

PHARMACEUTICAL SCIENCES (PHSC)

PHSC 5915 - Modern Drug Design & Drug Action (2 Credits)

The course explores the modern drug discovery and development processes and, utilizing clinical examples, establishes the ability of students to rationalize and predict how the chemical structure of a drug influences its medicinal properties and routes of metabolism. Crosslisted with PHRD 5915.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHSC 6015 - Pharmacokinetics (3 Credits)

The influence of physiological and pathophysiological factors on drug levels is considered. Knowledge gained allows students to calculate appropriate dosing of drugs in patients and anticipate how drug doses should be adjusted in disease and the presence of other drugs.

Crosslisted with PHRD 6015.

Grading Basis: Letter Grade

Typically Offered: Fall.

PHSC 6710 - Cannabis Therapeutics Neurology/Mental Health (2 Credits)

The evidence-based risks and benefits of cannabis and/or FDA-approved and investigational cannabis-derived drugs will be discussed in epilepsy and movement disorders, sleep, and migraine. Cannabis use in various mental health conditions will be presented, including depression, anxiety, post-traumatic stress, and schizophrenia. Requisite: Crosslisted with PCSM 6710.

Grading Basis: Letter Grade

Typically Offered: Fall.

PHSC 6720 - Cannabis Therapeutics: Pain, Oncology (2 Credits)

The evidence-based risks and benefits of cannabis and/or FDA-approved and investigational cannabis-derived drugs will be discussed in management of various types of pain, and their supportive role in oncology. Patient safety considerations, including drug-cannabis interactions, and at-risk populations with cannabis use will be presented.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHSC 6730 - Legal & Regulatory Issues in Cannabis Medicine (2 Credits)

The legal history of cannabis and industrial hemp in the United States and the current diversity of state and federal regulations governing the sale and use of cannabis and cannabis-derived medicinal and retail products will be discussed, as well as how these regulations influence basic science and clinical research on cannabis.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHSC 6856 - Master's Independent Study (1-4 Credits)

Grading Basis: Letter Grade

Repeatable. Max Credits: 4.

PHSC 6860 - Pract-Pub Health (1-18 Credits)

Grading Basis: Letter Grade

Repeatable. Max Credits: 18.

Additional Information: Colorado State University.

PHSC 6925 - Medicinal Chemistry (2 Credits)

This course examines the mechanism of action of drugs for several drug classes, providing foundational knowledge of drug classification by chemical structure, mechanism of drug action, how targeted therapies were developed based on knowledge of the molecular target and how adverse effects can often be predicted. Crosslisted with PHRD 6925

Grading Basis: Letter Grade

Typically Offered: Spring.

PHSC 6950 - Master's Thesis BMSC (1-10 Credits)

Grading Basis: Letter Grade

Repeatable. Max Credits: 10.

Additional Information: Report as Full Time.

PHSC 6951 - Master's Research in Pharmaceutical Sciences (1-6 Credits)

Students in the MS in Pharmaceutical Sciences program will conduct independent research under a faculty mentor in their specialty area of cannabis science & medicine, clinical pharmacokinetics & pharmacodynamics, drug discovery, molecular & systems toxicology, or pharmaceutical biotechnology & drug delivery.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PHSC 6990 - Capstone Project in Pharmaceutical Sciences (3 Credits)

Students in the MS in Pharmaceutical Sciences program will complete a capstone, literature review paper under faculty mentor guidance in their specialty area of cannabis science & medicine, clinical pharmacokinetics & pharmacodynamics, drug discovery, molecular & systems toxicology, or pharmaceutical biotechnology & drug delivery.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring, Summer.

PHSC 7025 - Pharmacogenomics (2 Credits)

This course provides students with an understanding of how genetic factors influence drug disposition, response, and adverse effects.

Knowledge gained from this course will enhance students' ability to apply genetic information to pharmacy practice and select the most appropriate therapeutic intervention(s). Crosslisted with PHRD 7025.

Grading Basis: Letter Grade

Typically Offered: Fall.

PHSC 7305 - Hands On Proteomics Workshop (1 Credit)

4-day intensive hands-on workshop designed to provide comprehensive view of proteomics. Appropriate for individuals with little/no experience in mass spectrometry and/or high performance liquid chromatography.

Participants learn introductory proteomics science and applicable protocols/technologies through extensive hands-on experience.

Prerequisite: IDPT 7811, IDPT 7812, IDPT 7813, IDPT 7814, IDPT 7815 and Instructor permission.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring, Summer.

PHSC 7310 - Fundamentals of Pharmaceutical Sciences (3 Credits)

Core course explores key aspects of Pharmaceutical Sciences. Major themes will focus on macromolecular interactions, pharmaceuticals, pharmacokinetics, pharmacodynamics, apoptosis, signal transduction and immunology. Critical thinking and problem solving skills will be emphasized via lectures, discussions and computer-based data analyses. Crosslisted with TXCL 7310.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHSC 7320 - Physical Pharmacy & Pharmaceutical Sciences (3 Credits)

This course is designed to provide students with a thorough overview of physical chemical principles vital to Pharmaceutical Sciences; a course for someone whose research efforts will involve pharmaceutical development and/or the evaluation of drugs. Cross list with TXCL 7320.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

PHSC 7326 - Clinical Pharmacokinetics & Pharmacodynamics Journal Club (1 Credit)

This course will comprise discussions and presentations of contemporary journal articles, or research in progress related to clinical pharmacokinetics and pharmacodynamics. Two-term course, 1 credit each term, must attend both terms to receive grade. Two term course, 1 credit each term, must attend both terms

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 2.

Typically Offered: Fall, Spring.

PHSC 7328 - Computational Design in Drug Discovery (3 Credits)

This course covers the theory and application of computational modeling to drug design and development. Students will be trained in multiple computational techniques and will perform an independent drug design project to be presented at the end of the course.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

PHSC 7330 - Development of Drugs and Biologics (3 Credits)

A survey course designed to introduce students to pharmacokinetic and pharmacodynamics principals used in drug research and development by faculty of the Skaggs School of Pharmacy, Department of Pharmaceutical Sciences. The Phoenix Winnonlin Computer software, is used to complete homework. Cross listed with TXCL 7330

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHSC 7340 - Molecular Biophysics and Enzymology (2 Credits)

This course will present advanced topics in thermodynamics, kinetics, macromolecular interactions, and enzymology. Underlying theory and applications as found in the literature will be discussed. It is intended for those with a specialized research interest in the subject. Prerequisite: For students in the Pharmaceutical Sciences with research interest in subject

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHSC 7341 - Grad Phys/Path Therap 2 (3 Credits)

Grading Basis: Letter Grade

PHSC 7345 - Nanotechnology & Drug Delivery (2 Credits)

Course presents physicochemical and biological principles of drug delivery including drug delivery system design for various applications. In addition it will address principles of nanotechnology related to the design of nanosize delivery systems intended for drug delivery, imaging and diagnosis. Restrictions: Student should be enrolled in a graduate or equivalent program. Crosslisted: BIOE 7345

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

PHSC 7350 - Proteins (3 Credits)

Chemical and physical basis for protein structure, folding, function and stability; role of molecular dynamics, use of molecular simulations in investigations of protein-ligand and protein interactions; methods and principles of protein/peptide purification and enzyme catalysis, including electron transfer and mutagenesis. Crosslisted: BMST 7350.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Spring.

PHSC 7353 - Pharmacogenetics (2 Credits)

Grading Basis: Letter Grade

PHSC 7370 - Business Issue/Phrm Biot (2 Credits)

Grading Basis: Letter Grade

PHSC 7400 - Ethical Issues in Toxicology & Pharmaceutical Sciences (1 Credit)

The purpose of this course is to expose students to ethical issues in the fields of toxicology and pharmaceutical sciences. Emphasis will be placed on research conduct, animal use, and other timely issues relevant in these fields. Crosslisted: TXCL 7400.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall.

PHSC 7405 - Hands-On Metabolomics Workshop (1 Credit)

A 4-day intensive hands-on workshop that provides a comprehensive view of metabolomics. Participants will learn introductory metabolomics science and applicable protocols/technologies. Appropriate for individuals with little to no experience in mass spectrometry and who will use this technology in their research. Requisite- One year of full-time biomedical graduate study and instructor permission

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

PHSC 7452 - Introduction to Clinical Pharmacology (3 Credits)

The course provides students with a foundational knowledge of clinical pharmacology, including pharmacokinetics, drug metabolism, assessment of drug effects, optimizing patient therapy and drug discovery and development. It is grounded in weekly topical lectures, supplemented by readings, discussion and assignments. Requisite: Permission of Course Director.

Grading Basis: Letter Grade

A-GRAD Restricted to graduate students only.

Typically Offered: Fall, Spring.

PHSC 7453 - Introduction to the Pharmaceutical Industry (2 Credits)

Elective hybrid between lectures offered through online learning and live interactive courses. Class attendance on campus for 7 weekly classes and 8 others will be completed online. Students will be required to participate in a live (in-person) or teleconferenced (Zoom) presentation. See syllabus for more information.

Grading Basis: Letter Grade

Typically Offered: Fall.

PHSC 7472 - Grad Med Chemistry I (3 Credits)

Grading Basis: Letter Grade

PHSC 7473 - Gr Medicinal Chemistry 2 (3 Credits)

Grading Basis: Letter Grade

PHSC 7480 - Fundmntl Drug Dev/Action (5 Credits)

Grading Basis: Letter Grade

PHSC 7565 - Applied Statistics for Pharm Science and Toxicology (2 Credits)

Students will learn several basic statistical techniques for analyzing data including when and how to use them, the appropriate assumptions for these methods, and how to clearly articulate their statistical results in the context of toxicology and pharmaceutical sciences studies. Prerequisite: Pharmaceutical Sciences and Toxicology graduate students
Grading Basis: Letter Grade
Typically Offered: Fall.

PHSC 7568 - Seminar in the Pharmaceutical Sciences (2 Credits)

Discusses current literature and research in the pharmaceutical sciences. Requisites: Required for 1st through 3rd year Pharmaceutical Sciences grad students in conjunction with attendance at all Seminars in the Dept. of Pharmaceutical Sciences. (DOPS) Grad Program Seminar Series.
Grading Basis: Letter Grade
Repeatable. Max Credits: 6.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring.

PHSC 7571 - Prin & Mech Drug Act 2 (4 Credits)

Grading Basis: Letter Grade

PHSC 7572 - Principles & Mechanisms of Drug Action 3 (2-4 Credits)

Grading Basis: Letter Grade
Repeatable. Max Credits: 4.

PHSC 7608 - Molecular Interactions (3 Credits)

Provides chemical/physical basis for protein structure, folding, function & stability; presents methods/principles of protein/peptide purification & enzyme catalysis including electron transfer & mutagenesis. The role of molecular dynamics & use of molecular simulations in the investigations of protein-ligand/protein-protein interactions. Cross listed with STBB 7608.

Grading Basis: Letter Grade
Typically Offered: Spring.

PHSC 7609 - Biophysics & Spectroscopy (3 Credits)

This course will teach fundamentals of modern molecular spectroscopies and biophysical techniques as applied to biomolecules and the structural/dynamic information they afford. Cross listed with STBB 7609.
Grading Basis: Letter Grade
Typically Offered: Spring.

PHSC 7649 - Intro Mod Biotechnology (1 Credit)

Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.

PHSC 7650 - Research Rotation Pharmaceutical Sciences (1-10 Credits)

Research work in pharmaceutical sciences. Prereq: Consent of Instructor.
Grading Basis: Letter Grade with IP
Repeatable. Max Credits: 10.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring, Summer.

PHSC 7651 - Pharmaceutical Biotechnology (3 Credits)

Course covers role of bioengineering in development of pharmaceutical biotechnology products. In particular, the student will learn to apply solution thermodynamics as well as mass and heat transfer concepts to the stabilization/formulation of macromolecules and production of drug delivery systems. Crosslisted: CU Boulder CHEN 5900.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Fall.

PHSC 7653 - Protein Formulation (2 Credits)

This course will provide instruction in rational design of stable therapeutic protein formulations with emphasis on the practical and mechanistic aspects of developing aqueous solution and freeze-dried formulations. Students will read papers from the literature and participate in critical discussions.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

PHSC 7658 - Advanced Topics in Pharmaceutical Sciences (1-5 Credits)

Considers special topic of current interest in pharmaceutical sciences. Course may be repeated for credit with the instructor's approval.
Restriction: Consent of Instructor.
Grading Basis: Letter Grade
Repeatable. Max Credits: 6.
A-GRAD Restricted to graduate students only.
Typically Offered: Fall, Spring.

PHSC 7660 - Liposome-based Drug Delivery (2 Credits)

This literature-based course briefly reviews the fundamental physiochemical characteristics of lipid membranes and then rigorously discusses how these properties are exploited for drug delivery. This course focuses on how current liposome technology overcomes the barriers to successful delivery.
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

PHSC 7665 - Pharmacokinetic Principles & Applications (3 Credits)

A survey course to introduce students to pharmacokinetic and pharmacodynamics principles used in drug research and development. Taught by faculty from the School of Pharmacy, Department of Pharmaceutical Sciences. Phoenix Winnonlin Computer software will be used in the course. Cross-listed with TXCL 7665
Grading Basis: Letter Grade
A-GRAD Restricted to graduate students only.
Typically Offered: Spring.

PHSC 7667 - Population Pharmacokinetic Modeling (3 Credits)

This course will allow students to gain knowledge, expertise and experience with population pharmacokinetic (PK) and pharmacodynamic (PD) models and software used to perform data analysis. Students will have the opportunity to practice their modeling skills while being introduced to a broad range of relevant approaches. Requisite: Prerequisite: PHSC 7665 - Pharmacokinetic Principles & Applications
Grading Basis: Letter Grade
Typically Offered: Fall.

PHSC 7700 - Cannabis Pharmacology & Physiology (3 Credits)

This course addresses the history, botany, medicinal chemistry and pharmacology of active constituents in cannabis and hemp, with particular emphasis on their interplay with endogenous cannabinoids and the endocannabinoid system of the body. FDA-approved cannabinoid products and synthetic cannabinoids will also be discussed.
Grading Basis: Letter Grade
Typically Offered: Fall, Spring.

PHSC 7705 - Scientific Writing in Cannabis Science & Medicine (1 Credit)

This practical course will cultivate the students' ability to communicate scientific and regulatory information to appropriate audiences, ranging from the general public to the cannabis industry and state agencies who regulate cannabis.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHSC 7710 - Chemical Analysis of Cannabis (2 Credits)

This course will review the current state of cannabis research methodologies, including the extraction of plant materials, biochemical analysis and isolation of bioactive constituents. This didactic component will also include practical considerations of cannabis chemistry and research applications.

Grading Basis: Letter Grade

Typically Offered: Spring.

PHSC 7711 - Chemical Analysis of Cannabis Laboratory (1 Credit)

This laboratory companion course of PHSC/PCSM 7710 will provide practical experience with the extraction of plant materials spiked with cannabinoid reference standards, separation techniques, isolation and quantification of bioactive compounds, and mass spectrometry methods for compound identification. Prerequisite: PHSC 7710 or PCSM 7710 must be taken first or concurrently

Grading Basis: Letter Grade

Typically Offered: Spring.

PHSC 7720 - Seminar in Cannabis Science & Medicine (1 Credit)

This course allows students to practice critical thinking about literature pertinent to the pharmaceutical sciences, with a focus on cannabis science and medicine. The overall goal is to broaden students' scientific knowledge and provide practical experience in the critical evaluation and discussion of current and historical literature.

Grading Basis: Letter Grade

Typically Offered: Fall, Spring.

PHSC 8990 - Doctoral Thesis (1-10 Credits)

Doctoral thesis work in pharmaceutical sciences. Prereq: Consent of Instructor.

Grading Basis: Letter Grade with IP

Repeatable. Max Credits: 99.

A-GRAD Restricted to graduate students only.

Additional Information: Report as Full Time.

Typically Offered: Fall, Spring, Summer.