

# PHSC - PHARMACEUTICAL SCIENCES

## PHSC 610 Introduction to Biotech Drugs and Vaccine Products

**Credits 4. 4 Lecture Hours.** Understanding the comprehensive information and insights of new and conventional pharmaceutical biotechnology, associated products and biomolecular vaccines; introduction to the basic concepts and biochemical basis of biotech drugs with a focus on structure and function of carbohydrates, proteins, hormones and lipids pharmaceutical bioproducts; biochemical basis for cell structure, cellular metabolism, disease, biotech-drug functions and genetic information flow in prokaryotic and eukaryotic cells; common metabolic pathways of drugs, enzyme induction and metabolic regulation; introduction to different types of biomolecular vaccines and their development with some recent advances in vaccines development. **Prerequisites:** Enrollment in pharmaceutical sciences.

## PHSC 611 Drug Delivery and Formulations

**Credits 4. 4 Lecture Hours.** Introduction to the challenges and concepts for the delivery of drugs through various routes; development of unique formulations specific for that route; consideration of material properties of the drugs and patient and disease conditions; unique anatomy and physiology for a route; drug substances and the variety of physicochemical properties and biopharmaceutical properties with respect to physiological solubility, permeability and disposition. **Prerequisites:** CHEM 120 or equivalent, MATH 147 or equivalent; BIOL 113 or equivalent; approval of instructor.

## PHSC 612 Principles of Drug Actions

**Credits 4. 4 Lecture Hours.** Understanding the basic concepts and scientific underpinnings of pharmacology; comprehensive introduction to the fundamental pharmacology; understanding the uses of the major classes of clinically important drugs that are currently in medical practice and the re-purposing of these major classes.

## PHSC 613 Laboratory Rotations

**Credits 3. 9 Lab Hours.** Development of introductory skills through hands-on training with the instruments used in pharmaceutical research; development of introductory skills through hands-on training on the formulation of hypothesis, designing of experiments, planning on experimental materials required and execution of experiments in selected professors' laboratories; development of basics skills to formulate hypothesis, research methodology, data generation and analysis and conclusions of the experiments.

## PHSC 621 Biostatistics

**Credits 3. 3 Lecture Hours.** Introduction to basic statistical concepts and analytical methods; familiarization with statistical approaches used in pharmaceutical research and development; understanding the principles and development of skills for clinical research design, pre-clinical studies and clinical trials; understanding bio-statistical need for the result interpretation, introduction to evaluation of the medical literature and assessment of research reports and proposals; research terminologies, study design, statistical testing of data, investigator's responsibilities in the ethical considerations of research; fundamentals of data sets and the evaluation of statistical results by employing examples of the clinical application of statistics; introduction to the methods used to conduct research in significant areas of pharmacy practice.

## PHSC 622 Professionalism and Ethics in Research or Equivalent

**Credits 3. 3 Lecture Hours.** Introduction to ethical problems in interdisciplinary scientific research including publications, collaboration, data integrity, research misconduct and reviewing of manuscripts and grants; introduction to the history of scientific fraud by taking examples from recent cases, ethical dilemmas and the consequences of fraud; design mock misconduct trials and writing advocacy letters to change current policy; guidance on the responsibilities of principal investigator to monitor, manage and instruct lab personnel on ensuring data integrity.

## PHSC 681 Seminar

**Credit 1. 1 Other Hour.** Development of subject mastery by seminar presentations on current studies in pharmaceutical sciences with effective content development and delivery, and by engaging with audience to stimulate the research areas of interest. May be taken for credit up to two hours.

## PHSC 685 Directed Studies

**Credits 1 to 6. 1 to 6 Other Hours.** Offered to enable students to undertake and complete, with credit, limited investigations not within their thesis research and not covered by any other courses in the curriculum. May be repeated for credit. **Prerequisites:** Approval of instructor.

## PHSC 689 Special Topics in...

**Credits 1 to 4. 1 to 4 Other Hours.** Selected topics in an identified area of pharmaceutical sciences. May be repeated for credit. **Prerequisites:** Approval of instructor.

## PHSC 691 Research

**Credits 1 to 23. 1 to 23 Other Hours.** Research for thesis or dissertation. May be repeated for credit.

## PHSC 736 Advanced Physical Pharmacy

**Credits 3. 3 Lecture Hours.** Elements of physical chemistry including rheology and interface chemistry, and colligative properties underpinning key pharmaceutical processes; concepts of chemical and ionic equilibria; important concentration expressions in pharmaceutical sciences; significance of surface-active agents, complexation, and protein binding; in depth explanation on reaction kinetics and drug stability. **Prerequisites:** PHSC 611.

## PHSC 752 Nanotechnology for Biomedical Applications

**Credits 3. 3 Lecture Hours.** Introduction to recent advances in the field of nanotechnology with a particular emphasis on its biomedical applications; in-depth study of the nanomaterials, their physics and chemistry, nanoparticle-based drug delivery systems, and major challenges associated with the nanoparticle-based drug delivery systems; overview of the nanoparticle-based imaging and diagnostic systems and their applications using several examples of nanomedicine to demonstrate the impact of the nanotechnology on the diagnosis, treatment and prevention of diseases. **Prerequisites:** PHSC 611.