PHARMACEUTICAL SCIENCES LAB (PSCZ)

PSCZ 355. Analytical Methods in Pharmaceutical Sciences. 2 Hours.
Semester course; 4 laboratory hours. 2 credits. Prerequisite: PSCI 320. Enrollment is restricted to students enrolled in the B.S. in Pharmaceutical Sciences or by permission of instructor. The course will explore pharmaceutical and bioanalytical concepts and assays. It is designed to introduce topics associated with pharmaceutical analysis including method development, validation, instrumentation, and sample preparation that support the various stages of the drug development process, from target identification, drug discovery, lead optimization, preclinical drug development, active pharmaceutical ingredient and dosage form manufacturing, post marketing drug surveillance, and the use of artificial intelligence in pharmaceutical drug product analysis. Hands on experiential learning with various assays will be emphasized. Analytical methods to be introduced include UV-Vis spectroscopy, FTIR, GC, HPLC.

PSCZ 375. Drug Dosage Form Development Laboratory. 1 Hour.
Semester course; 2 laboratory hours. 1 credit. Prerequisite: PSCZ 425. Corequisite: PSCI 370. Enrollment is restricted to students enrolled in the B.S. in Pharmaceutical Sciences or by permission of instructor. The laboratory course supports hands on experiential learning related to the design of dosage forms using a Quality-by-Design approach, and their characterization using United States Pharmacopeia compendial testing and Good Laboratory Practice, artificial intelligence in pharmaceutical dosage form development. A variety of traditional dosage forms will be explored, including oral tablets, injectables and nebulizers. Advanced drug delivery systems including lipid-based nanocarriers for small molecules and biologics including mRNA will also be explored. Analytical methods studied previously will be used in the course to characterize dosage forms, including assays for dose content uniformity, dissolution, purity, drug product stability, residual solvent, and drug loading and controlled release. Extensive characterization of the quality attributes of the formulations will be emphasized.

PSCZ 425. Molecules to Medicine Laboratory. 2 Hours.
Semester course; 4 laboratory hours. 2 credits. Prerequisites: PSCI 330 and PSCZ 355. Corequisite: PSCI 420. Enrollment is restricted to students in the B.S. in Pharmaceutical Sciences program or by permission of the instructor. The laboratory will cover various tools that support the drug development process, including both computational and advanced analytical techniques. Software tools include those for modeling Quantitative Structure-activity Relationship, Design of Experiments, machine learning and pharmacokinetic modeling to support drug design. Advanced analytical techniques will focus on HPLC-MS and will also include PCR and ELISA.