

# Understanding Our Curriculum

One question that comes up quite frequently when talking with preceptors is “what are we teaching our students” and “when are they exposed to certain classes”. Below you will find a brief summary of our curriculum so that you will know what the student has been exposed to when they enter your practice experience. As you can see from the curriculum provided, the four-week IPPE community experience occurs during the summer following the first year. At this point in the curriculum, students have had no exposure to the major disease state modules. The first year of the curriculum mainly focuses on the disease at the molecular and cellular level in Principles of Drug Action and Pathophysiology. They have had Top Drugs and Medical Terminology so they do have some drug knowledge but that knowledge is very limited. Many times the introductory community experience is the student’s first experience with direct patient care in a pharmacy setting. During this experience students will spend a great deal of time learning how the pharmacy runs and becoming oriented to the workflow and layout of the dispensing area. Some students may consider this “pharmacy technician” work but it’s important that they master the many functions related to preparation of prescriptions. Some students may have significant prior experience as pharmacy technicians and those students may be allowed to work at a higher level.

The four-week IPPE institutional experience occurs during the summer following the second year. This experience is designed to introduce students to the hospital environment so that they may gain a greater appreciation for the impact of hospital practice on the healthcare system. At this point in the curriculum students have taken several disease modules but still have a long way to go. They have had parenterals and have been exposed to actually preparing IVs in the pharmacy care labs.

The advanced practice experiences begin in May following the P3 year. At this time all didactic classes have been completed and students are ready to put into action what they’ve learned in the curriculum. The APPEs consist of 7 six-week experiences. Out of these 7 there are 3 elective experiences, and 4 required experiences. All students are required to take an advanced Community practice experience, advanced Institutional practice experience, Adult Medicine experience, Ambulatory care experience, 2 Patient care experiences, and one more patient care or non-patient care experience.

## **First Year Fall Semester**

Principles of Drug Action I - This course focuses on disease at the molecular-level as well as foundational concepts of medicinal and pharmaceutical chemistry, pharmacology, and toxicology. (Introduction to medicinal chemistry, biochemistry, transporters, etc.)

Pharmaceutical Calculations - Fundamentals of pharmaceutical measurement and calculations.

Pharmaceutics I - Fundamentals of physical pharmacy and an introduction to liquid oral dosage forms. (Dosage forms, acid-base chemistry, solubility, etc.)

Introduction to Pharmacy - An introduction to the pharmacist in society, modes of pharmacy practice, historical perspectives, fundamentals of professional responsibility.

Pathophysiology I - Students will be introduced to disease processes at a cellular level. The course will serve as an introduction to pathophysiology building on the anatomy and physiology courses that students have already completed.

Drug Information Retrieval – Orientation to relevant primary, secondary and tertiary resources used to provide drug information for clinical questions, and associated professional responsibilities. In addition, the course will include information on study designs, biostatistics, and introduction to clinical literature evaluation.

Integrated Lab Sequence I – Focuses on:

- Obtaining medication histories and implementing behavior change action plans
- Utilizing PharmacyRx® outpatient software to fill prescriptions
- Molecular modeling using PyMol® computer software
- Calculating aliquots, specific gravity, and dosages
- Compounding powder charts, a simple syrup, solutions, suspensions, and emulsions.
- Learning where to find information in the Patient's Medical Chart
- Written communication basics (SOAP notes) utilizing TJC and ISMP guidelines.
- Drug information retrieval through hard copy and electronic means.  
Introduction to "Check Tech" exercises in which students double check a prescription for accuracy that a "technician" has filled.

## **First Year Spring Semester**

Top Drugs and Medical Terminology - Introduction to the origin and definition of medical terms used in healthcare settings. Course is arranged by body and organ systems with a heavy emphasis on pharmacology and slight emphasis on anatomy and physiology. Brand/Generic names, dosage forms, and therapeutic class of current top 200 drugs.

Principles of Drug Action II - Continuation of Drug Action I. (Protein structures, enzyme kinetics, pharmacogenetics, etc.)

Pharmaceutics II – Fundamentals of drug delivery systems (tablets, capsules, powders, topical and transdermal, rectal, vaginal, ocular, nasal, otic, pulmonary)

Pharmacy Practice Ethics and Law I - Distinguishes ethical from other kinds of issues in pharmacy, identifies options open to a pharmacist faced with an ethical issue. Students will be introduced to administrative law as it applies to the practice of pharmacy.

Pathophysiology II – Students will be introduced to disease processes at the organ/system level. This course will serve as an extension to Pathophysiology I as complete organ systems are introduced and the impact of diseases on these systems is studied.

Microbiology and Immunology- Discussion of bacterial, viral, fungal and parasitic pathogens and the diseases. Topics include microbial structure, physiology, genetics, virulence factors, mechanisms of tissue damage and antimicrobial therapies. Discussion of the stimulation, production and role of innate and acquired immune responses, health outcomes in immunopathological conditions and the modulation of immune function using vaccines and other biotechnology products.

Parenterals – The course introduces the student to the pharmaceutics and clinical applications of parenterals. Topics include calculations, aseptic technique, and regulations.

Integrated Lab Sequence II – Focuses on:

- Calculations and extemporaneous compounding of Tamifu, capsules, and suppositories
- Patient counseling with a focus on pharmacy ethics and law
- Identifying the cause of adverse drug events (ADEs) using Naranjo's algorithm and reporting of ADEs through FDA Medwatch
- Acetaminophen Toxicity Management
- Introduction to Sterile Compounding (ampules, fluid vials, powder vials)
- Check Tech exercises

## **First Year Summer Semester**

Introductory Community Pharmacy Practice Experience - The purpose of this course is to expose students to entry-level pharmacy practice through working in a community pharmacy practice site.

## **Second Year Fall Semester**

Research Methods and Literature Evaluation - Introduction and application of basic concepts of methodology and design needed for efficient evaluation, utilization, and clinical application of medication information available in medical literature.

Introduction to Communications - Orientation to psychosocial and communication principles and techniques with application to professional practice environments and clinical counseling situations.

Biopharmaceutics and Pharmacokinetics - The study of the interrelationship between formulation factors and pharmacokinetic aspects of drug absorption, distribution, metabolism, and excretion.

Neurology and Psychiatry Module - Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetics and pharmacotherapy (including both prescription and non-prescription medications) as they apply to neurology/psychiatric drug therapy management.

Endocrine Module - This course will provide students with the appropriate pharmacologic, medicinal chemistry, pharmaceuticals, and therapeutic knowledge to appropriately select and monitor medication therapy for selected endocrine disorders.

Electives – Student must choose from a list of approved electives

Integrated Lab Sequence III – Focuses on:

- Core elements of Medication Therapy Management utilizing Mirixa software for documentation.
- Calculations and sterile compounding of 3% Sodium Chloride and ceftazidime
- Research methods using data collection and analysis.
- Compounding PLO gel (promethazine).
- Use of treatment guidelines to identify problems with prescriptions, and to make recommendations for treatment of hypertension and diabetes.
- Patient counseling utilizing APhA's patient counseling guidelines

- Recognition and treatment of Extrapiramidal Side Effects of Neuro/Psych drugs
- Calculations and pharmacokinetics for vancomycin and phenytoin
- Diabetic ketoacidosis treatment

### **Second Year Spring Semester**

Health Care Systems - An overview of the structure, organization, delivery, and financing of the U.S. health care system, managed health care and pharmacy services, combined with the role of the pharmacist.

Self Care/Patient Assessment I Module - Basic patient assessment skills required in the delivery of pharmaceutical care and principles of self care including: determining if self care is appropriate and recommending appropriate self care treatment.

Infectious Diseases Module - Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetics and pharmacotherapy (including both prescription and non-prescription medications) as they apply to infectious diseases therapy management.

Gastrointestinal, Nutrition and Hepatic Module- Selection of appropriate therapy for disorders of the gastrointestinal system based on treatment guidelines, disease pathophysiology, and the pharmacologic and physiochemical properties of medications.

Electives – Student must choose from a list of approved electives

Integrated Lab Sequence IV – Focuses on:

- Health care systems (Medicare Part D)
- Mirixa system and MTM
- Pain and Pain management (PCA compound)
- Self-care and patient assessments – Blood pressure/pulse measurement
- Emergency Preparedness/case studies
- Infectious disease case studies
- Medicinal chemistry
- Infectious disease pharmacokinetics
- Check Tech exercises
- GI/hepatic disorders
- Nutrition, nutritional disorders, and TPN calculations/preparation

## **Second Year Summer Semester**

Introductory Institutional Pharmacy Practice Experience - The purpose of this course is to expose students to entry-level pharmacy practice through working in an institutional pharmacy practice site.

## **Third Year Fall Semester**

Pharmacy Practice Ethics and Law II - This course reviews the principles of ethics as they apply to pharmacy practice. Students will focus primarily on the law as it applies to drugs, medical devices, and the practice of pharmacy.

Advanced Communications – Application of techniques and strategies for patient-centered and colleague-centered communication with an emphasis on skills that enable development and maintenance of constructive interpersonal relationships in a variety of pharmacy practice settings.

Professional Pharmacy Management - Examination of the managerial aspects of pharmacy practice within the healthcare system with an emphasis on the basic financial, operational, and human resource management, knowledge, and skills necessary for a successful professional practice.

Self Care/Patient Assessment II Module - Basic patient assessment skills required in the delivery of pharmaceutical care and principles of self care including: determining if self care is appropriate and recommending appropriate self care treatment.

Cardiovascular Module - Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetic and pharmacotherapy (including both prescription and non-prescription medications) as they apply to cardiovascular drug therapy management.

Electives – Student must choose from a list of approved electives

Integrated Lab Sequence V – Focuses on:

- Pharmacy Practice, Law, and Advocacy
- Clinical and Practical Diabetes Review
- Hypertension and blood pressure/pulse measurement
- Journal Club, literature review and statistics
- Patient counseling
- Check Tech exercises
- Cardiovascular case study and IV NTG preparation
- MTM and dyslipidemia
- CHF and patient discharge counseling

- Business plan and Pharmacy Practice
- ACLS/Arrhythmias and Digoxin toxicity

### **Third Year Spring Semester**

Pharmacoeconomics and Outcomes - Introduction to the principles and tools of pharmacoeconomics and outcomes assessment that are commonly used to study the impact of pharmaceutical care services on the health and health care of a patient or community.

Bone and Joint Module – Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetics and pharmacotherapy (including both prescription and nonprescription medications) as they apply to bone and joint disease drug therapy management.

Special Populations Module - Provides enhanced coverage of pharmacologic and therapeutic issues relevant to populations with alternative pharmaceutical needs because of unique diseases and altered pharmacokinetics and pharmacodynamics outside of the defined normal adult population.

Respiratory Module - Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetics and pharmacotherapy (including both prescription and nonprescription medications) as they apply to respiratory drug therapy management.

Renal/Urology Module - Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetic and pharmacotherapy (including both prescription and non-prescription medications) as they apply to renal and urology drug therapy management.

Hematology/Oncology Module – Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetic and pharmacotherapy (including both prescription and non-prescription medications) as they apply to hematology and oncology drug therapy management.

Eye, Ears, Nose, Throat and Dermatology Module - Principles of pathophysiology, pharmacology, medicinal chemistry, clinical pharmacokinetic and pharmacotherapy (including both prescription and non-prescription medications) as they apply to EENT and dermatologic drug therapy management.

Electives – Student must choose from a list of approved electives

Integrated Lab Sequence VI – Focuses on:

- APhA Immunization Certification course
- Pediatric pharmacokinetics (vancomycin)
- Extemporaneous compounding lansoprazole solution and ketoprofen gel
- Calculations, use of package insert, and sterile compounding prep for an antibiotic and a placebo chemotherapy agent
- Use of NCCN guidelines to make recommendations for chemotherapy regimen.
- Written communications including SOAP notes and FARM notes
- Patient counseling on cold case scenarios regarding appropriate therapy and use of inhalers for COPD and/or Asthma, smoking cessation agents, oral contraceptives, and emergency contraceptives.
- Treatment plans for a mock hospitalized renal patient
- Health literacy in low-vision patients

**Fourth Year**

Advanced Community Pharmacy Practice Experience – Application of knowledge, skills, and attitudes necessary to provide pharmaceutical care in the community pharmacy setting

Advanced Institutional Pharmacy Practice Experience – Application of knowledge, skills, and attitudes necessary to provide pharmaceutical care and manage the pharmacy practice in the institutional setting

Ambulatory Care Pharmacy Practice Experience - Application of the knowledge, skills, and attitudes necessary to provide pharmaceutical care in ambulatory care settings.

Adult Medicine Pharmacy Practice Experience - Application of the knowledge, skills, and attitudes necessary to provide pharmaceutical care in acute care settings.

Patient Care Elective I – Application of knowledge, skills, and attitudes necessary to provide pharmaceutical care in the specialty pharmacy setting

Patient Care Elective II – Application of the knowledge, skills, and attitudes necessary to provide pharmaceutical care in the specialty pharmacy setting

Patient Care or Non-Patient Care Elective III – Application of the knowledge, skills, and attitudes necessary to provide pharmaceutical care in the specialty pharmacy setting