pharmacy and Practice 1

This is the first course of a two part series on pharmacotherapy, in which students will study the interpretation of laboratory and other clinical data and the application of the principles of clinical pharmacology, biopharmaceutics, toxicology, and pathophysiology in order to provide safe, effective, and rational drug therapy in the management of disease states that are frequently encountered in pharmacy practice. Students will develop skills in pharmacy practice and patient education.

375.426 Clinical Pharmacy and Practice 2

This is the second course of a 2-part series on pharmacotherapy in which students will study the interpretation of laboratory and other clinical data and the application of the principles of clinical pharmacology, biopharmaceutics, toxicology, and pathophysiology in order to provide safe, effective, and rational drug therapy in the management of disease states that are frequently encountered in pharmacy practice. Students will develop skills in pharmacy practice and patient education.

375.427 Pharmaceutical Molecular Biology

This course includes the characterization of human diseases and their newly developed therapies, and also a variety of technologies to develop new drugs on the basis of molecular biology and functional genomics. Especially, the functions and interactions among the genes and/or proteins elucidated by the completion of the human genome project will be discussed. Newly conceptual technologies for drug development such as molecular prevention from complex human diseases and gene therapy will be included.

5. Graduate Courses

The College of Pharmacy, in cooperation with the Graduate School, offers courses leading to M.S. and Ph.D. degrees in the basic and clinical sciences. These courses are directed through the University's Graduate School. In the graduate course, credits are given for the completion of regular courses or seminars and to the individual research performed under the supervision of



Course Description

Minimum Credit Requirements for Graduate Courses

Courses	Course Credit
Master's	24
Doctoral	60*

*This includes the credits obtained in the Master's program.

the graduate advisor. The minimum credit requirements for the graduate courses are as follows. Upon recommendation of the graduate advisor, and subject to the approval of the department chairman, graduate students may take some of the courses offered in the graduate or undergraduate programs of a department other than their own. These courses are applicable to the fulfillment of the credit requirements. In such case, those courses must be approved as equivalent to the major courses of the student's department. The permitted number of credits thus taken will be determined by the department regulation, but in no cases can the credits earned in undergraduate courses exceed six credits. However, if the department requires some of the undergraduate courses of the department as pre-requisites to the graduate program, these courses will not be applied to the credit requirement of the program, though they will be counted toward the computation of the grade point average of the student's graduate program.

Integration of Graduate Courses

The master's courses and the doctoral courses are sequentially integrated, and course credits earned in the master's program may be included in the course credit requirement of the doctoral courses (60 credits).

- (1) Previous graduate work pursued in the master's courses according to the integrated curriculum may be counted in the credit requirement of the doctoral courses within the limit of 36 credits. However, course credits may be transferred in excess of 24 credits only for the courses in which the student obtained a grade of "B" or better.
- (2) Previous graduate work pursued in the master's courses offered by other departments of Seoul National University or by other equivalent institutions and professional schools may be transferred as part of the course credit requirement of the doctoral courses within the limit of 24 credits.
- (3) When a doctoral degree candidate wishes to have more than 24 transfer credits approved according to provision (1) above, or to have the maximum of 24 transfer credits approved according to provision (2) above, the student must make a request to the Dean of the College in which he/she majors by no later than the close of the first quarter of the first semester. The Dean will then refer the matter to the Graduate Council for review, and upon its recommendation, grant the transfer with the approval of the President and send the transfer credits to the Register to be recorded.
- (4) When no such procedures are taken as specified above, only 24 credits of graduate work pursued as part of the master's program will be automatically transferred to the Doctoral course. Hence, all doctoral degree candidates are expected to obtain a minimum of 36 course credits.
- (5) When students reenter the graduate course offered by the same department, the graduate

credits earned prior to their readmission may be approved as part of the graduate work within the limit of 12 credits for the Master's degree program and 18 credits for the Doctoral course (also see provision 3).

- (6) When a student in Master's course wishes to have transfer credits allowed for the graduate courses taken in his/her undergraduate years, the student must request so to the Dean of the College in which he/she majors, and must go through the same procedure as provision (3).

6. Graduate Courses at Glance

Required Courses for All Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.501	Seminar in Pharmacy I	1	2	
375.502	Seminar in Pharmacy II	1	2	
375.601	Seminar in Pharmacy III	1	2	
375.602	Seminar in Pharmacy IV	1	2	

Selective Courses for All Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.505	Topics in Pharmaceutical Sciences 1	1	2	
375.506	Topics in Pharmaceutical Sciences 2	1	2	

Pharmaceutical Bioscience Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.510	Topics in Biochemistry	3	3	
375.538	Advanced Pharmacal Microbiology	3	3	
375.542	Topics in Pharmaceutical Molecular Biology	3	3	
375.614A	Biochemical Toxicology of Human Diseases	3	3	
375.615A	Pharmaceutical Functional Genomics	3	3	
375.641	Advanced Medicinal Mycology and Laboratory	3	2	2
375.642	Advanced Antibiotic Chemistry	3	3	
375.643A	Topics in Immunological Products	3	3	
375.647	Actinomycetal Metabolites and Laboratory	3	2	4
375.648	Topics in Genetics and Genomics	3	3	
375.649	Biopharmaceutical Engineering	3	3	
375.737A	Topics in Medicinal immunology	3	3	
375.783	Molecular Endocrinology	3	3	
375.785A	Current Techniques in Biochemistry	3	2	2
375.795	Advanced Oncology	3	3	
375.833	Genome Informatics for New Drug Development	3	3	



Course Description

Pharmacognosy and Pharmaceutical Analysis Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.503	Instruments in Pharmaceutical Research	2	2	
375.536	Biosynthesis of Plant Constituents	3	3	
375.537	Medicinal Plants Taxonomy	3	3	
375.580	Advanced Pharmaceutical Analysis I	3	3	
375.582	Analysis of Pharmaceutical Preparation I	3	3	
375.585	Instrumental Analysis I	3	3	
375.682	Advanced Pharmaceutical Analysis II	3	3	
375.684	Analysis of Pharmaceutical Preparation II	3	3	
375.686	Instrumental Analysis II	3	3	
375.696	Studies in Pharmacoproteomics	3	3	
375.697	Natural Product Derived Pharmaceuticals 1	3	3	
375.698	Natural Product Derived Pharmaceuticals 2	3	3	
375.796	Screening Methods for Bioactive Natural Products I	3	2	2
375.797	Screening Methods for Bioactive Natural Products II	2	2	2
375.798	Chemical Structure Analysis of Medicinal Plant Constit	3	3	
375.799	Chemistry in Pharmacognosy and Lab	3	2	2
375.800	Advanced Pharmacognosy	3	3	
375.805	Preservation of Natural Resources	3	3	
375.811	Methods in Bioactive Natural Products Research I	3	3	
375.812	Methods in Bioactive Natural Products Research II	3	3	

Pharmacology Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.513	Advanced Pharmacology I and Laboratory	3	2	4
375.514	Advanced Pharmacology II and Laboratory	3	2	4
375.516	Clinical Pharmacokinetics and Laboratory	3	2	2
375.517	Drug-Receptor Interaction and Laboratory	3	2	4
375.618	Biochemical Pharmacology	3	3	
375.619	Advanced Toxicology	3	3	
375.620	Neuropharmacology and Laboratory	3	2	4
375.668	Topics in Molecular Pathophysiology	3	3	
375.669	Phenomics of Model of Organisms	3	3	
375.670	Topics in Protein Therapeutics Development	3	3	
375.695	Cardiovascular Pharmacology and Laboratory	3	2	2
375.721	Topics in Cellular Pathophysiology	3	3	
375.786	Advanced Pharmacokinetics	3	3	
375.787	Membrane Potentials and Ion Channels	3	3	
375.813	Molecular Pharmacology	3	3	
802.901	Advanced Physiology I	3	3	
802.902	Advanced Physiology II	3	3	

Pharmaceutical Health Science Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.518	Advanced Hygienic Chemistry	3	3	
375.523	Industrial Toxicology	3	3	
375.525	Environmental Diseases	3	3	
375.622	Drug Induced Diseases	2	2	
375.623	Clinical Pharmacy Practice I	2	8	
375.624	Clinical Pharmacy Practice II	2	8	
375.625	Environmental Hygiene and Lab	3	2	2
375.629	Pesticide Toxicology I	3	3	
375.630	Pesticide Toxicology II	3	3	
375.711	Biological Self-Defense Mechanism	3	3	
375.715	Environmental Risk Assessment	3	3	
375.716	Methods in Biological Safety Evaluation	3	3	
375.718	Molecular Toxicology	3	3	
375.719	Clinical Pharmacogenomics	3	3	
375.720	Clinical Trial Methodology	3	3	
375.806	Clinical Environmental Pharmacy	3	3	
375.807	Risk Assessment of Chemicals	3	3	
375.808	Free Radicals in Biology and Medicine	3	3	
375.810	Advanced Pharmacotherapy	3	3	
375.814	Drug Dispensing	2	2	4
375.815	Patient Education	3	2	4
375.816	IV Admixture of TPN and Clinical Application	2	2	4
375.817	Topics in Drug Information	2	2	4
375.818	Pediatric Pharmacy	2	2	4
375.819	Geriatric Pharmacy	2	2	4
375.820	Seminar in Clinical Pharmacy	2	4	
375.821	Topics in Pharmaceutical Affairs	3	3	
375.822	Drugs in Society	3	3	
375.823	Pharmaceutical Economics and Policy	3	3	



Course Description

Pharmaceutical Chemistry Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
375.571	Advanced Pharmaceutical Chemistry I	3	3	
375.573	Chemistry of Chemotherapeutic Agents I	3	3	
375.579	Stereochemistry I	3	3	
375.678	Stereochemistry II	3	3	
375.771	Chemistry of Chemotherapeutic Agents II	3	3	
375.772	Advanced Pharmaceutical Synthetic Reactions	3	3	
375.774	Advanced Pharmaceutical Chemistry II	3	3	
375.789	Advanced Medicinal Chemistry	3	3	
375.791	Physical Organic Pharmaceutical Chemistry I	3	3	
375.792	Physical Organic Pharmaceutical Chemistry II	3	3	
375.793	Advanced Organic Pharmaceutical Chemistry I	3	3	
375.794	Advanced Organic Pharmaceutical Chemistry II	3	3	

Pharmaceutics Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.688	Biomedical Biomaterials	3	3	
371.689	Advanced Macromolecular Drug Delivery	3	3	
375.555	Advanced Pharmaceutics I	3	3	
375.556	Advanced Physical Pharmacy I	3	3	
375.557	Pharmaco-Biophysics	3	3	
375.559	Advanced Dispersion System	3	3	
375.657	Advanced Pharmaceutics II	3	3	
375.659	Advanced Physical Pharmacy II	3	3	
375.660	Advanced Industrial Pharmacy	3	3	
375.661	Molecular Structure of Drug I	3	3	
375.662	Lab. in Molecular Structure of Drug I	2	2	
375.809	NMR in Pharmacy	3	3	
375.824	Topics in Drug Transporters in Biological Membranes	3	3	
375.825	Topics in Tissue Specific Drug Transport	3	3	
375.826	Topics in Pharmacokinetic Drug Interaction	3	3	
375.827	Advanced Pharmacokinetics	3	3	
375.828	Topics in Pharmacokinetics Analysis	3	3	
375.829	Advanced Biopharmaceutics	3	3	
375.830	Topics in Experimental Biopharmaceutics	3	3	
375.831	Topics in Bioactive Delivery Systems	3	3	
375.832	Laboratory for Bioactive Delivery System	2	2	

Natural Products Science Major

Code No.	Course name	Credit	hours/week	
			Lec	Lab
371.514	Natural Medicines	3	3	
821.510	Special Research in Chemistry of Natural Products	3	2	2
821.511	Natural Products Chemistry	3	3	
821.512	Separation Techniques in Bioactive Natural Products	3	3	
821.520	Special Research in Biological Functions of Natural Products	3	2	2
821.521	Natural Products Biochemistry	3	3	
821.522	Natural Products Pharmacology and Toxicology	3	3	
821.523	Biological Functions of Natural Products	3	3	
821.531	Natural Resources	3	3	
821.541	Natural Products Information	3	3	
821.612	Topics in Natural Products Chemistry	3	3	
821.624	Natural Products Biotechnology	3	3	
821.625	Topics in Natural Products Biochemistry	3	3	
821.626	Topics in Natural Products Pharmacology and Toxicology	3	3	
821.627	Topics in Biological Functions of Natural Products	3	3	
821.632	Topics in Natural Resources	3	3	
821.642	Topics in Natural Products Information	3	3	
821.711	Structure Elucidation of Natural Products	3	3	
821.712	Natural Products Biopolymers	3	3	
821.713	Natural Products Synthesis	3	3	
821.715	Marine Natural Products Chemistry	3	3	
821.716	Topics in Natural Products Synthesis	3	3	
821.721	Cell Function Regulations from Natural Products	3	3	
821.731	Taxonomy of Economic Plants	3	3	

7. Graduate Course Description**Joint Course****375.501 Seminar in Pharmacy 1**

This course will consist of lectures given by faculty members, visiting scholars, and graduate students, followed by discussion that will cover the latest trends in research and pharmacy.

This is for the students in MS program.



Course Description

375.502 Seminar in Pharmacy 2

A continuation of the course Seminar in Pharmacy I, this course will consist of lectures given by faculty members, visiting scholars, and graduate students, followed by discussion that will cover the latest trends in research and pharmacy. This is for the students in MS program.

375.505 Topics in Pharmaceutical Sciences 1

The course aims to provide students with the latest developments in new drug development in the pharmaceutical industry. International as well as domestic professionals specializing in various fields in biotechnology will be invited to lecture and lead discussions on advanced biopharmaceutical subjects. Topics include target development, gene and protein functions and interactions, biological mechanism of various diseases, immune reactions and mechanism of bioactive materials. The medium of instruction is English and all presentations and discussions should be in English.

375.506 Topics in Pharmaceutical Sciences 2

The course aims to provide students with the latest developments in new drug development in the pharmaceutical industry. International as well as domestic professionals specializing in various fields in biotechnology will be invited to lecture and lead discussions on advanced pharmaceutical chemistry. Topics include design and synthesis of novel bioactive compounds, natural products chemistry, analysis of bioactive compounds, formulation and preformulation studies, and design of dosage forms for optimizing therapy. The medium of instruction is English and all presentations and discussions should be in English.

375.601 Seminar in Pharmacy 3

This course is for the students in Ph D program. Lectures will be given by faculty members, visiting scholars, and graduate students. They will be followed by discussion covering the latest trends and advances in research on pharmacy.

375.602 Seminar in Pharmacy 4

A continuation of Seminar in Pharmacy III, this course is for the students in Ph D program. Lectures will be given by faculty members, visiting scholars, and graduate students. They will be followed by discussions covering the latest trends and advances in research.

1. Courses in Pharmaceutical Bioscience Major

Kim, Kyu-Won, Ph.D., (Professor)

Lee, Seung Ki, Ph.D., (Professor)

Surh, Young-Joon, Ph.D., (Professor)

Choi, Eung-Chil, Ph.D., (Professor)

Kang, Chang-Yuil, Ph.D., (Professor)

Kim, Sunghoon, Ph.D., (Professor)

375.510 Topics in Biochemistry

The course will cover progress in modern biochemistry and molecular biology. Selected topics will be discussed.

375.538 Advanced Pharmacal Microbiology

The latest findings and progress in microorganisms associated with the production of pharmaceuticals will be discussed in this course.

375.542 Topics in Pharmaceutical Molecular Biology

The achievement of the completed human genome has been widely utilized as the basis for drug development. Accordingly, novel functions and interactions among a variety of genes and/or proteins will be introduced in this course. Furthermore, newly developed concepts for drug development including the molecular prevention of human diseases and pharmacogenomics will be discussed. The course will also include recent movements in and the future of postgenomic research in pharmaceutical science.

375.614A Biochemical Toxicology of Human Diseases

Lecture contents involve the general concept of biochemical nature of disease, abnormal metabolism, genetic disease, and recent advances in gene therapy.

375.615A Pharmaceutical Functional Genomics

The pharmacological activities of drugs are affected by personal genetic background, habit, environment, age, diet, and physical status. In the future, these factors will be considered for drug development, and customized drugs and recipes will be applied for the best treatment of each individual patient. This class studies human genomics focusing on gene functions, genetic and protein network, and genetics polymorphism that are related to drug action.

375.641 Advanced Medicinal Mycology and Laboratory

In this course, the latest advances in the taxonomy of fungi and their constituents that are medicinally useful will be surveyed along with laboratory and field experiments.

375.642 Advanced Antibiotic Chemistry

This course will cover the chemical structures, action mechanisms, resistance mechanisms, and antibacterial activities of new antibiotics.

375.643A Topics in Immunological Products

This introductory course will cover the latest advances in immunology and their application to new immunological product development.

375.647 Actinomycetal Metabolites and Laboratory

In this course, important metabolites of actinomycetes will be discussed and the isolation and physiological activities of these metabolites will be examined through experiments.

375.648 Topics in Genetics and Genomics

This course covers updated information and research trends in the main subjects of genetics and genomics, with a focus on the applications of genetic and genomics to biotechnology and pharmaceutical sciences. Specific issues include DNA replication, transcription, decoding genetic information, molecular structure, mutation and evolution, genomic analysis and information.



Course Description

375.649 Biopharmaceutical Engineering

This course introduces students to cutting edge biotechnology and bioengineering that are applied to disease prevention, diagnosis and treatment, and teaches them the working principles for the new technologies. In addition, the social impact of the new biotechnologies and products will be also discussed.

375.737A Topics in Medicinal Immunology

Recent advances and applications in immunology are discussed.

375.783 Molecular Endocrinology

This course will cover the latest advances in biochemistry and molecular biology in terms of modern endocrinology. It will provide the general concepts of modern endocrinology: action mechanisms of hormones, disease and endocrinology, signal transduction pathways leading to cell proliferation, cell cycle control, and programmed cell death. Seminars on selected topics from recent issues of major journals are also planned.

375.785A Current Techniques in Biochemistry

The course covers isolation and purification of biomolecules, assay of bioactive compounds, gene technology, kinetic analysis of enzymes, and purification and biochemical analysis of receptors.

375.795 Advanced Oncology

This course will introduce the characteristics of cancer cells, causes of cancer, principles of carcinogenesis, cellular and molecular mechanisms underlying viral, chemical, and physical carcinogenesis, functions of oncogenes and tumor suppressor genes, and current strategies applied to cancer prevention and therapy.

375.833 Genome Informatics for New Drug Development

This course includes 1) functional genomics which utilize the information of the completed human genome project, 2) DNA chip technology, protein chip technology, and proteomics, which will help the identification and interpretation of disease-causing proteins, and 3) chemical genomics for natural and synthetic products, all of which can be applied to develop new drugs. This course also includes lectures and discussions on the technology of bioinformatics on how huge amounts of information are integrated and then utilized to identify novel drug candidates.

2. Courses in Pharmacognosy and Pharmaceutical Analysis Major

Kim, Jinwoong, Ph.D., (Professor)

Kim, Young Choong, Ph.D., (Professor)

Sung, Sang Hyun, Ph.D., (Full-Time Instructor)

Park, Jeong Hill, Ph.D., (Professor)

Song, Joon Myong, Ph.D., (Assistant Professor)

Kwon, Sung Won, Ph.D., (Full-Time Instructor)

375.503 Instruments in Pharmaceutical Research

This is an introductory course to various instruments which are widely used in pharmaceutical research. This course includes basic principles of the instruments, their applications, interpretation of data, and sample preparation methods.

375.536 Biosynthesis of Plant Constituents

In this course, the primary and secondary plant metabolites and the biosynthetic pathway of these substances will be discussed.

375.537 Medicinal Plants Taxonomy

General information on the taxonomy of medicinal plants will be covered in this course

375.580 Advanced Pharmaceutical Analysis 1

This course is for the development of physical, chemical, and mathematical models for applications to various theories of compound separations. Emphasis will be placed on the theory of chemical equilibrium in terms of pharmaceutical analysis as well as ionic equilibrium, complex-forming reactions, solvent extraction processes, and all chromatographic applications.

375.582 Analysis of Pharmaceutical Preparation 1

In this course, the entire pharmaceutical manufacturing process from the quantitative and qualitative analysis of raw materials to standardization, manufacturing equipmenting, and final product assays and stability studies will be taught.

375.585 Instrumental Analysis 1

This course will consist of lectures on the theories and applications of NMR, IR, UV, MASS, and other spectroscopy for the analysis of pharmaceuticals.

375.682 Advanced Pharmaceutical Analysis 2

This course will consist of an introduction to theories on and their applications to up-to-date methods of pharmaceutical analysis as well as a presentation of the new processes and a comparison with the existing methods in order to formulate more reasonable and improved methodology for analysis.

375.684 Analysis of Pharmaceutical Preparation 2

The principles and applications of the separative analysis of each component of compounded pharmaceuticals and selective analysis using specific reactions will be considered in this course. Emphasis will be placed on the particular analytical procedures and techniques of official methods of pharmaceutical analysis.

375.686 Instrumental Analysis 2

The fundamental theories of chromatographic separation and quantitation of pharmaceuticals will be taught in this course.

375.696 Studies in Pharmacoproteomics

This class contains actually everything a researcher would try to find in pharmacoproteomics field such as deep theory of instruments, background knowledge, practical protocols, and published data. Also it would be a precious information tool for the researchers who study



Course Description

the proteome related field. By focusing on what is currently issued, graduate students will be able to grasp the available information filtered from numerous primary literatures at the end of the class.

375.697 Natural Product Derived Pharmaceuticals 1

This course covers all aspects of natural products as pharmaceuticals including both plant derived and microbial derived.

375.698 Natural Product Derived Pharmaceuticals 2

An in-depth discussion of recent advanced in knowledge and scientific techniques of natural products as pharmaceuticals including both plant derived and microbial derived

375.796 Screening Methods for Bioactive Natural Products 1

This course provides lectures, discussions, and laboratory experiments on principles for methods to screen compounds with a variety of bioactivity from natural sources.

375.797 Screening Methods for Bioactive Natural Products 2

This course will provide lectures on the principles for methods to screen compounds with various bioactivity from natural sources and laboratory experiments.

375.798 Chemical Structure Analysis of Medicinal Plant Constituents

In this course, students will discuss techniques used for the identification and determination of the structures of substances of natural origin. Discussion topics include physical methods and spectroscopic techniques of structure elucidation.

375.799 Chemistry in Pharmacognosy and Lab.

This course will cover a comprehensive consideration of the chemistry and pharmacology of plant constituents that are important because of their biological activities. Included will be the bread classes, alkaloids, terpenoids, steroids, flavonoids, and other related groups.

375.800 Advanced Pharmacognosy

This course will cover an in-depth discussion of recent advances in our knowledge of plant and animal materials with biological properties of interest to pharmaceutical scientists.

375.805 Preservation of Natural Resources

This course will offer the origin, classification, distribution, and biological activities of natural pharmaceutical plants.

375.811 Methods in Bioactive Natural Products Research 1

This course will provide lectures on the screening of natural products for biological activities, instruction of pre-screening methods, screening methods to assay certain natural product activities, isolation of active compounds using activity-guided fractionation, and structural elucidation. The animal cell and plant tissue culture systems will be introduced as techniques for enhancing the yield of secondary products

375.812 Methods in Bioactive Natural Products Research 2

This course will provide lectures on the methods to isolate pure compounds with various bioactivity from natural sources. The major subjects will include carcinogens, anti-cancer, anti-inflammatory, anti-conceptive, antibacterial agents, radioimmune assay, affinity

chromatography, prostaglandins, phytoalexines, phytohormones, and pheromones.

3. Courses in Pharmacology Major

Ko, Kwang Ho, Ph.D., (Professor)

Lee, Myung Gull, Ph.D., (Professor)

Kim, Sang Geon, Ph.D., (Professor)

Oh, Uhtaek, Ph.D., (Professor)

Lee, Mi-Ock, Ph.D., (Associate Professor)

Shin, Young Kee, M.D., Ph.D., (Assistant Professor)

375.513 Advanced Pharmacology 1 and Laboratory

This course will cover the action of autonomic and cardiovascular drugs at the cellular level and the current concepts of the mechanism of drug action.

375.514 Advanced Pharmacology 2 and Laboratory

This course will cover the current research trends, new developments in drugs and pharmacodynamic concepts, and the mechanism of the action of cardiovascular drugs, centrally acting drugs, and chemotherapeutic agents.

375.516 Clinical Pharmacokinetics and Laboratory

This course will cover the methods of applying pharmacokinetics for the safe and effective therapeutic management of individual patients.

375.517 Drug-receptor Interaction and Laboratory

This course will cover the concepts of receptors involved in physiological phenomena, theoretical and experimental classification of receptors, and handling processes such as the purification, characterization, and cloning of receptors with biological activities.

375.618 Biochemical Pharmacology

This course will take a theoretical approach to the study of the cellular and sub-cellular actions of drugs and the relationship between these actions and the pharmacological properties of medicinal agents in intact organisms.

375.619 Advanced Toxicology

This course will cover the mechanism of toxic interactions, safety testing, and chemical carcinogenesis.

375.620 Neuropharmacology and Laboratory

This course will cover the concepts of the role of the nervous system in controlling biological activities via the central or peripheral nervous system, the mechanisms through which each biological function is controlled by the nervous system, and the experimental methods to test these issues.

375.668 Topics in Molecular Pathophysiology

The molecular pathophysiology is the study, which elucidates disease process in the



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molecular level and explains the sequence of events in the response of the cells or tissues to etiologic agent by means of interaction with molecules. This course introduces the recent research trends classified according to their main theme and presents pathophysiological understandings of disease.

375.669 Phenomics of Model of Organisms

The discovery of genetic data of Model organism opens the systematic phenotype identification of organisms. Especially, phenotype of model organisms, including genetically--engineered mouse or mutants, is essential for the construction of a great biological atlas of gene map. This course was built on the conceptual basis of “the diagnostic clinic for mice” and also presents the understandings of the comprehensive systematic analysis of genetically engineered mouse.

375.670 Topics in Protein Therapeutics Development

Biopharmaceutics refer to macromolecules derived from living organisms, therapeutic proteins generally taking the most of the part. At present, high market growth rate of such therapeutic proteins is attracting many companies to thrust into the market. In this subject, the characteristics of the development of recent protein therapeutics are summarized, and the series of developing process is discussed in industrial, academic, and regulatory point of view.

375.695 Cardiovascular Pharmacology and Laboratory

This course will consist of a consideration of the nature of the normal homeostatic regulation of the cardiovascular system and of its modification by drugs, and of the sites and characteristics of drug actions affecting the cardiovascular system.

375.721 Topics in Cellular Pathophysiology

The fundamental structures and functions of cells in higher organisms and the molecular mechanisms of intracellular signal transduction pathways which connect extracellular stimuli to gene expression will be instructed. Also, recent advances in cell physiology and the related human diseases and therapy will be introduced and discussed.

375.786 Advanced Pharmacokinetics

This course will cover the basic and latest topics in pharmacokinetics.

375.787 Membrane Potentials & Ion Channels

The membrane potential is the potential difference across the membrane, which is caused by the activities of various ion channels. In addition to controlling internal milieu such as osmosis, volume, and signal transduction, the membrane potential determines the excitability of muscle and neurons. Ion channels are excitable elements in the cell membrane and determine the electrical signals of muscles and nerves. Because of the latest advances in biochemistry, molecular biology, and electrophysiology, the genetic information on and structures of the ion channels are largely known. In this course, the definition of the membrane potential with a concomitant introduction to classical biophysical experiments will be discussed. The properties, genetic codes, structures, and functions of ion channels in

relation to various diseases will also be explored.

375.813 Molecular Pharmacology

The course of molecular pharmacology provides information on drug action or selective toxicity at the molecular level. Molecular Pharmacology includes the studies of drug-receptors, drug-enzymes, molecular biology of drug metabolism, signaling pathways, protein-nucleic acids interaction, and drug-induced gene regulation. Students are encouraged to discuss components of biological experimentation and recent reports on molecular pharmacology. This course is offered to the students in Ph.D. and M.S. programs.

802.901 Advanced Physiology I

A systemic study of the function of various body systems, i.e. cardiovascular, gastrointestinal, respiratory and endocrine systems. Lectures emphasize various mechanisms involved in maintaining a proper internal environment for the normal existence of body.

802.902 Advanced Physiology II

In this course, which is sequential to Advanced Physiology I, nerve, autonomic nerves and central nervous system are presented.

4. Courses in Pharmaceutical Health Science Major

Chung, Jin Ho, Ph.D., (Professor)

Kim, Young Chul, Ph.D., (Professor)

Lee, Byung Hoon, Ph.D., (Associate Professor)

Shin, Wan Gyoon, Ph.D., (Associate Professor)

Oh, Jung Mi, Pharm. D. (Assistant Professor)

375.518 Advanced Hygienic Chemistry

This course will review the latest literature on hygienic chemistry, with an emphasis on the disposition of xenobiotics, toxic mechanism, and biological self-defense mechanism.

375.523 Industrial Toxicology

This course will introduce the general principles of industrial toxicology. Topics will cover the toxicity of air-borne industrial chemicals such as solvents, gases, and particulates. Special emphasis will be placed on industrial hygiene practice.

375.525 Environmental Disease

This course will cover the harmful actions of environmental pollutants in biological systems and the pathogenesis of environmental diseases.

375.622 Drug Induced Disease

This course will cover the diseases that result from extended drug treatment and misuse from theoretical and practical viewpoints.

375.623 Clinical Pharmacy Clerkship 1

This course will consist of field practice in selected hospitals that possess in-patient care



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facilities so as to provide students with a chance for practical experience as future clinical pharmacists.

375.624 Clinical Pharmacy Clerkship 2

This course will consist of field practice in selected hospitals that possess in-patient care facilities so as to provide students with a chance for practical experience as future clinical pharmacists.

375.625 Environmental Hygiene and Laboratory

In this course, students will survey and conduct experiments on the current state of environmental elements such as air, water, and earth as well as the physical and chemical substances in these elements.

375.629 Pesticide Toxicology 1

This course will cover the latest developments in insect physiology and biochemistry. Also, it will examine the mode of action of major pesticides in both insect and vertebrate systems.

375.630 Pesticide Toxicology 2

This course will cover the evaluation of toxic actions, principles of selective toxicity, pesticide resistance, and environmental effects. Also, special problems related to the use of pesticides will be dealt with.

375.711 Biological Self-defense Mechanism

The course will review several important current issues including cellular defense mechanisms in free radical toxicology.

375.715 Environmental Risk Assessment

In order to characterize the potential adverse health effects of human exposures on environmental hazards, this course will cover four major processes of risk assessment: hazard identification, dose-response assessment, exposure assessment, and risk characterization.

375.716 Methods in Biological Safety Evaluation

This course aims at providing students with a better understanding of the fundamental physiological mechanisms for biological safety evaluation.

375.718 Molecular Toxicology

In the course of molecular toxicology, students are learning about the toxicology of xenobiotics in the molecular level. In this course metabolic activation (biotransformation) of xenobiotics, interaction of xenobiotics with genes, gene expression and signal transduction as well as the health effects caused by the series of the events.

375.719 Clinical Pharmacogenomics

Recently, the rapid development of pharmacogenomics have provided extensive information regarding on the genetic background on the wide inter-individual variation of drug responses, which is expected to lead to the era of personalized pharmacotherapy. Pharmacogenetics is a science that is interesting to the inherited variants of genes related to pharmacokinetics (drug metabolizing enzymes, drug transporters etc.) and

pharmacodynamics (receptor, ion channel, target enzyme etc.), which are associated to the susceptibility of an individual to the higher risk of ADR or therapeutic failure. In this course, students will learn the role of pharmacogenomics in relation to wide interindividual variation of drug disposition and to the possible contribution to the personalized pharmacotherapy.

375.720 Clinical Trial Methodology

Clinical pharmaceutical trial is a research activity with the potential to improve the quality of health care and control costs through careful comparison of alternative treatments. The importance of clinical pharmaceutical trial in drug approval as well as bioequivalence of generic drug and the acquisition of foreign currencies through multi-national pharmaceutical trial caused social attention. In this course, students will learn the fundamental concepts and how to design, develop and evaluate all phases of a clinical pharmaceutical trial.

375.806 Clinical Environmental Pharmacy

This course will cover the pathophysiology of major environmental diseases and clinicochemical test methods.

375.807 Risk Assessment of Chemicals

This course will introduce the risk assessment of chemicals including hazard identification, dose-response assessment, and exposure assessment to students. It will also provide an example for the remediation process in several waste sites. Finally, recent technologies such as PB-PK modeling, mechanism-based risk assessment, and application of transgenic animals will be discussed to precisely predict the actual risk.

375.808 Free Radicals in Biology and Medicine

Free radicals such as oxygen and carbon-centered radicals are generated endogeneously and/or exogeneously in humans. Due to their high reactivity with macromolecules including DNA, proteins, and lipids, they can damage cells and tissues, finally leading to various chronic degenerative diseases. This course will introduce the sources of free radicals generated in the cells and recent technology to detect free radicals, and provide a number of examples for toxic insults resulting from free radicals.

375.810 Advanced Pharmacotherapy

This is a course on pharmacotherapy for more advanced disease states. It will focus on the considerations and precautions required for the proper selection, dosage, and monitoring of drugs and the recognition of clinically significant, efficacious, and/or toxic drug interactions in order to provide safe, effective, and rational drug therapy based on the current medical and pharmacy literature. Emphasis will be placed on problem-solving by analyzing actual patient cases.

375.814 Drug Dispensing

Students will develop clinical skills to screen prescriptions for rational drug selection, proper dosing, possible drug interactions, and allergies. Students will also develop dispensing skills to select right drugs and dosage forms.



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375.815 Patient Education

Students will acquire knowledge needed for patient education with focuses on drug products, drug regimen, side effects, cautions, dietary considerations, etc.

375.816 IV Admixture of TPN and Clinical Application

Students are exposed to the preparation of aseptic parenteral nutrition products while considering their safety, stability, and drug interactions. This course will focus on nutritional assessment, pediatric/adult nutritional considerations, drug-nutrient interactions, enteral nutrition, and their proper monitoring.

375.817 Topics in Drug Information

This course introduces students to drug information sources and how to access them, systematic drug literature searches, and how to answer drug information questions. The course emphasizes clinical services, focusing on actual experience in literature retrieval, analysis, and dissemination of drug information.

375.818 Pediatric Pharmacy

This is a course on the application of clinical principles of pharmacology, biopharmaceutics, and toxicology to optimize disease management for pediatric patients.

375.819 Geriatric Pharmacy

This is a course on the application of clinical principles of pharmacology, biopharmaceutics, and toxicology to optimize disease management for geriatric patients.

375.820 Seminar in Clinical Pharmacy

Students are involved with discussions and practical sessions that enhance their understanding and skill levels in selected areas of clinical practice. Students enhance their verbal presentation, communication, writing, and problem-solving skills. They also work on the critical analysis of data and the provision of care through a weekly conference and projects.

375.821 Topics in Pharmaceutical Affairs

This course has students analyzing the practice and implementation of pharmaceutical care. Students confront their assumptions about the pharmacy profession, pharmacy practice, and pharmaceutical care. The course includes discussions, guest speakers, intensive literature searches, and evaluations.

375.822 Drugs in Society

This course covers the following topics: cultural foundations of pharmacy; development of the present state of pharmacy practice; the role of the pharmacist as a health practitioner in relation to other health practitioners; and the identification of factors (health policy, regulation, economics, research and development, promotion) that affect individual responses to drug therapy.

375.823 Pharmaceutical Economics & Policy

This course covers the following topics: economic analysis of the pharmaceutical sector of health care systems; problems of pricing production and distribution of pharmaceuticals; and domestic or international policy issues relevant to price and access of pharmaceuticals.

5. Courses in Pharmaceutical Chemistry Major

Chun, Moon Woo, Ph.D., (Professor)

Kim, Deukjoon Kim, Ph.D., (Professor)

Lee, Jeewoo, Ph.D., (Professor)

Kim, Sanghee, Ph.D., (Associate Professor)

Jew, Sang-sup, Ph.D., (Professor)

Suh, Young-Ger, Ph.D., (Professor)

Park, Hyeung-geun, Ph.D., (Associate Professor)

375.571 Advanced Pharmaceutical Chemistry 1

This course will cover the chemical bond theory and the chemical structural theory. It will take an instructional approach to carbonium ion, carbanion, radical, benzene, and nitrene.

375.573 Chemistry of Chemotherapeutic Agents 1

This course will cover the development of new chemotherapeutics and theoretical approaches to the relationship between chemical structures and pharmaceutical actions (anticancer agents, sulfa drugs, and fungicidal drugs) in pharmaceutical synthesis, anticancer agents, and antibiotics.

375.579 Stereochemistry 1

This course will introduce stereochemical concepts including the characteristics of chemical bonds, stereoisomerism and absolute configuration, asymmetric carbon and enantiomer, configurational notations, and structures of molecules and symmetry.

375.678 Stereochemistry 2

This course will cover the application of modern stereochemical concepts to the preparation of optically active compounds including the resolution of racemic compounds, stereoselective reactions, asymmetric synthesis, stereochemistry of substitution reactions, stereochemistry of pericyclic reactions, stereochemistry of double bonds, and optically active compounds without asymmetric carbons.

375.771 Chemistry of Chemotherapeutic Agents 2

This course will consist of instruction on the synthesis and chemistry of antimicrobial chemotherapeutics such as b-lactam antibiotics and aminoglycoside antibiotics.

375.772 Advanced Pharmaceutical Synthetic Reactions

This course will involve a theoretical approach to the synthetic and competitive reactions of organic compounds. It will also cover the synthetic development of fine chemicals such as new pharmaceuticals, pesticides, and perfumes.

375.774 Advanced Pharmaceutical Chemistry 2

The applications to organic synthesis, reaction mechanisms, and recent achievements of organic transition metals will be covered in this course. The course will also include topics on recent organic reactions.

375.789 Advanced Medicinal Chemistry



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This course will describe the molecular mechanisms of drugs at receptor, enzyme, and DNA levels and structure-activity relationships of drugs using medicinal chemical concepts such as pharmacophores, bioisosteres, QSAR, and molecular modeling.

375.791 Physical Organic Pharmaceutical Chemistry 1

The general organic reaction mechanisms will be studied in this course through an introduction to the physical, organic, and chemical properties of organic reaction such as substitution and elimination reactions.

375.792 Physical Organic Pharmaceutical Chemistry 2

New organic reaction mechanisms and their applications will be studied in this course through an introduction to the physical, organic, and chemical properties of new organic reactions.

375.793 Advanced Organic Pharmaceutical Chemistry 1

The structural features and preparation of olefin and 3-9 membered carbocycles will be discussed in this course. In addition, their synthetic applications to bioactive molecules including natural products will be discussed.

375.794 Advanced Organic Pharmaceutical Chemistry 2

The structural features and preparation of olefin and 3-9 membered carbocycles will be discussed in this course. In addition, their synthetic applications to bioactive molecules including natural products will be discussed.

6. Courses in Pharmaceutics Major

Shim, Chang-Koo, Ph.D., (Professor)

Chung, Suk-Jae, Ph.D., (Professor)

Kim, Dae-Duk, Ph.D., (Associate Professor)

Kim, Chong-Kook, Ph.D., (Professor)

Lee, Bong-Jin, Ph.D., (Professor)

Byun, Youngro, Ph.D., (Associate Professor)

371.688 Biomedical Biomaterials

The purpose of this course is to introduce students to biomaterials used for drug delivery systems and medical devices so that they can understand the role and function of materials used in the biomedical field. In particular, students will learn about such biopolymers as proteins and polysaccharides, as well as synthetic polymers such as polyethylene glycols. Materials to be taught will be separated based on characteristics and structure. For characteristics, biodegradable polymers, water soluble polymer and hydrogels will be introduced, and structurally linear polymer and crosslinked polymers will be introduced. The course will deal with the structure of biomaterials, and interaction between matter and drugs. Using examples, students will learn to analyze function of materials, which is to decrease

toxicity and increase drug efficiency. In particular, the course will focus on the material characteristics of implantable materials and their interactions with biological systems upon contact. Through this course, students will learn to predict and solve problems in developing drug delivery materials with respect to possible side effects or toxicity from the perspective of materials.

371.689 Advanced Macromolecular Drug Delivery

The purpose of this course is to explore the problems involved with administration of macromolecular drugs ; through analyzing and solving such problem, students will understand problem solving techniques using drug delivery system and build on knowledge to create new technologies. Macromolecular drugs to be dealt with in this course refer to protein and polysaccharide drugs and DNA used in treatment of diseases. For protein drugs, students will learn about drug delivery systems using chemically/physically combined technologies, manipulative technologies, formulation and device technologies. For polyssaccharide drugs, students will learn about non-invasive delivery using chemical derivatives, and for genetic drugs, viral or non-viral vector systems. Furthermore, students will learn about cell delivery technology using the DNA manipulative cell technology. The course focuses on the understanding of the basic principles of the above and the analysis of recent technologies being researched in the field.

375.555 Advanced Pharmaceutics 1

This course will consist of lectures on theoretical methodology and the selection, application methods, and timed release of preparations in order to evaluate, guarantee, and enhance the quality of drugs.

375.556 Advanced Physical Pharmacy 1

This course presents the following major components; 1) an overview of molecular structure and molecular interaction of drugs. 2) The application of spectroscopic methods and X-ray crystallography to the pharmaceutical system. 3) General principle of electrolytes and solution system and dispersion system in pharmacy.

375.557 Pharmaco-biophysics

This course will include various physicochemical characteristics that can be studied though pharmacologically active compounds, various organs, and bioavailable substances.

375.559 Advanced Dispersion System

This course will study dispersion systems including small particle technology, interfacial phenomena, and electrokinetic and rheological properties of materials in colloidal and coarse dispersions.

375.657 Advanced Pharmaceutics 2

This course will cover the factors relevant to the preformulation of pharmaceuticals. Topics will include the solubilization, dissolution, absorption, and excipients of active ingredients.

375.659 Advanced Physical Pharmacy 2

The study of the thermodynamic properties of drugs in solutions and the application of



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thermodynamics and kinetics to the decomposition and stabilization of medical agents will be included in this course.

375.660 Advanced Industrial Pharmacy

The topics to be discussed in this course are the principles and production schemes of new drug delivery systems.

375.661 Molecular Structure of Drug 1

The topics to be discussed in this course are the determination methods of molecular structures and of bond distances, bond angles, and conformations and patterns of hydrogen bonds of drugs in a solid state.

375.662 Laboratory in Molecular Structure of Drug 1

This is a complementary laboratory course for the course Molecular Structure of Drugs I and related experiments.

375.809 NMR in Pharmacy

The theory and application of NMR spectroscopy concerning the structure determination of biological compounds (proteins and nucleic acids) will be studied in this course.

375.824 Topics in Drug Transporters in Biological Membranes

This course includes topics relevant to the drug transport phenomenon, which affects absorption, distribution and excretion. Characteristics of transporters, methodologies in such studies, and practical application will be discussed and updated regularly.

375.825 Topics in Tissue Specific Drug Transport

Various strategies for tissue-specific drug targeting will be discussed. The strategies that utilize the characteristics of transporters will be the primary focus for the course discussion. Particular emphasis will be on tissues that interface polarized epithelial cells such as brain and kidney cells.

375.826 Topics in Pharmacokinetic Drug Interaction

A drug interaction generally refers to a modification of the expected drug response in the patient, due to the exposure of the patient to another drug or substance. Some unintentional drug interactions produce adverse reactions in the patient, whereas some drug interactions may be intentional to provide an improved therapeutic response or to decrease adverse drug effects. Drug interactions may include drug-drug interactions, food-drug interactions or chemical-drug interactions, such as the interaction of a drug with alcohol and tobacco. In this lecture, the risk of a drug interaction in association with multiple drug therapy, multiple prescribers, poor patient compliance, and patient risk factors will be discussed. Screening for drug interactions, significance of the interaction, mechanisms of drug interactions during the processes of absorption, metabolism, disposition, biliary and/or renal excretion will also be discussed using appropriate examples.

375.827 Topics in Pharmacokinetics

Pharmacokinetics is the study of the time course and concentrations of drugs in biological fluids, tissues, and excreta. Physiological, biochemical, and mathematical knowledge will be

applied to model the temporal relations of drug concentrations. Topics will include kinetic characterizations relevant to the processes of absorption, distribution, metabolism, and excretion. Updated literature information will be evaluated in relevant topics.

375.828 Topics in Pharmacokinetics Analysis

This course covers the estimation of kinetic parameters. Particular attention will be paid to the statistical estimation of the parameters using computers and nonlinear least square methods. The estimates will be applicable in 1) understanding the kinetic processes; 2) prediction of dose and dosing rates for optimal clinical response; and 3) ultimate development of safe and effective therapeutics.

375.829 Topics in Biopharmaceutics

The course will discuss topics in pharmaceutics including factors that affect the absorption, distribution, metabolism, and excretion of drugs.

375.830 Topics in Experimental Biopharmaceutics

This course will include topics such as the routes of administration, distribution, and disposition of pharmaceuticals and bioavailability. Particularly, the methodologies in the literature relevant to these topics will be discussed and evaluated.

375.831 Topics in Bioactives Delivery Systems

This course covers the methods of preparation, evaluation and application of delivery systems, as well as physicochemical interactions between bioactives and delivery systems, and physiological considerations of delivery systems.

375.832 Laboratory for Bioactives Delivery System

This course includes the design, preparation and evaluation of bioactives delivery systems according to physicochemical and physiological parameters.

7. Courses in Natural Products Science Major

Chang, Il-Moo, Ph.D., (Professor)

Han, Young Nam, Ph.D., (Professor)

Kang, Sam Sik, Ph.D., (Professor)

Kim, Yeong Shik, Ph.D., (Professor)

Mar, Woongchon, Ph.D., (Professor)

Suh, YoungBae, Ph.D., (Professor)

Yun-Choi, Hye Sook, Ph.D., (Professor)

Shin, Jongheon, Ph.D., (Associate Professor)

371.514 Natural Medicines

This course is intend to provide the students with the broad range of knowledge concerning complimentary and alternative medicine (CAM). The potential benefits and the safety issues of CAM are to be discussed. The problems concerning the drug interactions among CAM



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and with conventional therapies are also to be discussed. The recent research progress on the inter-complementary effects of CAM and conventional medicines are to be reviewed with examples.

821.510 Special Research in Chemistry of Natural Products

This lecture is designed to help students interpret spectral data for the identification and characterization of the structures of natural compounds obtained through fractionation, isolation, and purification.

821.511 Natural Products Chemistry

This course provides a comprehensive and balanced introduction to natural products. This course builds upon both fundamental chemical principles for natural products and a wealth of diverse secondary metabolites, and guides the graduates to acquire or expand their knowledge in the field of natural products chemistry.

821.512 Separation Techniques in Bioactive Natural Products

Principles and applications of modern separation methods necessary for the isolation of biologically active agents will be studied. It is recommended that students take Natural Products Chemistry and Biochemistry before taking this course.

821.520 Special Research in Biological Functions of Natural Products

This course is designed to provide students with information on existing methods and experimental techniques concerning models for searching biological activities including physiological, pharmaceutical and toxic activities. The contents include establishing new models for searching activities, and their applications.

821.521 Natural Products Biochemistry

This course will cover the following topics: understanding of molecules within cells; interactions between cells that allow for the construction of multi-cellular organisms; concepts and processes of molecular cell biology; gene control pathways; understanding of gene control during development and disease states; experimental tools that allow the study of living cells and organisms; and analyzing DNA and protein sequences. New discoveries and new methodologies covered are bioinformatics, DNA chip microarray technology, apoptosis, and signaling pathways. This course will demonstrate the dynamic nature of science and prepare the students not only to engage actively in scientific research and teaching but also to become educated members of a public that is increasingly asked to deal with complex issues such as environmental toxins, genetically modified foods, and human gene technology.

821.522 Natural Products Pharmacology and Toxicology

The course provides basic knowledge on general pharmacology related with natural products and traditional Chinese herbs. Students learn the following: interaction of receptors with drug molecules; physiological and anatomical structures of human cells, tissues and organs; and pharmacokinetics on natural products' absorption, distribution, metabolism and elimination. Additional focuses of the course will be toxicological aspects of natural

constituents derived from herbal materials and screening methodologies of toxic effects.

821.523 Biological Functions of Natural Products

Basic chemical, biochemical, and pharmacological aspects of biologically active compounds will be studied in this course.

821.531 Natural Resources

The general uses and economic values of important natural resources will be reviewed to obtain overall ideas on the history and processes in the development of natural products. Natural resources with potential uses and the issue of under development are also discussed to accumulate the comprehensive knowledge on the development of natural products.

821.541 Natural Products Information

This course offers lectures and experimental laboratory on the basic structure and function of the computer, and networking systems of the internet related with information on the natural products industry. In addition, bibliographic studies on classical medicine, especially, traditional Chinese medicine, will be intensively performed in this course. Students require some knowledge of Chinese literature and alphabets. The course will also require students to prepare discussions and presentations during the semester.

821.612 Topics in Natural Products Chemistry

This course provides expanded coverage of many topics on natural products chemistry. This course focuses on information on possible leads to new natural products, such as screening methods, and the surveys on modern HPLC hyphenated techniques or NMR methods in structure elucidation.

821.624 Natural Products Biotechnology

In recent years, there has been a heightened public awareness of the fast-growing field of biotechnology. Natural products biotechnology covers an explanation of the genetic foundation of biotechnology known as the tools approach. The ability to manipulate the genetic make-up of organisms has led to explosive progress in all areas of this field. This lecture examines the fundamental principles and facts that underlie current practical applications of various organisms, describes those applications, structure and biosynthesis of the biologically active metabolites, and examines future prospects for related technologies.

821.625 Topics in Natural Products Biochemistry

This lecture concentrates on the relationship between active natural compounds' function toward cell membrane and various functions of membrane proteins & enzymes for the understanding of the biological activity of active compounds at the level of biological cell membrane.

821.626 Topics in Natural Products Pharmacology and Toxicology

It is recommended that students who take this course have prior knowledge of general pharmacology, physiology, biochemistry and anatomy. Knowledge of individual natural drugs and their constituents on pharmacology and toxicology will be emphasized. In addition, pharmacology, toxicology and drug-interaction of traditional herbal drugs such as



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traditional Chinese drugs will be studied as well. By taking this course, students will learn how to develop useful natural drugs and related products such as dietary supplements, and functional cosmetics.

821.627 Topics in Biological Functions of Natural Products

Recent articles on special topics in Natural Products Science will be discussed in this course.

821.632 Topics in Natural Resources

In order to learn about the uses and developments of useful natural products, various groups of natural resources will be discussed in depth, in regards to their characteristics and processes of development. Current approaches to the development and research of natural resources will be also discussed.

821.642 Topics in Natural Products Information

In this class, students will search the Internet for information on the natural products industry, regulatory agencies, and natural products sciences. Throughout the course, students will learn database construction techniques using HTML. Based on such basic information technology, all students will have access to information on regulatory agencies over the world, such as the American FDA, and other agencies in the EU, Japan, China, Korea, etc. Students will first learn about regulations regarding the registration process and requirements of various natural products like natural drugs, dietary supplements, functional cosmetics and related products. Then, the students will practice the registration process with a model item of their own to obtain registration permission. Through the on-line training, students will construct their own databases on natural products information.

821.711 Structure Elucidation of Natural Products

The development of spectroscopic methods has enabled the structure elucidation of secondary metabolites. The identification of natural products by spectrometry is greatly facilitated by ready access to reference spectra. Therefore, this course provides many exercises for structure elucidation of natural products by spectroscopic data obtained from reference spectra.

821.712 Natural Products Biopolymers

In this course, students will discuss the chemical and biological properties of biopolymers located in the biomembrane, including polysaccharides, proteins, and peptides.

821.713 Natural Products Synthesis

This course covers selected topics including both the partial and total synthesis of natural products. A wide ranging survey of organic syntheses with an emphasis on important functional group transformations and carbon-carbon bond-forming reactions are provided. The course also includes retro-synthetic analysis and the method for selective synthesis of optically active compounds and heterocycles.

821.715 Marine Natural Products Chemistry

Marine organisms produce a wide variety of biologically active and structurally unique metabolites. This course focuses on the chemical, biological, and pharmacological features

of marine natural products compared to those derived from terrestrial organisms. Theoretical and experimental approaches to these compounds are also covered, as well as their pharmaceutical and biotechnological potentials.

821.716 Topics in Natural Products Synthesis

Biologically active natural products are rich sources of medicines. This course will provide advanced knowledge of natural products focusing on their structure, chemistry, biological activity, and synthesis. The focus will be on the chemical synthesis of biologically active natural products with complex structures. Topics include retro-synthetic analysis and designing synthetic pathways using recent chemical databases and journals.

821.721 Cell Function Regulations from Natural Products

This course concentrates on a small number of organisms and the critical experiments that have advanced our understanding of the cell cycle. The topics include the following: origin of the different experimental approaches to the cell cycle; principles of cell cycle regulation, especially focusing on the roles of the cyclin dependent protein kinases; their contribution to our current picture of cell growth and division; how different organisms have specialized in regulating particular aspects of cell cycle control, resulting in the emergence of a great plethora of proteins that govern cell cycle progression; and the question of cancer and other important medical problems. This course also focuses on the field of “signal transduction”, which has revealed almost unimaginable diversity and complexity within large families of proteins involved in the production and destruction of second messenger molecules, and information transfer via kinase cascades and their associated regulatory proteins.

821.731 Taxonomy of Economic Plants

In this course, students are introduced to general classification systems on organisms with an emphasis on economically important biological resources. Basic concepts of biological classification will be discussed in detail, such as rules on biological nomenclature, scientific names, characters, and phylogeny. In addition, organisms with important economic value will be introduced to provide general understanding on important natural resources.