**약 학 과**

(DEPARTMENT OF PHARMACY)

**1.Department Introduction**

Our mission is to develop highly creative academic research in each scientific area of pharmaceutical science in order to ultimately make a solid contribution to the Korean pharmaceutical industry by supplying innovative ideas and discoveries of global standard. We expect that highly capable drug discovery experts would be churned out into the Korean pharmaceutical industry through synergistic performance of multiple academic activities including experimental research activity, academic collaboration with many research groups abroad and development of in-house drug discovery expertise. Our curriculum and academic course works are geared towards meeting the above needs. The expertise in drug discovery or pharmacy requires masterful understanding of multi-disciplinary science and, therefore, all the necessary courses are provided for biochemistry, microbiology, pharmacology, pharmaceutics, formulation, toxicology, medicinal chemistry, synthetic organic chemistry, analytical chemistry, natural product chemistry, pharmacognosy and physical pharmacy. All the above courses are open to graduate students.

**2.List of Faculty Members**

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| --- | --- | --- | --- | --- |
| Position | Name | Last School Graduated | Degree | Major |
| Professor | KIM, Jung-Ae | Loyola University of Chicago, USA | PhD | Physiology |
| Professor | KIM, Jong Oh | University of Nebraska Medical Center, U.S.A. | PhD | Physical Pharmacy |
| Professor | PARK, Pil-Hoon | University 0f Missouri-columbia, USA | PhD | Pharmacology |
| Professor | YONG, Chul Soon | University of South Carolina, USA | PhD | Pharmaceutics |
| Professor | LEE, Eung-Seok | Purdue University, USA | PhD | Medicinal Chemistry |
| Professor | JAHNG, Yurngdong | University of Houston, USA | PhD | Organic Chemistry |
| Professor | JEONG, Byeong-Seon | Seoul National University, Korea | PhD | Pharmaceutical Chemistry |
| Professor | JEONG, Tae Cheon | KAIST, Korea | PhD | Toxicology & Public Health |
| Associate Professor | KIM, Dong Young | Sungkyunkwan University, Korea | PhD | Molecular Biology |
| Associate Professor | LEE, Iyn-Hyang | University of York, UK | PhD | Social Pharmacy, Health Policy |
| Associate Professor | CHANG, Jae Hoon | Seoul National University, Korea | PhD | Immunology |
| Associate Professor | CHOI, Dong Young | University of Kentucky, USA | PhD | Neuropharmacology |
| Associate Professor | CHOI, Hyukjae | Seoul National University, Korea | PhD | Pharmacognosy,  Natural Product Chemistry |
| Assistant Professor | KIM, Soo Young | University of Texas at Austin, USA | PhD | Biochemistry |
| Assistant Professor | KIM, Ju Hyun | Catholic University, Korea | PhD | Instrumental Analysis |
| Assistant Professor | NAM, Ju Won | Ewha Womans University, Korea | PhD | Pharmacognosy,  Natural Product Chemistry |
| Assistant Professor | AH, Young-Mi | Hanyang University | PhD | Clinical Pharmacy |
| Assistant Professor | JEONG, Jee-Heon | Seoul National University, Korea | PhD | Cell Delivery |
| Assistant Professor | Choi, Hye Duck | Seoul National University | PhD | Pharmacotherapy |

**3.Course Description**

■ 기초공통(Basic Major Courses)

생명약학특론 3 credit

(LIFE AND PHARMACEUTICAL SCIENCES)

This course is the multi-disciplinary to discuss various subjects about life science-related pharmacy including pharmacology and physiology. Specific focus will be on the action mechanisms by which endegenous physiological factors and exogenous drugs exert.

의약생명과학특론 3 credit

(ADVANCED MEDICINAL AND PHARMACEUTICAL BIOLOGY)

This course introduces students to new trend for study of Biology in phamacy related field. And classification and reaction mechanism of small molecules, proteins, DNA and cell drug developed by biotechnology and their application.

약화학세미나 3 credit

(PHARMACEUTICAL CHEMISTRY SEMINAR)

The raw materials of drugs, the discovery of new compounds, and the distribution and metabolism of drugs will be discussed. Each graduate student presents the contents of his / her field of interest in colloguium form and acquires a broader knowledge through questions.

제제과학특론 3 credit

(BASIC INDUSTRIAL PHARMACY)

This course is concerned with the fundamental physicochemical properties of pharmaceutical systems to understand conventional dosage forms such as tablet, capsule and liquid, and drug delivery system. In this course, the student is introduced to powder characteristic theory, interfacial phenomena, rheology, micromeritics and so forth, with particular emphasis on those relevant pharmaceutical systems. This is followed by a consideration of the solid state, important because of the large number of solid dosage forms. The basic flow properties of a variety of systems are also discussed together with an introduction to stability, efficacy and safety of material in the liquid and solid states.

보건사회약학특론 3 credit

(ADVANCED SOCIAL PHARMACY)

This module introduces students to the sociological issues of relevance to disease, medicine and pharmacy and to the empirical approaches to applying a variety of disciples including sociology, economics, politics, psychology, educational studies, etc. to pharmacy practice and research. Emphasis is placed on issues of current concern within either international or Korean healthcare system.

약화학특론 3 credit

(ADVANCED PHARMACEUTICAL CHEMISTRY)

This course covers the general pharmaceutical chemistry including organic synthesis, medicinal chemistry, and organic reaction mechanism.

생명약학세미나 3 credit

(THE SEMINAR OF BIOLOGICAL PHARMACOLOGY)

The course, the seminar of biological pharmacology, is to discuss current trends of biochemistry, toxicology and molecular biology.

임상약학특론 3 credit

(ADVANCED CLINICAL PHARMACY)

This subject is aimed at the followings:

▷ Advance the quality of patient care through evidence-based medication therapy management based on sound pharmacotherapeutic principles

▷ Enhance the health of our communities by incorporating contemporary health promotion and disease-preventing strategies in our practice environments

▷ Motivate young practitioners to enhance the breadth, depth, and quality of care they provide to their patients

▷ Challenge established pharmacists and other primary-care providers to learn new concepts and refine their understanding of the pathophysiologic tenets that undergird the development of individualized therapeutic regimens.

■ 전공 (Major Courses)

개별연구(1) 3 credit

(INDEPENDENT STUDY (1))

개별연구(2) 3 credit

(INDEPENDENT STUDY (2))

약학과세미나(1)~(8) 1 credit

(SEMINAR(1)~(8))

■ 약학전공(PHARMACY MAJOR)

구조생물학특론 3 credit

(ADVANCED STRUCTURAL BIOLOGY)

The course, advanced structural biology, provides a basic knowledge for the understanding of protein structures at atomic level and introduces diverse techniques such as X-ray crystallography, SAXS (Small Angle X-ray Scattering) and NMR (Nuclear Magnetic Resonance).

단백질화학특론 3 credit

(ADVANCED PROTEIN CHEMISTRY)

The course, advanced protein chemistry, introduces the principle of protein expression and purification methods. And we will discuss about the pharmaceutical application of high purity proteins.

병태생리학특론 3 credit

(ADVANCED PATHOPHYSIOLOGY)

This course is aimed to understand the causes and pathogenesis of inflammatory diseases at the molecular and cellular level. Cellular responses to damaging insults, pathogenesis of acute and chronic inflammation, and inflammatory angiogenesis will be discussed.

병태생리학세미나 3 credit

(PATHOPHYSIOLOGY SEMINAR)

To understand the cause and pathogenesis of cancer disease at the molecular and cellular level, we will discuss the following topics: molecular carcinogenesis, cancer invasion and metastasis, tumor microenvironment, cancer resistance to chemotherapy, and targets for new anti-cancer drug development.

생리학특론 3 credit

(ADVANCED PHYSIOLOGY)

This course focuses on understanding the signaling molecules and their network which are essential for the processes of cell proliferation, differentiation, survival and death. This will help students understand how the body systems work to maintain homeostasis, which is essential to life.

물리약학특론 3 credit

(ADVANCED PHYSICAL PHARMACY)

Physicochemical characteristics of drug substances in the process of drug development will be covered in this course. Fundamentals and applications of thermodynamics, chemical equilibria, electromotive force and oxidation-reduction, solubility and distribution phenomea, interfacial phenomea, and basic theory of quantum chemistry will also be treated to provide the students with the knowledge essential for new drug development as well as dosage form design.

약물송달학특론 3 credit

(ADVANCED DRUG DELIVERY SYSTEM)

Development of drug delivery system (DDS) is comprehended in order to reduce the side effect of drug and enhance its bioavailability. Furthermore, its application to highly valued drug and commercial product are explained.

특수제형학 3 credit

(SPECIAL DRUG DOSAGE FORMS)

This course will be focused on modified-release drug forms and included regulatory perspectives and specific presentations for orally disintegrating tablets, ophthalmic products, aerosol drug products, drug-eluting stents, and parenteral products including nanoparticles, microspheres, and liposomes, suppository, implant.

분자미생물학특론 3 credit

(ADVANCED MOLECULAR MICROBIOLOGY)

This lecture will focus on the microbial physiology, biochemistry and genetics in the molecular level in order to introduce the basic concepts for the essence of life.

생리활성천연물특론 3 credit

(ADVANCED BIOACTIVE NATURAL PRODUCTS)

In this course, the students will have a chance to make a presentation after reading the papers about bioactive natural products, especially which is related to their research areas. After the presentations, the students will discuss about the presented topics and share their information.

천연물분광학 3 credit

(SPECTROSCOPY IN NATURAL PRODUCT CHEMISTRY)

In this class, the students will study about the basic theory of spectroscopy (IR, UV, MS, NMR) to understand how to elucidate the structures derived from natural products. They can be familiar with the spectroscopic analysis of representative classes of natural products.

천연물분광학특론 3 credit

(ADVANCED SPECTROSCOPY IN NATURAL PRODUCT CHEMISTRY)

This class is the advanced course of “Spectroscopy in Natural Product Chemistry”. NMR data acquisition, data processing, and data analysis skills will be introduced. The students will have structure elucidation practice of unknown natural products based on self-acquired and self-processed NMR data.

분자약물학 3 credit

(MOLECULAR PHARMACOLOGY)

The purpose of this course is to cover areas of molecular pharmacology that are particularly relevant to the discovery and characterization of drugs from the basic science perspective such as receptor-ligand interactions and cellular signaling. It will cover areas including the structure and receptors and their actions, the discovery of anti-cancer drugs and basic signaling mechanisms that are associated with targets of molecules used for therapy.

신호전달약리학 3 credit

(SIGNAL TRANSDUCTION PHARMACOLOGY)

A number of recent discoveries in biological sciences, in particular at the molecular level, have greatly impacted on the understanding of drug action. It is now considered that signal transduction pharmacology is essential for the development of new drugs and therapeutic strategies. This course addresses drug - induced diverse transmembrane signal transduction pathways from theory to proposed therapeutic implications to understand the molecular mechanisms of drug action.

약물학특론 3 credit

(ADVANCED PHARMACOLOGY)

This course provides the graduate students with an introduction to the basic principles of pharmacology. Topics include drug-receptor interactions, dose-response relationships, pharmacogenomics, metabolism, and toxicity. The course highlights the receptor mechanisms; G-protein couples receptor, signal transduction, selectivity and regulation.

기기분석특론 3 credit

(ADVANCED INSTRUMENTAL ANALYSIS)

This course provides the basic principles and practices for the study of drug metabolism to understand the importance of drug metabolism in new drug development.

생물약제학특론 3 credit

(ADVANCED BIOPHARMACEUTICS)

The interrelationship between formulation factors and pharmacokinetic aspects of drug absorption, distribution, metabolism and excretion will be included in the lecture. Applied theory of dosage form design for optimal drug activity and bioavailability for all routes of drug administration will be covered in association with understanding physicochemical properties of drug molecules.

제어방출형제제특론 3 credit

(ADVANCED CONTROLLED RELEASE DOSAGE FORMS)

The development of controlled-release devices is an attempt to simulate nature's process so as to deliver a drug to a target organ at a specified period of time, and to accomplish the optimum therapeutic effect while keeping undesirable side effects to a minimum.

프리포뮬레이션 3 credit

(PHARMACEUTICAL PREFORMULATION)

This course is designed to provide the student with fundamental principles in the development of new drug entity. The student will gain practical knowledges on the physicochemical properties of drug substances. Solubility, melting point, assay development, drug stability, microscopy, powder flow properties and excipient compatibility will be covered in this course.

생물유기화학특론 3 credit

(ADVANCED BIOORGANIC CHEMISTRY)

General introduction of the main classes of biomolecules, major metabolic pathways of each major class of biomolecules such as lipid, carbohydrate, amino acid, and nucleotide will be covered in this course.

의약화학특론 3 credit

(ADVANCED MEDICINAL CHEMISTRY)

This course covers mechanism of action of various drugs based on relationship between drug and receptor, enzyme, and DNA. Pharmacophore, bioisostere, quantitative structure-activity relationship are also discussed. Classification of drugs according to disease, along with mechanism of action, metabolism, and SAR for each class will be covered in this lecture.

근거중심 의약품정책 특론 3 credit

(EVIDENCE-BASED PHARMACEUTICAL POLICY)

This module aims to provide an appreciation of the principles guiding health and pharmaceutical policies and to appraise published evidence of the effectiveness and efficiency of related policy interventions. The module will apply scientific methods to health and pharmaceutical policies, focusing on quantitative evaluation of various historic and current policy interventions.

보건사회약학 연구방법론 3 credit

(RESEARCH METHODS IN SOCIAL PHARMACY)

This module aims to provide an introduction to the philosophy and common methods of research used in health and health care relating to medicines, and to enable students to design and critically appraise research studies addressing a variety of different types of question. This module forms an introduction to a number of research methods such as trials, systematic reviews and epidemiological and qualitative methods.

의약품 경제학 특론 3 credit

(ADVANCED PHARMACOECONOMICS)

This module aims to provide a structured approach to applying economic techniques to the study of health and health care relating to medicines. The module introduces the discipline of economics and its applications into health technologies e.g. pharmaceuticals, and health services research. The main focus of the module is on economic evaluation techniques but a brief overview is given of other areas of pharmacoeconomics.

약물유전체학특론 3 credit

(ADVANCED PHARMACOGENOMICS)

Pharmacogenomics is the technology that investigate how genetic makeup of drug metabolizing enzymes, transporters and receptors affect an individual's pharmacokinetics and pharmacodynamics to drugs. By doing so, pharmacogenomics aims to develop rational means to optimize drug therapy to ensure maximum efficacy with minimal adverse effects. This course teaches the research methods of pharmacogenomics and major genetic variations of drug metabolizing enzymes, transporters and receptors affecting individual drug responses.

의약품합성학세미나 3 credit

(SEMINARS IN ORGANIC SYNTHESIS)

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

의약품합성학특론 3 credit

(ADVANCED ORGANIC SYNTHESIS)

Advanced organic reactions for carbon-carbon, carbon-oxygen, and carbon-nitrogen bond formation for new drug development will be discussed. The strategy, examples and applications of such reactions to design and synthesis of new organic compounds including new drugs will also be covered.

헤테로고리약품화학 3 credit

(HETEROCYCLES IN PHARMACEUTICAL CHEMISTRY)

Classification of heterocycles and nomenclature and characteristic feature of each class of heterocycles. Preparative method, reactivity, and reaction mechanism of each class of heterocycles.

면역치료제특론 3 credit

(ADVANCED IMMUNOTHERAPY)

This course introduces students to outline of immune response in pharmacy-related field. Topics covered in the course include: immune response against pathogens, tumor immunology, antibody mediated immunotherapy, tumor immunotherapy, cell-based immunotherapy, and DNA vaccine.

의약면역학특론 3 credit

(ADVANCED MEDICINAL IMMUNOLOGY)

This course introduces students to outline of Immunology in pharmacy-related field. Topics covered in the course include: innate and acquired immunity, immune response, molecular mechanism in immune response, interaction with immune cells, migration and technical methods for study of Immunology.

생화학특론 3 credit

(ADVANCED BIOCHEMISTRY)

This course deals with the component of cells, especially protein, carbohydrate, nucleic acid and phospholipid, and metabolism of these high molecules.

비대칭합성화학 3 credit

(ASYMMETRIC SYNTHESIS)

Methods for the synthesis of optically active compounds will be discussed, including the principles behind asymmetric reactions. Introduction to the various methodologies for the control of the absolute stereochemistry of the desired product in organic synthesis. Topics include principles of asymmetric synthesis and asymmetric catalysis, and application of chiral synthons in total synthesis.

유기반응 메커니즘 3 credit

(ORGANIC REACTION MECHANISM)

The purpose of this course is to help students learn how to draw reasonable mechanism for organic reactions. This lecture includes the general approach to familiarize students with the classes and types of reaction mechanisms and the detailed mechanism for each type of the organic reactions.

유기반응 메커니즘 연습 3 credit

(ORGANIC REACTION MECHANISM PRACTICE)

The purpose of this course is to improve ability to understand organic reaction mechanisms by solving extensive problem sets. The problems vary in difficulty from relatively easy to very difficult. Many of the reactions covered in the problem sets are classical organic reactions, including many ‘name reactions’.

세포치료제 3 credit

(CELL MEDICINE)

The purpose of this course is to learn about current cell therapy and cytomedicine delivery. Students will discuss about new cell delivery system.

제제학특론 3 credit

(ADVANCED PHARMACEUTICS)

The purpose of this course is to learn about new advanced drug dosage form and to discuss about new formulation as well as future perspective of advanced pharmaceutics.

기능성식품학특론 3 credit

(ADVANCED FUNCTIONAL FOODS)

For maintaining the life, nutrients are essential. The nutrients can be used by cells through biochemical metabolism following absorption. This course deals with the action mechanism of functional foods which are able to modulate biological system, so called 3rd function of foods.

독성학특론 3 credit

(ADVANCED TOXICOLOGY)

All xenobiotics including drugs possess intrinsic toxicity. Through understanding the biochemical mechanism of action induced by hazardous xenobiotics including environmental pollutants, defense mechanism of biological systems and active antidotal methods against toxicants are lectured.

분자독성학특론 3 credit

(ADVANCED MOLECULAR TOXICOLOGY)

This course deals with the cellular and molecular mechanism of action of toxic substances and current molecular techniques used in the toxicology.

예방약학특론 3 credit

(ADVANCED HYGIENIC PHARMACY)

This course deals with the effects of foreign substances related with the food hygienes and environmental hygienes on biological systems.

신경약물학 3 credit

(NEUROPHARMACOLOGY)

This course will discuss the drug-mediated changes in functioning of the nervous system. The specific focus of this course will be on a description of the cellular and molecular actions of drugs on synaptic transmission. This course will also refer to specific diseases of the nervous system and their treatment in addition to giving an overview of the techniques used for the study of neuropharmacology.

퇴행성 신경질환의 분자학적 기초 3 credit

(MOLECULAR BASIS OF NEURODEGENERATIVE DISEASES)

This course will discuss the major molecular/pathological mechanisms and genetics of neurodegenerative diseases including Alzheimer’s disease, Parkinson’s disease, Amyotrophic Lateral Sclerosis and Huntington’s disease by using presentations, review papers and video resources. We will focus on recurring themes (protein aggregation, production of reactive oxygen species, genetic risk modifiers, excitotoxicity) as well as differing mechanisms among diseases.

행동약리학 3 credit

(BEHAVIORAL PHARMACOLOGY)

This course will discuss drugs that affects nervous system function, and their behavioral or neural mechanisms of their effects. Specific topics will include abused drugs, psychopharmacology, learning and memory, behavioral modifications by drugs. In addition, we will give an overview of the techniques used for the study of behavioral pharmacology.

천연물분리정제법연구 3 credit

(STUDY IN NATURAL PRODUCT ISOLATION)

In this class, a diverse chromatographic techniques will be discussed and its application for structure elucidation will be introduced. Types of chromatography based on mobile/stationary phase as well as the characteristics and benefits of each chromatography will be introduced.

천연물절대구조결정론 3 credit

(STRUCTURE ELUCIDATION OF NATURAL PRODUCTS)

Natural products are important source of novel bioactive compounds for drug discovery. In particular, three dimensional structure (absolute configuration) of natural products is closely related to their bioactivity. In this class, analytical method to determine absolute configuration of natural product functionality by spectroscopic techniques widely used in pharmacognosy/ natural product chemistry will be discussed.

약물치료학특론세미나 3 credit

(ADVANCED PHARMACOTHERAPEUTICS SEMINAR)

The purpose of Advanced Pharmacotherapeutics Seminar is to train the students to identify and resolve drug-related problems by using patient case studies. Through this course, thinking skills in integrating background knowledge included pathophysiology, pharmacology and pharmacotherapy can be promoted.

신약개발특론 3 credit

(SPECIAL TOPICS IN NEW DRUG DEVELOPMENT)

Introduction of recent trend in new drug development.

Discussion about synthesis and screening system in new drug discoveries.

최신천연물화학연구법 3 credit

(NEW RESEARCH TECHNIQUES IN NATURAL PRODUCT CHEMISTRY)

We will study the newly emerging research techniques in the field of rapidly changing natural product chemistry. We will examine the improvements and deficiencies in each innovative research techniques and discuss how to apply them to individual research.

질량분석학 3 credit

(MASS SPECTROMETRY)

This course provides the basic principles and applications of mass spectrometry in&#xA;new drug development.

약물대사체분석학 3 credit

(DRUG METABOLITE ANALYSIS)

This course provides the basic principles and practices for the study of drug metabolism to understand the importance of drug metabolism in new drug development.

약물 감시의 이해 3 credit

(AN INTRODUCTION TO PHARMACOVIGILANCE)

The course focuses on the pharmacovigilance system for drug safety and advanced training for drug-induced disease evaluation.

노인 약물치료학 3 credit

(GERIATRIC PHARMACOTHERAPY)

We will compare various guidelines related to medication use of elderly patients and evaluate the pharmacotherapy of elderly patients in this course.

임상 영양학 3 credit

(CLINICAL NUTRITION)

In this course, the method of nutritional status evaluation and nutrition supply will be introduced and nutritional supply practice based on patient cases will be conducted.

단백질결정학 3 credit

(PROTEIN CRYSTALLOGRAPHY)

Protein crystallography is the powerful techniques used to determine protein structure at atomic resolution. Students will learn and discuss the theories of gene cloning, protein purification, crystallization, x-ray diffraction, and structure determination in this class.