



## Drug Discovery Development Pathway Approved Choice Sciences

### **Chem 2550 – Organic Chemistry Laboratory II (2 credit hours)**

- ❖ Introduction to spectroscopic characterization, scientific writing, computational chemistry, and the laboratory techniques of organic chemistry, including synthesis, isolation, purification, and identification of organic compounds.
- ❖ Prereq: 2540 or 2540H. Prereq or concur: 2520, 2620 or 2920H.

### **MICROBIO 4000.01 – Basic and Practical Microbiology (4 credit hours)**

- ❖ Provides an understanding of microorganisms and their interaction with the human experience.
- ❖ Prereq: 3 cr hrs in Biology. Not open to students with credit for 4000 or 4000.02. GE nat sci bio course.

### **ANATOMY 2300.04 – Human Anatomy (4 credit hours)**

- ❖ EEOB 2510 or ANATOMY 3300 are also acceptable
- ❖ Regional study of the basic structure and terminology associated with the human body supplemented with computer-assisted instruction. Laboratory includes demonstrations on prosected human cadavers.
- ❖ Prereq: Enrollment in pre-Health and Rehabilitation Sciences (pre-HRS), Health and Rehabilitation Sciences (HRS), pre-Optometry (pre-Opt), Exercise Science (ExSci), pre-Pharmacy (pre-Pharm), Education and Human Ecology (EHE), or pre-Dental (pre-Dent) only. Not open to students with credit for 2100.xx or 3300.xx.

### **BIOLOGY 1114 – Biological Sciences: Form, Function, Diversity, and Ecology (4 credit hours)**

- ❖ Exploration of biology and biological principles; evolution and speciation, diversity in structure, function, behavior, and ecology among prokaryotes and eukaryotes. A broad introduction to biology comprises both Biology 1113 and 1114.
- ❖ Prereq: Math 1130 (130), 1148, or 1150 or above, or Math Placement Level L or M. Prereq or concur: Chem 1110 (101), 1210 (121), 1610, or 1910H (201H), or permission of course coordinator. Not open to students with credit for 114. This course is available for EM credit. GE nat sci bio course. NS Admis Cond course.

### **PHYSICS 1200 – Mechanics, Kinematics, Fluids, Waves (5 credit hours)**

- ❖ Algebra-based introduction to classical physics: Newtons laws, fluids, waves.
- ❖ Prereq: A grade of C- or above in Math 1148 (148), or Math Placement Level M. Not open to students with credit for 111. This course is available for EM credit. GE nat sci phys course. NS Admis Cond course.

### **PHYSICS 1201 – E&M, Optics, Modern Physics (5 credit hours)**

- ❖ Algebra-based introduction to electricity and magnetism, simple optics, overview of modern physics including special relativity and quantum mechanics.
- ❖ Prereq: 1200 (111). Not open to students with credit for 112. This course is available for EM credit. GE nat sci phys course. NS Admis Cond course.

### **MOLGEN 4500 – General Genetics (3 credit hours)**

- ❖ The principles of genetics, including molecular genetics, transmission genetics of prokaryotes and eukaryotes, developmental and non-chromosomal genetics, recombinant DNA and genomics, and the genetics and evolution of populations.
- ❖ Prereq: Biology 1101 (101), 1113 (113), or 1113H (115H), and 3 additional cr hrs in the Biological Sciences. Not open to students with credit for MolGen 4606 (605 and 606), 500, or 500H.
- ❖ MOLGEN 4500E is also acceptable (4 cr. hrs.)

### **MOLGEN 4606 – Molecular Genetics (4 credit hours)**

- ❖ A comprehensive genetics course for majors covering transmission and molecular genetics; DNA replication, repair and mutation; transcription and translation; analysis and manipulation of genes at the molecular level.
- ❖ Prereq: Biology 1113 (113), 1113H (115H), 1114 (114), 1114H (116H), or Chem 1210 (121) or equiv, or permission of instructor. Not open to students with credit for 605 or 606; or 4500 (500) unless waived by instructor.

### **MICROBIO 5122 – Immunology (2 credit hours)**

- ❖ Cellular and molecular properties of the immune system.
- ❖ Prereq: 4000 or 4110.

### **CHEM 2210 – Analytical Chemistry I: Quantitative Analysis (5 credit hours)**

- ❖ Quantitative chemical analysis for chemistry majors; quantitative analysis of the elemental and molecular composition of complex systems.
- ❖ Prereq: 1220 (123), 1620 (163), or 1920H (203H), and Math Placement Level L, or a grade of C- or above in Math 1148 and 1149, or 1130 (130), 1131 (131), or 1150 (150), or above. Not open to students with credit for 2210H (221H). GE data only course.

### **CHEM 5440 – Intro to Computational Chemistry (3 credit hours)**

- ❖ Introduction to fundamental concepts in computational chemistry, including molecular modeling, molecular dynamics, and semi-empirical and ab initio calculations.
- ❖ Prereq: 2520 (253), 2620 (253), or 2920H (253H), or equiv. Not open to students with credit for 644

### **HUMNNTR 2210 – Science of Human Nutrition (3 credit hours)**

- ❖ Basic principles of biological science, emphasizing the interaction between nutrients and physiological (including cellular) processes.
- ❖ Prereq: Not open to students with credit for 210. GE nat sci bio course.

### **HUMNNTR 2310 – Fundamentals of Nutrition (3 credit hours)**

- ❖ Nutrient and energy needs of the human biological system throughout the life cycle including energy balance with consideration of socio-psychological factors.
- ❖ Prereq: Biology 1113 (113), or 1101 (101), or equiv; and Chem 1210, or 1610, or 1910H; and Chem 1220, or 1620, or 1920H, or 1250. Not open to students with credit for 310. This course is available for EM credit.

### **PSYCH 3331 – Abnormal Psychology (3 credit hours)**

- ❖ Examination of current theories and empirical findings regarding the major forms of psychopathology and treatment.
- ❖ Prereq: 1100 or 1100H. Not open to students with credit for 2367.02, 3331H, or 3331E.

### **PSYCH 3340 – Intro to Life Span Development Psychology (3 credit hours)**

- ❖ Consideration of theories and research on psychological development across the lifespan; includes consideration of social policies that influence developmental outcomes.
- ❖ Prereq: 1100 (100) or 1100H (100H). Not open to students with credit for 340, 340H, or 340E.

### **PHR 2400.01 – Addicting Drugs: Effect, Introductory Neurobiology and Regulation (3 credit hours)**

- ❖ Overview of effects, regulation, and mechanism of action of addicting drugs with an introduction to function of the nervous system and how this function is altered by drugs.

### **PHR 2410 – Drugstore Science (3 credit hours)**

- ❖ Distance-learning course (100% online)
- ❖ This course introduces the science behind common drugstore products, including over-the-counter (OTC) medications and drug-cosmetics, including how these products work, potential non-drug alternatives, and various drug-related issues involving their use. Note: Content of this course is not intended to be considered as professional medical advice or to replace advice from a healthcare provider.

### **PHR 3400 – Therapeutic Frontiers (2 credit hours)**

- ❖ Spring semester only
- ❖ Prerequisite: BSPS enrollment or permission of instructor
- ❖ Investigation of newly emerging (and at times) controversial strategies for treating disease, including biologics, cell replacement therapy, and vaccines among others. This course also explores the science behind important therapeutic factors such as the placebo effect, the microbiome, and pharmacogenomics.

### **PHR 3520 – Principles of Therapeutics (2 credit hours)**

- ❖ Spring semester only
- ❖ Prerequisite: PHR 4000\*, BSPS enrollment or permission of instructor
- ❖ Designed to provide knowledge about medication therapies and treatment guidelines for common illnesses affecting patients.

### **PHR 4210H –Problem Solving in Biomedical Chemistry (2 credit hours)**

- ❖ Spring semester only
- ❖ Prerequisite: PHR 3200, enrollment in BSPS or instructor permission
- ❖ A course designed to use problem-based learning to promote understanding of biomedical concepts. Case studies will be assigned, allowing students to apply biochemical principles and communicate with their colleagues in the course.
- ❖ Non-honors students may enter with permission from instructor

**PHR 4330 –Basic Pharmacokinetics (2 credit hours)**

- ❖ Prerequisite: Math 1151
- ❖ An elementary course designed to introduce the student to the topic of pharmacokinetics. The application of biopharmaceutics and pharmacokinetic principles as they relate to drug absorption, distribution and elimination will be discussed.

**PHR 4420 – Molecular Pharmacology: From DNA to Biopharmaceutical Products (2 credit hours)**

- ❖ Autumn semester only
- ❖ Prerequisite: PHR 3200 or instructor permission
- ❖ Introduces students to pharmacological research and drug discovery through readings, discussions, and presentations.

**PHR 4430 – GPCR Pharmacology (2 credit hours)**

- ❖ Spring semester only
- ❖ Prerequisite: enrollment in BSPS or instructor permission
- ❖ Focuses on the pharmacology of G-protein-coupled receptors (GPCRs). GPCRs constitute a large and diverse family of proteins whose importance is underscored by the fact that at least one third of the currently marketed drugs target these proteins.

**PHR 4440 – Pharmacology of Neurologic and Psychiatric Disorders (3 credit hours)**

- ❖ Prerequisite: NEUROSC 3000 or PHR 3200 or equivalent or instructor permission
- ❖ This course is designed for pharmaceutical science majors, neuroscience majors, or non-majors with a basic knowledge of biology. This course will serve as an introduction to principles of pharmacological therapy of neurologic and psychiatric diseases.

**PHR 4470 – Contemporary Pharmacology (1 credit hours)**

- ❖ Prerequisite: PHR 4000, 4400 or 5460; and permission of instructor
- ❖ Exploration of current research topics in pharmacology through discussions of recently published pharmacology papers.
- ❖ Repeatable up to a maximum of 3 credit hours

**PHR 5270 – Antibiotics and Microbial Natural Products (3 credit hours)**

- ❖ Spring Only
- ❖ Prerequisite: PHR 4000 with a C- or higher
- ❖ This course is organized into four distinct modules. First, we examine the different classes of natural products through the lens of biosynthesis -- how the molecules are constructed and diversify. Second, we focus on their function -- not only as antibiotics against human pathogens (mode of action and resistance) but also their proposed functions for the producing organisms. Third, we explore the methods and challenges in natural product discovery and how genomics is revolutionizing the field. The most recent and significant developments in microbial natural products are presented in the final section of the class through student research presentations on select topics

**PHR 5410 – Understanding and Changing Vaccine Hesitancy Perspectives (3 credit hours)**

- ❖ Vaccines are among the most significant achievements in modern medicine, providing a safe and highly effective means to prevent disease. However, an increasing number of individuals are refusing vaccination. In this course, we analyze contributing factors to the anti-vaccine movement, discuss the psychology behind vaccine hesitancy, and evaluate the implications of undervaccination.

**PHR 5460 – Current Addiction Neurobiology Literature (1 credit hours)**

- ❖ Current research findings relating to neurobiology of addiction are explained and interpreted. Students should have some introductory knowledge of neurobiology.
- ❖ Repeatable to a maximum of 9 cr hrs.

**PHR 5510 – Basics of Pharmaconutrition (3 credit hours)**

- ❖ Autumn semester only
- ❖ Prerequisite: Undergraduate standing, enrollment in the PharmD program, or permission of instructor
- ❖ Covers basic information on the effects of dietary factors on pharmaconutrition to be utilized as a foundation in solving patient-related cases in pharmacy practice.

**PHR 5520 - Advanced Pharmaconutrition (2 credit hours)**

- ❖ Provides concepts needed by pharmacists necessary to include nutrition into their daily assessment of patients and integrate their findings into the therapeutic plan.
- ❖ Prereq: 5510, and enrollment in the College of Pharmacy; or permission of instructor. Not open to students with credit for Phr 5155.

**PHR 5540 – Introduction to Clinical and Translational Pharmacy Research (2 credit hours)**

- ❖ Autumn semester only
- ❖ Prerequisite: PHR 4000 or permission of instructor
- ❖ Course is graded S/U
- ❖ Introduction to conducting research in clinical pharmacy including research design issues and ethical considerations. Faculty conducting research in various populations will discuss their research, followed by class discussion.

**PHR 5700/CBG 5700 – Introduction to Personalized Therapeutic and Pharmacogenomics (3 credit hours)**

- ❖ Exploration of the trend to therapy tailored to the individual patient rather than "one drug fits all;" inter-individual differences in drug responses, with emphasis on genetic and genomic factors; ethical, regulatory, and economic issues that impact drug therapies. Credit for introductory biology course recommended prior to enrollment.
- ❖ Cross-listed in BioPhrm and CBG.