Phcy 402: Foundations of BioMolecular Sciences II
School of Pharmacy

This course is the second semester of a two-semester sequence that integrates the underlying principles of medicinal and natural products chemistry, pharmacology, and toxicology required to develop a detailed understanding of disease processes, natural products and natural product-based drug discovery, chemotherapeutic treatment options for infectious disease, drug associated side effects, and related drug and toxicological considerations. This second semester presents an overview of natural product drugs that derive from natural sources, provides detailed coverage of antimicrobial chemotherapy for the treatment of bacterial and fungal infections, describes important aspects of herbal medicine and alternative medical practices, and introduces principles in pharmaceutical and environmental toxicology. This course integrates the following aspects of biomolecular sciences: Basic Biomedical Sciences Molecular Biology/Genetics  Relate the action of antibiotics to processes involved in replication, transcription, and translation of genetic information, describing the basis for selective inhibition of microbial processes over mammalian processes.  Genetic factors in microbial resistance to antibiotics Pharmaceutical Sciences Medicinal Chemistry  Physico-chemical properties of drug molecules in relation to drug absorption, distribution, metabolism, and excretion (ADME) of antimicrobial agents  Chemical basis of antibiotic pharmacology and therapeutics  Structural and chemical features of antimicrobial agents to enhance their effects in otherwise antibiotic resistant microbes Pharmacology  Principles of antimicrobial therapy  Mechanism(s) of action of drugs in various categories  Role of pharmacology in drug choice and the treatment of infectious disease  Mechanisms of microbial resistance to antimicrobial agents  Adverse effects and side effects of anti-infective agents  Antibiotic drug-target interactions  Antimicrobial synergism and antagonism  Drug-drug, drug-food, drug-lab test interactions  Natural product and antimicrobial drug discovery and development Pharmacognosy and Alternative and Complementary Treatments  Concepts of crude drugs, semi-purified, and purified natural products  Variability of occurrence of pharmacologically active substances in plants and impact on regulatory aspects of herbal products  Overview of classes of pharmacologically active natural products  Natural and synthetic anti-infective agents  Dietary supplements and probiotics  Alternative medical treatments  Evaluation of alternative and complementary medicine (i.e., herbals and botanical dietary supplements) purity, bioavailability, safety, and efficacy  Herbal (botanical)-drug interactions  Dietary Health Supplement and Education Act and impact on regulation of dietary supplements and herbal products Pharmaceutical and Environmental Toxicology  Drug-induced mitochondrial dysfunction and mitochondrial liability in drug development  Overview of occupational and environmental toxicology  Toxicity of lead, mercury, and heavy metals  Utilization of chelators  Managing poisoned patients

3 Credits

Prerequisites
- Pre-Requisite: 24 Earned Hours

Instruction Type(s)
- Lecture: Lecture for Phcy 402

Course Fee(s)
- Pharmacy Practice 8
  - $10.00

Subject Areas
- Pharmaceutical Marketing and Management

Related Areas
- Industrial and Physical Pharmacy and Cosmetic Sciences (MS, PhD)
- Medicinal and Pharmaceutical Chemistry
- Natural Products Chemistry and Pharmacognosy (MS, PhD)
- Pharmaceutical Sciences
- Pharmaceutics and Drug Design (MS, PhD)
- Pharmacoeconomics/Pharmaceutical Economics (MS, PhD)
- Pharmacy (PharmD - USA - PharmD, BS/BPharm - Canada)
- Pharmacy Administration and Pharmacy Policy and Regulatory Affairs (MS, PhD)
- Pharmacy, Pharmaceutical Sciences, and Administration, Other