DEPARTMENT OF PHARMACEUTICAL AND ENVIRONMENTAL HEALTH SCIENCES

The Department of Pharmaceutical Sciences, along with the Department of Pharmacy Practice and Administration, offers courses leading to the **Doctor of Pharmacy Degree.** The Doctor of Pharmacy (Pharm.D.) is a six-year program requiring a minimum of two years of study at the pre-professional (pre-pharmacy) level and four years of study at the professional level. Courses offered through this department include the following disciplines: biochemistry in human diseases, pharmaceutics, pharmacokinetics, and integrated courses including pharmaceutical/medicinal chemistry, pathophysiology, and pharmacology.

The Department of Pharmaceutical Sciences offers a B.S. in Biomedical Science. The **Biomedical Science Program** teaches fundamental biomedical science principles with a focus of understanding diseases and treatments. This major will provide students the opportunity to acquire the fundamentals for all health care and health care related professions with the aim of improving overall human health. Students may select a concentration in Pre-Pharmacy, Pharmaceutical Sciences, or Health Administration. Positions which may be available to these graduates include: pharmaceutical marketing, drug discovery, biomedical research, disease control, pharmaceutical scientists, medical writing, health educator, medicinal chemist, biotechnologist, etc.

Students should refer to program admission policies, comprehensive examination information, and other important information regarding the B.S. degree offered through this department within the College of Pharmacy and Health Sciences introductory section of this document.

The Department of Pharmaceutical Sciences also offers courses leading to the **Doctor of Philosophy (Ph.D.) degree** and **Master of Science (M.S.) degree in Pharmaceutical Sciences.** Students who are interested in pursuing a graduate degree in Pharmaceutical Sciences should consult the Graduate School Bulletin of Texas Southern University for further information or visit the website (www.tsu.edu (http://www.tsu.edu/)).

Members of the faculty in the Department of Pharmaceutical Sciences are housed in Gray Hall with the Department Office located in Gray Hall Room 124. The Department supports the primary mission of the College of Pharmacy and Health Sciences to produce quality health care professionals, particularly minorities who are competent in health care delivery including the provision of patient-centered care and other health care services and programs.

Since the Department offers courses leading to the entry-level Pharm.D. with the Department of Pharmacy Practice and Administration (described in the next section), interested students should refer to the end of the next section for a summary of requirements for the entry-level Pharm.D. degree and the sequence in which required courses should be taken. Courses offered through the Department of Pharmaceutical Sciences are described below.

Students should refer to admission policies, formative, summative, comprehensive and other examination and important information regarding the completion of the entry-level Pharm.D. under the College of Pharmacy and Health Sciences Overview section of this document.

- Biomedical Science (Health Administration Concentration), Bachelor of Science (https://catalog.tsu.edu/undergraduate/schools-colleges/pharmacy-health-sciences/pharmaceutical-environmental-health-sciences/biomedical-science-health-administration-concentration-bs/)
- Biomedical Science (No Concentration), Bachelor of Science (https://catalog.tsu.edu/undergraduate/schools-colleges/pharmacy-health-sciences/pharmaceutical-environmental-health-sciences/biomedical-science-bs/)
- Biomedical Science (Pharmaceutical Sciences Concentration), Bachelor of Science (https://catalog.tsu.edu/undergraduate/schools-colleges/pharmacy-health-sciences/pharmaceutical-environmental-health-sciences/biomedical-science-pharmaceutical-sciences-concentration-bs/)
- Biomedical Science (Pre-Pharmacy Concentration), Bachelor of Science (https://catalog.tsu.edu/undergraduate/schools-colleges/pharmacy-health-sciences/pharmaceutical-environmental-health-sciences/biomedical-science-prepharmacy-concentration-bs/)
- Biomedical Science (Pre-Pharmacy Concentration, Accelerated 3+4 PharmD), Bachelor of Science (https://catalog.tsu.edu/undergraduate/schools-colleges/pharmacy-health-sciences/pharmaceutical-environmental-health-sciences/biomedical-science-pre-pharmacy-concentration-3-plus-4-PhamrD/)
- Environmental Health, Bachelor of Science (https://catalog.tsu.edu/undergraduate/schools-colleges/pharmacy-health-sciences/pharmaceutical-environmental-health-sciences/environmental-health-bs/)

Health Sciences Core Courses

HSCR 150 Concepts Of Health (3 Credits)
Lecture: 3, **Lab:** 0
Concepts of Health (3) Overview of the health care industry and its transition from the past to the present via the scientific process and analysis of relationships among selected health problems. Three hours of lecture per week.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

HSCR 260 Biomedical Ethics (3 Credits)
Lecture: 3, **Lab:** 0
Biomedical Ethics (3) Comprehensive study of ethical rules, principles, and theories; their application to contemporary moral issues/dilemmas; and their impact on the legal, social, and medical communities. Three hours of lecture per week. Prerequisite: HSCR 150 or concurrent enrollment.
Prerequisite(s): HSCR 150 (may be taken concurrently)
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

HSCR 300 Hlth Sciences Sem (1 Credits)
Lecture: 1, **Lab:** 0
Health Sciences Seminar (1) Exposure to current social, political, and economics issues; their impact on specific health disciplines via discussions, simulations, and presentations. One hour of lecture per week. Prerequisite: HSCR 150 or concurrent enrollment.
Prerequisite(s): HSCR 150 (may be taken concurrently)
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

HSCR 360 Princ Of Disease (3 Credits)
Lecture: 3, **Lab:** 0
Principles of Disease (3) Comprehensive study of principles and concepts in human disease focusing on the cellular and mechanistic processes involved in disease and the clinical and physiological manifestations that result. Etiology, pathogenesis, treatment, prognosis and research relative to human disease and health are stressed. Three hours of lecture per week.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

HSCR 361 Research For Hlth Prof (3 Credits)
Lecture: 3, **Lab:** 0
Research for Health Professionals (3) Review of the basic techniques and the principles of the research process in health facilities. Enrollees must perform quantitative health research using computer applications. Three hours of lecture per week.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSCR 1346 Substance Use & Abuse (3 Credits)
Lecture: 3, **Lab:** 0
This course provides instruction in the current use and abuse of drugs in today's society. Emphasis is placed on physiological, sociological and psychological factors involved in the use and abuse of drugs. This course also will include instruction in the personal, legal and societal consequences of substance abuse. This course is equivalent to TCCNS course PHED 1346.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

Pharmaceutical Science Courses

PHAR 111 Pharmacy Orientation (1 Credits)
Lecture: 1, **Lab:** 0
Pharmacy Orientation (1) Survey of the pharmacy profession with emphasis on history, ethics, careers, and professional organizations. One hour of lecture per week.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

PHAR 112 Pharmacy Orientation (1 Credits)
Lecture: 1, **Lab:** 0
Pharmacy Orientation (1) Survey of the pharmacy profession with emphasis on history, ethics, careers, and professional organizations. One hour of lecture per week.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 211 Pharmacy Applications (1 Credits)
Lecture: 2, **Lab:** 0
Pharmacy Applications (1) Study of the fundamental principles underlying the science and practice of pharmacy in the United States. One hour of lecture per week. Prerequisites: PHAR 111, PHAR 112 and successful completion of freshman biology and chemistry courses.
Prerequisite(s): (PHAR 111 and PHAR 112)
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 212 Medical Terminology (1 Credits)
Lecture: 1, **Lab:** 0
Medical Terminology (1) Programmed course of study building medical words from Greek and Latin prefixes, suffixes, word roots, and combining forms. Professional students are required to complete this course. One hour of lecture per week.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

PHAR 426 Pathophysiology (2 Credits)
Lecture: 2
Principles and concepts about human diseases and their pathophysiological nature. Emphasis will be placed on common significant diseases and evidence based medical science and practice.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 428 Pharmacolocy (2 Credits)
Lecture: 2
Principles of pharmacology forming the basis for drug therapy.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 433 Pharmaceutics I Calculations (3 Credits)
Lecture: 3, **Lab:** 0
Pharmaceutics I - Calculations (3) Problems, calculations, and processes involving weights and measures, specific gravity, percentage, solutions, and alligations peculiar to pharmacy and related sciences. Three hours of lecture per week. Prerequisite: First professional year standing in the College of Pharmacy and Health Sciences. Corequisite: Concurrent enrollment in PHAR 413.
Prerequisite(s): PHAR 413 (may be taken concurrently)
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 434 Pharmaceutics II Dosage Forms (3 Credits)
Lecture: 3
Pharmaceutics II - Dosage Forms I (3) Biopharmaceutics and the application of physicochemical principles with applications to drugs, dosage forms, and drug action. Three hours of lecture per week. Prerequisites: PHAR 413 and PHAR 433. Corequisite: Concurrent enrollment in PHAR 414.
Prerequisite(s): (PHAR 433 and PHAR 413 and PHAR 414 (may be taken concurrently))
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 414 Pharmaceutics II Lab (1 Credits)
Lab: 3
Pharmaceutics II Laboratory (1) Demonstrations, case studies, recitation, simulations, presentations, and small group discussions to accompany PHAR 434. Three hours of laboratory per week. Prerequisite/Corequisite: Successful completion of or concurrent enrollment in PHAR 434.
Prerequisite(s): PHAR 434 (may be taken concurrently)
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 539 Pharm III Pharmacokinetics (3 Credits)
Lecture: 3
Basic principles of in vivo drug kinetics (linear and nonlinear), principles of bioavailability/bioequivalence, and factors that affect bioavailability of a drug such as physio-chemical properties, dosage formulations, and physiological factors. Prerequisites: PHAR 434, PHAR 414, and completion of all 400-level courses in the professional pharmacy program. Co-requisite: Successful completion of or concurrent enrollment in PHAR 519.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 519 Pharm III Pharmacokinetics Lab (1 Credits)
Lab: 3
Examples and problems utilizing pharmacokinetic principles as applied to drug therapy. Prerequisites: PHAR 434, PHAR 414, and completion of all 400-level courses in the professional pharmacy program. Co-requisite: Successful completion of or concurrent enrollment in PHAR 539.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 530 Principles of Drug Action I (3 Credits)
Lecture: 3
An integrated course incorporating pathophysiology, pharmacology, and pharmaceutical/medicinal chemistry concepts essential to understanding the basis of drug use in diseases of the nervous and renal systems. Core concepts include mechanism of drug action and the chemical basis of pharmacology.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)College of Pharm & Hlth Sci

PHAR 538 Principles of Drug Action III (3 Credits)
Lecture: 3
Continuation of PHAR 439. Interdisciplinary course incorporating pathophysiology, pharmacology, and pharmaceutical/medicinal chemistry concepts essential to understanding the basis of drug use in diseases of the eye, ear, nose, and throat, integumentary system, and endocrine system. Prerequisites: PHAR 439, PHAR 419, and completion of all 400-level courses in the professional pharmacy program. Co-requisite: Successful completion of or concurrent enrollment in PHAR 518.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 518 Prin of Drug Action Lab III (1 Credits)
Lab: 3
Demonstrations, case studies, recitation, presentations, and small group discussions to accompany PHAR 538. Prerequisites: PHAR 439, PHAR 419, and completion of all 400-level courses in the professional pharmacy program. Co-requisite: Successful completion of or concurrent enrollment in PHAR 538.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 541 Principles of Drug Action II (4 Credits)
Lecture: 4
An integrated course incorporating pathophysiology, pharmacology, and pharmaceutical/medicinal chemistry concepts to understanding the basis of drug use in diseases of the cardiovascular and endocrine systems. Core concepts include mechanism of drug action and the chemical basis of pharmacology.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)College of Pharm & Hlth Sci

PHAR 601 Special Problems (1-8 Credits)
Lecture: 2-8
Special Problems (0-8) Methods in pharmaceutical sciences and clinical research; application of hypothesis formulation, literature evaluation, experimental design, clinical skills, data acquisition/analysis, and formal presentations. Variable number of hours of lecture per week. Students may enroll in up to a total of 8 semester credit hours of Special Problems while in the professional pharmacy program. Prerequisite: Special permission by the Department.
College/School: College Of Pharmacy/Hlth Sci.
Department: Phar Pratice/Clinical Hlth Sci

PHAR 648 Principles of Drug Action III (4 Credits)
Lecture: 4
An integrated course incorporating pathophysiology, pharmacology, and pharmaceutical/medicinal chemistry concepts to understand the basis of drug use in infectious diseases, immune/respiratory systems disorders. Core concepts include mechanism of drug action and the chemical basis of pharmacology.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)College of Pharm & Hlth Sci

Pharmaceutical Chemistry Courses

PHCH 410 Introduction to Medicinal Chemistry (1 Credits)
Lecture: 1
Introduction to Medicinal Chemistry Principles. Topics include structure activity relationships, drug metabolism and principles of drug discovery.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

PHCH 411 Pharmaceutical Chemistry I Lab (1 Credits)
Lecture: 0, **Lab:** 3
Pharmaceutical Chemistry I Laboratory (1) Demonstrations, case studies, recitation, presentations, and small group discussions to accompany PHCH 431. Three hours of laboratory per week. Prerequisite/Corequisite: Successful completion of or concurrent enrollment in PHCH 431.
Prerequisite(s): PHCH 431 (may be taken concurrently)
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Pharmaceutical Sci

For degree plan and curriculum, please see the Department of Pharmacy Practice.

Environmental Health Courses

HSEH 232 Intro To Environ Hlth (3 Credits)
Lecture: 3, **Lab:** 0
Introduction to Environmental Health (3) Survey of topics in population and resource management, fundamentals of air and water pollution, solid and hazardous wastes, pest and vector control, and radiation protection. Open to majors and non-majors. Three lecture hours per week. Prerequisite: Consent of the Program Director.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 233 Epidemiology & Biostat (4 Credits)
Lecture: 4, **Lab:** 0
Epidemiology and Biostatistics (4) Principles of distribution and determinants of diseases in human populations, including statistical methods and computer applications in data collection and analysis. Four hours of lecture per week. Prerequisite: HSEH 232.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 234 Health Physics (3 Credits)
Lecture: 3, **Lab:** 0
Health Physics (3) Fundamentals of ionizing and non-ionizing radiation with respect to source, exposure dose, biological interaction, methods of surveillance, and protection. Three hours of lecture per week. Prerequisite: HSEH 233.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 235 Human Ecology (3 Credits)
Lecture: 3, **Lab:** 0
Human Ecology (3) Principles of environmental physiology; medical geography and sociology; international and travel health; adaptation mechanisms to extremes of temperature, pressure, altitude, and microgravity; circadian rhythms. Three hours of lecture per week. Prerequisite: HSEH 233.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 334 Pub Hlth Org & Admin (3 Credits)
Lecture: 3, **Lab:** 0
Public Health Organization and Administration (3) Principles of organization and administration of environmental health programs by governmental agencies, including disease surveillance and health data management, environmental policy and ethics, and health education. Three hours of lecture per week. Prerequisite: HSEH 233.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 337 Environ Microbio (4 Credits)
Lecture: 2, **Lab:** 4
Environmental Microbiology (4) Survey of microorganisms of ecological, medical, and industrial importance with respect to nutrient recycling, food spoilage, infectious diseases, and biotechnology. Two hours of lecture and four hours of laboratory per week. Prerequisite: HSEH 232.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 338 Water Pollution & Control (3 Credits)
Lecture: 3, **Lab:** 0
Water Pollution and Control (3) Survey of chemical, physical, and biological pollutants affecting water quality for drinking and other designated end uses. Pollution monitoring and control strategies also discussed. Three hours of lecture per week. Prerequisite: HSEH 337.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 339 Air Pollution & Control (3 Credits)
Lecture: 3, **Lab:** 0
Air Pollution and Control (3) Survey of ambient and indoor air quality changes due to toxic emissions. Atmospheric chemistry and meteorology, standard air pollution indicators, global climate changes, and control strategies discussed. Three hours of lecture per week. Prerequisites: HSEH 232 and HSEH 344.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 344 Environ Chem (4 Credits)
Lecture: 2, **Lab:** 4
Environmental Chemistry (4) Comprehensive survey of behavior and fate of chemical pollutants in atmosphere, hydrosphere, geosphere, and biosphere, including standard methods of chemical analysis of environmental media. Two hours of lecture and four hours of laboratory per week. Prerequisite: HSEH 232.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 425 Insect & Vector Control (3 Credits)
Lecture: 3, **Lab:** 0
Insect and Vector Control (3) Comprehensive survey of agricultural and urban pests, disease transmitting vectors and their habitat, principles of entomology, parasitology and zoonoses, integrated vector control, and pest management. Three hours of lecture per week. Prerequisite: HSEH 344.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 431 Solid Waste Mgmt (3 Credits)
Lecture: 3, **Lab:** 0
Solid Waste Management (3) Municipal solid waste problems and solutions: generation, storage, collection, transport, processing, and disposal. Three hours of lecture per week. Prerequisite: HSEH 337.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 432 Hazardous Waste Mgmt (3 Credits)
Lecture: 3, **Lab:** 0
Hazardous Waste Management (3) Industrial, medical, and household hazardous waste problems and solutions: generation, characterization, transport, storage, treatment, and disposal. Minimization, exchange, recovery, incineration, and secure landfills discussed. Three hours of lecture per week. Prerequisites: HSEH 338 and HSEH 344.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 433 Institu Hlth & Safety (3 Credits)
Lecture: 3, **Lab:** 0
Institutional Health and Safety (3) Survey of structural, electrical, and fire safety of residential, school, hospital, day-care, and penal institutions. Sick building syndrome, emergency planning, and accommodation of disabled persons discussed. Three hours of lecture per week. Prerequisite: HSEH 235.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 434 Sewage Trtmt & Disposal (3 Credits)
Lecture: 3, **Lab:** 0
Sewage Treatment and Disposal (3) Industrial, agricultural, and municipal wastewater collection, transport, treatment, and disposal. Design and operation of sewage treatment plants, on-site and waterless systems, and sludge management discussed. Three hours of lecture per week. Prerequisite: HSEH 338.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 435 Environ Hlth Probs (3 Credits)
Lecture: 3, **Lab:** 0
Environmental Health Problems (3) Global environmental issues: famine and starvation, environmental refugees, environmental justice and equity, hazardous waste sites, housing and urban blight, crime and substance abuse. Three hours of lecture per week. Prerequisite: Consent of the Program Director.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 436 Independent Study (3 Credits)
Lecture: 3
Students will acquire and apply knowledge of environmental health issues, challenges, and environmental health systems. When necessary for student progression, the course will offer a specialized designed curriculum to fill student deficiencies that are needed for on-time graduation. 3 hours lecture per week.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 442 Safety & Health (3 Credits)
Lecture: 3, **Lab:** 0
Occupational Safety and Health (3) Recognition, measurement, evaluation, and control of workplace hazard exposures. Fundamentals of industrial hygiene, ergonomics, occupational disease surveillance, hazard communication, and worker protection discussed. Three hours of lecture per week. Prerequisites: HSEH 339 and HSEH 450.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 450 Environ Toxicology (3 Credits)
Lecture: 3, **Lab:** 0
Environmental Toxicology (3) Comprehensive survey of principles of toxicodynamics and toxicokinetics; xenobiotic dispersal and ecosystem response; exposure pathways and target organs; mechanisms of toxicity; toxicity testing for mutagenesis, carcinogenesis, and teratogenesis. Three hours of lecture per week. Prerequisite: HSEH 234.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS

HSEH 451 Environ Impact Assessmt (3 Credits)
Lecture: 3, **Lab:** 0
Environmental Impact Assessment (3) Consideration of environmental impacts and risks of legislative proposals, policies, programs, and projects following NEPA regulations: qualitative/quantitative risks, identification, characterization, exposure assessment, dose-response determination, interpretation, communication, and management. Three hours of lecture per week. Prerequisite: Consent of the Program Director.
College/School: College Of Pharmacy/Hlth Sci.
Department: (R)Dept of Health Sciences

HSEH 460 Internship (3 Credits)
Lecture: 3
Internship (3) Field practicum in industry, governmental agencies, consulting firms, and academic research facilities providing observation and participation in the practice of environmental health programs. . Prerequisite: Junior level EH major prior to enrolling in the course.
College/School: College Of Pharmacy/Hlth Sci.
Department: Dpt of Pharmaceu Sc& Env HS