

Pharmaceutical Sciences (PHRMSCI)

Courses

PHRMSCI 1. New Student Seminar. 1 Unit.

Weekly meetings consisting of presentations by faculty, professional staff, and Peer Academic Advisors provide information about the Pharmaceutical Sciences major, campus resources, learning skills, and special programs and opportunities.

Grading Option: Pass/Not Pass only

Restrictions: Pharmaceutical Sciences majors only. New students only.

PHRMSCI 3. Professional Development and Careers in the Pharmaceutical Sciences. 0 Units. 1 Workload Units.

Designed to help Pharmaceutical Science majors select a career track and prepare for graduate program applications and careers in industry.

Restrictions: Pharmaceutical Sciences majors only.

PHRMSCI 42. Life 101 . 2 Units.

Covers the latest scientific work on the impact of nutrition, exercise, and lifestyle choices on mental and physical health. Motivates students to make positive changes by fostering personal growth.

PHRMSCI 66. Gateway to Drugs. 4 Units.

Introduces students to human physiology, how drugs work, and where they come from, common health issues and the drugs used to treat them, and well-known recreational drugs.

(II)

PHRMSCI 76. Ethical Conduct of Research. 2 Units.

Covers the ethical responsibilities of biomedical scientists. Topics include, as discussions and case studies, the high standards of science, the responsible conduct of research, animal experimentation, and clinical trials as they relate to the pharmaceutical sciences.

PHRMSCI H80. Drugs and Society. 4 Units.

Where drugs come from, how drugs work, how and why people abuse drugs, the costs of drug abuse on society, which drugs are commonly abused, and how drug abuse can be prevented and treated. Course intended for non-science majors.

Prerequisite: Recommended: High school chemistry and biology.

Restrictions: Campuswide Honors Collegium only.

(II)

PHRMSCI 90. The Art of Public Speaking. 4 Units.

Students learn to effectively prepare and present public speeches and slide presentations. Included are storytelling, informative, commemorative, and persuasive speeches, and scientific presentation. Evaluating speeches and strategies to reduce speaker apprehension is also covered.

Restrictions: Pharmaceutical Sciences majors have the first consideration for enrollment.

PHRMSCI 120. Human Physiology. 4 Units.

Covers the function of the human body. All major organ systems are discussed. Designed to prepare students for healthcare careers, such as medicine, pharmacy, dentistry, and for research careers which require basic knowledge of how the human body functions.

Prerequisite: BIO SCI 97 and CHEM 1C.

Overlaps with BIO SCI E109.

PHRMSCI 120L. Human Physiology Lab. 2 Units.

Designed to complement PHRMSCI 120. Computer-based lab simulations are used to study the function of the human body. Class physically meet for review sessions and exams.

Prerequisite: BIO SCI 97 and CHEM 1C.

Overlaps with BIO SCI E112L.

PHRMSCI 121. Human Anatomy with Pathological Correlates. 5 Units.

Covers the forms of, and relationships between, the many anatomical components of the human body, including discussion of several pathological conditions of the body as they relate to anatomy.

Prerequisite: BIO SCI 97 and BIO SCI 98 and BIO SCI 99. Recommended: Organic Chemistry series is highly encouraged.

Overlaps with BIO SCI 136, BIO SCI 170.

Restrictions: Pharmaceutical Sciences majors have the first consideration for enrollment.

PHRMSCI 122. Medical Microbiology. 4 Units.

Introduces students to all of the traditional topics covered in a typical microbiology lecture. Emphasis on microorganisms that are medically important and drive human disease and mortality.

Prerequisite: BIO SCI 99 and CHEM 51C and BIO SCI E109.

PHRMSCI 122L. Medical Microbiology Laboratory. 3 Units.

An introduction to the structure, metabolism, cultivation, isolation, classification, and identification of the major groups of bacteria. Additional focus on identification of infection and use of antibiotics in diseased patients.

Prerequisite: BIO SCI 99 and CHEM 51C with a minimum grade of C-.

PHRMSCI 142. Healthspan Sciences. 4 Units.

Covers the complex and multi-factorial process of aging and increases the understanding of factors that contribute to enhanced lifespan, including basic principles of health and wellness and scientifically proven interventions, both pharmacological and non-pharmacological.

Prerequisite: BIO SCI 98 and BIO SCI 99 and PHRMSCI 120.

PHRMSCI 155. Neuropsychopharmacology. 4 Units.

Mechanisms underlying chemical signaling processes in the nervous system. Fundamental knowledge for understanding the cellular and molecular actions of drugs and their mechanisms of action on synaptic transmission. Applied neuropsychopharmacology including major drug classes and therapeutic uses.

PHRMSCI 163. Pharmacogenomics and Epigenetics. 4 Units.

Survey of the genetic and epigenetic basis of inter-subject variability in response to drugs. Covers drug efficacy, safety, and need for their optimization in pharmacotherapy. Emphasizes genetic mechanisms of polymorphisms in the pharmacokinetics and pharmacodynamics of representative therapeutic drugs.

Prerequisite: BIO SCI 99.

Concurrent: PHRMSCI 263

PHRMSCI 170A. Molecular Pharmacology I. 4 Units.

Molecular basis of drug-receptor action at the molecular and cellular levels. Structure-function of drug targets emphasizing enzymes, ion channels, and membrane transport proteins. Understanding how the drugs' mechanisms of action contribute to the development of more efficacious and safer drugs.

Corequisite: CHEM 51C.

Prerequisite: (CHEM 51C or CHEM H52C) and (PHRMSCI 120 or BIO SCI E109).

Restrictions: Pharmaceutical Sciences majors have the first consideration for enrollment.

PHRMSCI 170B. Molecular Pharmacology II. 4 Units.

Introductory survey covering the molecular mechanisms of drugs that target the nervous system, such as anxiolytics, antidepressants, antipsychotics, hypnotics, muscle relaxants, and recreational drugs; drugs related to the immune system, including antibiotics, antihistamines, and immunosuppressants; drugs used to treat cancer.

Prerequisite: PHRMSCI 170A.

PHRMSCI 171. Physical Biochemistry. 4 Units.

Thermodynamics and kinetic fundamentals as applied to problems relevant to pharmaceutical sciences such as receptor/enzyme-ligand interactions. Fundamentals of biophysical methods used in the pharmaceutical sciences including structure determination and biomolecular spectroscopy.

Prerequisite: (PHYSICS 3C or PHYSICS 7E) and (CHEM 1C or CHEM H2C) and BIO SCI 99.

Restrictions: Pharmaceutical Sciences majors have the first consideration for enrollment.

PHRMSCI 172. Topics in Pharmaceutical Sciences. 2 Units.

Presents information about various fields of research, study, careers, and graduate school opportunities in pharmaceutical sciences. Taught by guest lecturers from various disciplines including 199 research course faculty. Helps Pharmaceutical Sciences students select electives appropriate to their future goals.

Corequisite: CHEM 51C or CHEM H52C.

Grading Option: Pass/Not Pass only

PHRMSCI 173. Pharmacotherapy. 4 Units.

An exploration of the clinical application of medications to selected disease states. Focus is on an understanding of underlying principles of pharmacology and how this knowledge can be applied to treatment of diseases.

Prerequisite: PHRMSCI 170B (may be taken concurrently).

PHRMSCI 174. Biopharmaceutics and Nanomedicine. 4 Units.

Introduces theories and tools of new drug formulations. Particularly new novel therapeutics based on biological materials, pathological characteristics utilized to achieve the maximum efficacy and specificity, and drug delivery systems based on emerging nanotechnology are extensively discussed.

Prerequisite: PHRMSCI 177 and PHRMSCI 177L.

Restrictions: Pharmaceutical Sciences majors have the first consideration for enrollment.

PHRMSCI 174L. Biopharmaceutics and Nanomedicine Lab. 3 Units.

Introduction to cancer drug screening using cellular models, and confirmation of comprehensive therapeutic efficacy using a live animal model. Includes basic cell culture, cytotoxicity assays, cell analysis, drug circulation test, and tumor eradication and imaging experiments. Materials Fee

Corequisite: PHRMSCI 174.

Prerequisite: PHRMSCI 177 and PHRMSCI 177L.

(Ib)

PHRMSCI 175. Drug Discovery Computing Techniques. 4 Units.

Techniques used in computer-aided drug discovery, including theory behind these techniques and practical applications. Topics include scientific computing; python; classical force fields and simulations; visualization and movie-making; quantum mechanics in drug discovery; molecular dynamics; solvation models; and several others.

Prerequisite: CSE 41 or I&C SCI 31. CSE 42 or I&C SCI 32 is recommended.

Concurrent: PHRMSCI 275

PHRMSCI 177. Medicinal Chemistry. 4 Units.

An introduction of the basics of drug activity and mechanisms. Strategies used to identify lead compounds such as natural product chemistry, combinatorial chemistry, molecular modeling, and high-throughput screening. Relationship of molecular structure to pharmacological activity. Prerequisite: CHEM 51A and CHEM 51B and CHEM 51C and (BIO SCI 98 or CHEM 128).

Same as CHEM 177

Restrictions: Pharmaceutical Sciences majors have the first consideration for enrollment.

PHRMSCI 177L. Medicinal Chemistry Laboratory. 3 Units.

An introduction of the basics of drug activity and mechanisms. Strategies used to identify lead compounds such as natural product chemistry, combinatorial chemistry, molecular modeling, and high-throughput screening. Relationship of molecular structure to pharmacological activity. Materials Fee

Corequisite: PHRMSCI 177 or CHEM 177.

Prerequisite: CHEM 51A and CHEM 51B and CHEM 51C and (BIO SCI 98 or CHEM 128).

Same as CHEM 177L

Restrictions: Pharmaceutical Sciences majors have the first consideration for enrollment.

(Ib)

PHRMSCI 179. Emerging Technologies in Pharmaceutical Sciences and Medicine. 4 Units.

Introduces emerging, ground-breaking technologies in pharmaceutical sciences and medicine, including pharmacogenomics, genome editing, and stem cell and engineered T cell therapies. Explores these novel technologies with both their underlying theories and forward-thinking applications.

Concurrent: PHRMSCI 279

PHRMSCI 197. Professional Internship. 1-4 Units.

Provides students with opportunity to develop leadership and professional skills necessary for competitive placement in their chosen industry. Students gain new and field-specific skills outside the classroom environment while participating in a supervised internship for a total of 100 hours.

Grading Option: Pass/Not Pass only

Repeatability: May be taken unlimited times

Restrictions: Seniors only.

PHRMSCI 198. Independent Study in Pharmaceutical Sciences. 1-4 Units.

Students interested in independent study should arrange with a faculty member to sponsor and supervise such work. A time commitment of three hours per week per unit is expected. A written report is required at the end of each quarter.

Repeatability: May be taken for credit for 4 units

PHRMSCI 199. Undergraduate Research. 1-4 Units.

Original research in the laboratory of Pharmaceutical Sciences faculty. Attendance at regular research group meetings is also generally expected, and a quarterly written report is required. Strongly recommended for students considering research careers and/or graduate degree programs.

Repeatability: May be taken unlimited times

PHRMSCI H199. Honors Research in Pharmaceutical Sciences. 1-4 Units.

Undergraduate honors research in Pharmaceutical Sciences. A student time commitment of 10-15 hours per week is required.

Repeatability: May be taken unlimited times

PHRMSCI 223. Biological Macromolecules. 4 Units.

Introduction to nucleic acid and protein structure, dynamics, and function. Topics include analytical methods, molecular evolution, folding, and catalysis.

Same as CHEM 223

PHRMSCI 241. Advanced Topics in Pharmacology. 2 Units.

Application of pharmacological principles in disease therapy. Advanced pharmacological mechanisms and in-depth study of drug action. Discussion of several major drug classes/therapeutic strategies: molecular mechanisms of action, physiological consequences of administration, and clinical use.

PHRMSCI 242. Healthspan Sciences. 4 Units.

Covers the complex and multi-factorial process of aging and increases the understanding of factors that contribute to enhanced lifespan, including basic principles of health and wellness and scientifically proven interventions, both pharmacological and non-pharmacological.

Prerequisite: Recommended: Undergraduate courses in biochemistry, molecular biology, and basic physiology.

Concurrent: PHRMSCI 142

PHRMSCI 250A. Current Topics in Pharmaceutical Sciences. 1 Unit.

Intended to expose students to the primary literature and current research in the field of Pharmaceutical Sciences. Students analyze and present information for discussion. Guest speakers from academia and industry may participate throughout the quarter.

Grading Option: Satisfactory/Unsatisfactory only

Repeatability: May be taken for credit 3 times

Restrictions: Mathematical and Computational Biology majors only.

PHRMSCI 250B. Current Topics in Pharmaceutical Sciences. 1 Unit.

Intended to expose students to the primary literature and current research in the field of Pharmaceutical Sciences. Students analyze and present information for discussion. Guest speakers from academia and industry may participate throughout the quarter.

Prerequisite: PHRMSCI 250A with a minimum grade of B-.

Grading Option: Satisfactory/Unsatisfactory only

Repeatability: May be taken for credit 3 times

Restrictions: Mathematical and Computational Biology majors only.

PHRMSCI 250C. Current Topics in Pharmaceutical Sciences. 1 Unit.

Intended to expose students to the primary literature and current research in the field of Pharmaceutical Sciences. Students analyze and present information for discussion. Guest speakers from academia and industry may participate throughout the quarter.

Prerequisite: PHRMSCI 250B with a minimum grade of B-.

Grading Option: Satisfactory/Unsatisfactory only

Repeatability: May be taken for credit 3 times

Restrictions: Mathematical and Computational Biology majors only.

PHRMSCI 251. Experimental Pharmacology. 4 Units.

Introduction to the concepts and techniques used in pharmacological science. Molecular biology, quantitative and biochemical pharmacology, fluorescent probes, behavior, genetics, animal handling, anatomical and receptor binding analysis, methods for ion channel study, the absorption, distribution, metabolism, and elimination of drugs.

PHRMSCI 254. Introduction to Pharmacology. 4 Units.

Ligand-gated ion channels, G protein-coupled receptors, receptor tyrosine kinases, ligand-regulated transcription factors, their signaling mechanisms, trafficking, macromolecular complexes, and physiological responses.

PHRMSCI 255. Neuropharmacology. 2 Units.

Mechanisms underlying chemical signaling processes in the brain and periphery. Molecular biology, signal transduction, transmitter synthesis, and inactivation of major neurotransmitter systems. Drugs that act on these major neurotransmitters.

PHRMSCI 256. Experimental Design for Pharmacologists. 1 Unit.

Population and sample statistics, hypothesis testing, analysis of variance, nonparametric statistics, experimental design, power, and the use of statistical computer software.

Prerequisite: PHARM 251 with a minimum grade of B-.

PHRMSCI 257. Ethics in Research. 1 Unit.

Ethical conduct in research including data handling, authorship, conflict of interest, animal rights, handling of misconduct.

Prerequisite: PHARM 299 with a minimum grade of B-.

Repeatability: May be taken for credit 2 times

PHRMSCI 263. Pharmacogenomics and Epigenetics. 4 Units.

Survey of the genetic and epigenetic basis of inter-subject variability in response to drugs. Covers drug efficacy, safety, and the need for their optimization in pharmacotherapy. Emphasizes genetic mechanisms of polymorphisms in the pharmacokinetics and pharmacodynamics of representative therapeutic drugs.

Concurrent: PHRMSCI 163

PHRMSCI 272. Special Topics in Pharmaceutical Sciences. 2-4 Units.

Reserved for current topics of particular interest in areas of pharmaceutical sciences that are not covered by other courses. The subject will vary from year to year, highlighting, for example, significant emerging fields or highly specialized but vital research areas.

Repeatability: May be taken unlimited times as topics vary

PHRMSCI 275. Drug Discovery Computing Techniques. 4 Units.

Techniques used in computer-aided drug discovery, including theory behind these techniques and practical applications. Topics include scientific computing; python; classical force fields and simulations; visualization and movie-making; quantum mechanics in drug discovery; molecular dynamics; solvation models; and several others.

Concurrent: PHRMSCI 175

PHRMSCI 277. Medicinal Chemistry. 4 Units.

Fundamentals of medicinal chemistry covering diverse aspects of drug design, discovery, synthesis, and development. Molecular basis of drug action with an emphasis on the structure-to-function continuum.

PHRMSCI 279. Emerging Technologies in Pharmaceutical Sciences and Medicine. 4 Units.

Introduces emerging, ground-breaking technologies in pharmaceutical sciences and medicine, including pharmacogenomics, genome editing, and stem cell and engineered T cell therapies. Explores these novel technologies with both their underlying theories and forward-thinking applications.

Concurrent: PHRMSCI 179

PHRMSCI 298. Research Seminar. 2 Units.

Presentation and discussion of current problems and methods in teaching and research in pharmaceutical sciences.

Repeatability: May be taken unlimited times

PHRMSCI 299. Graduate Research. 1-12 Units.

Supervised original research or investigation under the direction of an individual faculty member.

Repeatability: May be taken unlimited times

PHRMSCI 399. University Teaching. 1-4 Units.

Limited to Teaching Assistants.

Grading Option: Satisfactory/Unsatisfactory only

Repeatability: May be taken unlimited times