



# College of Pharmacy PharmD Program Handbook



# College of Pharmacy PharmD Program Handbook

## Prepared by

Abdulrhman S. Alsayari, BPharm, PhD

Sultan M. Alshahrani, PharmD, PhD

Wael A. Alghamdi, PharmD, PhD

## Table of Contents

1.	KING KHALID UNIVERSITY.....	3
1.1	ABOUT THE UNIVERSITY.....	3
1.2	VISION .....	3
1.3	MISSION.....	3
1.4	GOALS.....	3
2.	COLLEGE OF PHARMACY .....	4
2.1	ABOUT THE COLLEGE.....	4
2.2	VISION .....	4
2.3	MISSION.....	4
2.4	GOALS.....	4
2.5	MAJOR VALUES.....	5
3.	PHARM D PROGRAM.....	6
4.	PHARM D PROGRAM LEARNING OUTCOMES.....	7
1.	KNOWLEDGE .....	7
2.	SKILLS .....	7
3.	COMPETENCIES.....	7
3.1	AUTONOMY & RESPONSIBILITY.....	7
3.2	PRACTICE.....	7
3.3	ATTRIBUTES .....	8
5.	PHARM D PROGRAM OUTLINE .....	9
6.	COURSE DETAILS BY DEPARTMENTS.....	14
7.	ACADEMIC PLAN OF PHARM D PROGRAM .....	18
8.	COURSES OVERVIEW – DEPARTMENT OF PHARMACEUTICAL CHEMISTRY .....	21
9.	COURSES OVERVIEW – DEPARTMENT OF PHARMACOGNOSY .....	27
10.	COURSES OVERVIEW – DEPARTMENT OF PHARMACEUTICS.....	31
11.	COURSES OVERVIEW – DEPARTMENT OF PHARMACOLOGY.....	40
12.	COURSES OVERVIEW – DEPARTMENT OF CLINICAL PHARMACY.....	46

## **1. King Khalid University**

### **1.1 About the university**

On Tuesday 09/01/1419 AH (06/05/1998) HRH Crown Prince ordered the merger of Imam Mohammad Ibn Saud Islamic University and King Saud University in the Southern Region into one entity under the new identity of 'King Khalid University'. Later, on 11/3/1419 AH (6/7/1998 AD), a Royal Decree, Decree 7/78/M was issued to complete all regular procedures necessary to effect the merger. The University's first budget was issued on 14/09/1419 AH (02/01/1999 AD) within the general state budget.

The King Khalid University is located in Asir region in the southwestern part of Saudi Arabia. The area of Asir region is about 80,000 square kilometers occupied with more than 1,600,000 people distributed in seventy eight governorate and centers.

### **1.2 Vision**

King Khalid University in the top 200 universities worldwide by 2030.

### **1.3 Mission**

To provide an academic environment conducive to teaching, learning, scientific research and social contribution through optimal utilization of our resources.

### **1.4 Goals**

- To enhance teaching and learning quality.
- To provide a facilitative academic environment.
- To promote effective partnership with the community.
- To support and promote scientific research.
- To improve graduate studies.
- To develop institutional performance.
- To increase financial resources.

## **2. College of Pharmacy**

### **2.1 About the college**

The College of Pharmacy (COP) is a part of the University's Health Colleges System, along with the other health colleges including the Colleges of Medicine, Dentistry, and Applied Medical Sciences (at Abha and Khamis Mushait). The COP at KKU was established in 2003 in Abha. The College has five departments: Pharmaceutical Chemistry, Pharmacognosy, Pharmaceutics, Pharmacology, and Clinical Pharmacy. At its inception, it offered only the program of Pharmaceutical Sciences (BPharm) as its entry-level degree. In response to the national and international trends in pharmacy education, KKU began offering the Doctor of Pharmacy (PharmD) program in 2010, in addition to the BPharm program. The BPharm program is five years in length, while the PharmD program is six years long.

The pharmacy programs are delivered in English, and both programs follow the same curriculum for the first three years, but they differ in the fourth and fifth years. In terms of the training period, BPharm students undergo four months of training, while PharmD students undertake one year. The BPharm program trains students in pharmaceutical sciences, after which the graduates will have the necessary experience to move into related science fields, such as hospital or community pharmacies, pharmaceutical companies or marketing. The pharmacy training period consists of three rotations, two mandatory rotations and one elective rotation. On the other hand, the PharmD program is a professional level degree, covering pharmaceutical sciences with a focus on the clinical aspects that will allow graduates to work efficiently in hospitals with the medical team. The pharmacy training periods, known as Advanced Pharmacy Practice Experiences (APPEs), have been designed to provide students with various experiences in clinical pharmacy areas, including hospitals or health institutions, community pharmacies, ambulatory care, and acute care/internal medicine. The APPEs consist of eight rotations, with four mandatory rotations and four elective rotations. In Saudi Arabia, the BPharm degree and the PharmD degree are equivalent in terms of registration as a pharmacist with the Saudi Commission for Health Specialties. However, the COP has suspended student acceptance to the BPharm program as of the first semester of 2019/20 (1441H). This decision was taken to fulfill one of the objectives under the strategic goal to improve pharmacy education and practice (Strategic Plan 2016-2021).

### **2.2 Vision**

To accomplish national and international recognition for excellence and innovation in pharmacy education, scientific research, and community service.

### **2.3 Mission**

Graduating pharmacists capable of playing an effective and efficient role within the health care professional team to serve the community through direct patient care, scientific research and community engagement.

### **2.4 Goals**

- Improve the quality of pharmacy education and practice.
- Recruit, develop, and retain distinguished faculty members to improve education and research.
- Promote educational environment and cooperation among pharmacy and other health care disciplines.
- Accommodate with the organization administrative processes and measures to provide support to the academic programs.
- Encourage high impact scientific research, postgraduate education, and enrich resources.
- Provide high quality continuous pharmacy education and excellent pharmaceutical services to the community.

## **2.5 Major values**

Honesty, commitment, respect, excellence, innovation and transparency.

### **3. PharmD Program**

The PharmD program at the College of Pharmacy, King Khalid University, is designed to provide a distinctive undergraduate program for clinical and pharmacy practices, and to graduate professional pharmacists who can work as drug therapy experts. The PharmD curriculum is structured around an integrated approach to drug therapy management. The study plan includes a six-year undergraduate degree program that consists of one preparatory year and five professional years. The five professional years of the PharmD program provide a combined academic and clinical experience for pharmacy students through a study plan that combines courses in basic and advanced pharmaceutical sciences. The academic year consists of two regular semesters and each semester consists of 15 weeks of classes, which are followed by two to three weeks of an examination period. The number of class hours each week is approximately 28 hours of instruction. The study plan provides students with a strong foundation in the pharmaceutical biomedical sciences and clinical sciences, as well as in social, behavioral, and administrative aspects of pharmacy practice. Foundational courses in the biomedical, pharmaceutical chemistry, pharmacology, and pharmaceutic sciences comprise the first three professional years of the program. The program also includes introductory (IPPE) and advanced (APPE) pharmacy practice experiences in government and private hospitals in primarily in the Asir region.

## **4. PharmD Program Learning Outcomes**

### **1. Knowledge**

- 1.1. Recall the scientific knowledge derived from pharmaceutical sciences including natural and synthetic drugs, pharmacodynamics pharmacokinetic profile, drug formulation and delivery and other disciplines.
- 1.2. Define scientific information related to biomedical sciences including functions of human body, biological, genetics, biotechnological, microbiological, and other aspects.
- 1.3. Recognize the basic principles of pharmacy practice involving therapeutics, evidence-based pharmaceutical care, pharmacy management, Pharmacoeconomics, pharmacoepidemiology, and other areas.
- 1.4. Recall necessary foundational knowledge of research and administrative skills required in pharmacy profession.

### **2. Skills**

- 2.1. Implement knowledge from the foundational sciences to become a medication therapy expert.
- 2.2. Apply the knowledge derived from different pharmaceutical areas in conducting research studies in the fields of pharmacy practice and pharmaceutical sciences.
- 2.3. Utilize evidence-based drug information retrieved from authentic resources to fulfill an appropriate patient- centered treatment plan.
- 2.4. Illustrate life-long learning in the field of pharmaceuticals, biomedical sciences and pharmacy practice.

### **3. Competencies**

#### **3.1 Autonomy & Responsibility**

- 3.1.1. Show responsibility and accountability through advocating patients' right to safe and effective medication use.
- 3.1.2. Demonstrate leadership abilities through professionalism, self- and time-management, and teamwork skills that help resolving challenges in the pharmacy profession.

#### **3.2 Practice**

- 3.2.1. Demonstrate effective verbal and written communication and counseling skills when interacting with patients, healthcare professionals and the public.
- 3.2.2. Retrieve information from electronic and scientific database towards pharmaceutical care improvement.
- 3.2.3. Interpret information obtained from various pharmacy-related resources regarding drug dosing, clinical pharmacokinetic parameters, and statistical data relevant to pharmacy practice and research.
- 3.2.4. Contribute to decision making process by constructing patient-centered evidence-based pharmaceutical care plan and medical recommendations.



### **3.3 Attributes**

- 3.3.1 Demonstrate high level of professional and ethical behavior with mutual respect towards patients and other healthcare professionals.
- 3.3.2 Participate actively in enhancing the health care profession and general public awareness.

## 5. PharmD Program Outline

### University and Medical College Requirements

University Requirements	12 Credit Hours
Medical College Requirements	20 Credit Hours
<b>Total</b>	<b>32 Credit Hours</b>

### University Requirements

Course Code	Course Title	Credit Hours
ICI - 111	The Entrance to the Islamic Culture	2
ICI - 112	Islamic Culture II	2
ICI - 113	Islamic Culture III	2
ICI - 114	Islamic Culture IV	2
ARAB - 201	Arabic Language Skills	2
ARAB - 202	Arabic Editing	2
<b>Total</b>		<b>12</b>

### Medical College Requirements

Course Code	Course Title	Credit Hours
ENG - 019	Intensive English Program	6
PHYS - 102	Physics for Health Sciences	4
ZOOL - 105	Zoology for Health Sciences	4
CHEM - 110	General Chemistry for Health Sciences	2
CHEM - 111	Organic Chemistry for Health Sciences	3
COMM - 141	Basic Biostatistics	1
<b>Total</b>		<b>20</b>

### College Requirements

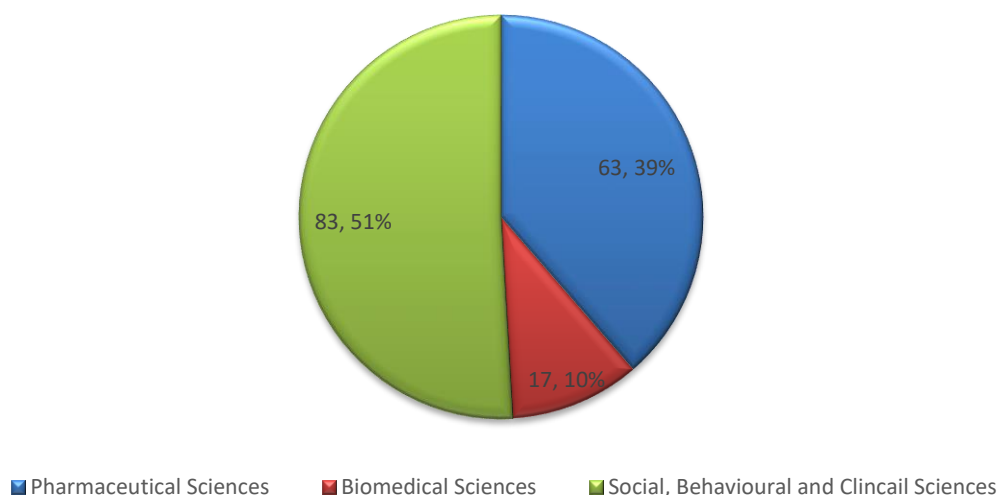
**Core Courses:**

Biomedical Sciences	17 Credit Hours
Pharmaceutical Sciences	63Credit Hours
Social, Behavioral and Clinical Sciences	83 Credit Hours
<b>Total</b>	<b>163 Credit Hours</b>

**Elective Courses:**

Elective course I - Industrial Pharmacy	2 Credit Hours
Elective course I - Drug Discovery	
Elective course II - Pharmacogenomics	2 Credit Hours
Elective course II - Pharmaceutical Biotechnology	
<b>Total</b>	<b>4 Credit Hours</b>

**Credit Hour Distribution in Core Courses**



**Biomedical Sciences**

SN	Course Code	Name of the Course	Lectures (Theory)	Practical	Credit Hrs	Contact Hrs
1.	PSL - 214	Structure & Function of Human Body I	4	0	4	4
2.	PSL - 215	Structure & Function of Human Body II	4	0	4	4
3.	PSL - 331	Pathophysiology	3	0	3	3
4.	MBC - 223	Biochemistry I	2	1	3	4
5.	MBC - 228	Biochemistry II	2	1	3	4
<b>Total</b>					<b>17</b>	<b>19</b>

### Pharmaceutical Sciences

SN	Course Code	Name of the Course	Lectures (Theory)	Practical	Credit Hrs	Contact Hrs
1.	PHG - 310	Basics of Natural Products	2	1	3	4
2.	PHG - 411	Complementary & Alternative Medicine	2	0	2	2
3.	PHG - 513	Nutraceuticals & Dietary Supplements	3	0	3	3
4.	PCH - 201	Pharmaceutical Organic Chemistry	3	1	4	5
5.	PCH - 202	Pharmaceutical Analytical Chemistry	2	1	3	4
6.	PCH - 303	Medicinal Chemistry I	3	0	3	3
7.	PCH - 304	Medicinal Chemistry II	3	1	4	5
8.	PCH - 405	Medicinal Chemistry III	3	0	3	3
9.	PHT - 220	Fundamentals of Pharmaceutics	2	1	3	4
10.	PHT - 222	Physical Pharmacy	2	1	3	4
11.	PHT - 223	Microbiology	2	1	3	4
12.	PHT - 321	Immunology	2	0	2	2
13.	PHT - 320	Pharmaceutics I	3	1	4	5
14.	PHT - 323	Pharmaceutics II	3	1	4	5

15.	PHT - 421	Biopharmaceutics & Pharmacokinetics	3	0	3	3
16.	PHT - 521	Modern Pharmaceutical Technology	2	0	2	2
17.	PHL - 331	Pharmacology I	3	0	3	3
18.	PHL - 333	Pharmacology II	3	1	4	5
19.	PHL - 435	Pharmacology III	2	1	3	4
20.	PHL - 436	Pharmacology IV	2	0	2	2
21.	PHL - 537	Toxicology	2	0	2	2
22.	PCH - 406	Drug Discovery (Elective)	2	0	2	2
23.	PHT - 422	Industrial Pharmacy (Elective)				
24.	PHG - 514	Pharmaceutical Biotechnology (Elective)	2	0	2	2
25.	PHL - 538	Pharmacogenomics (Elective)				
<b>Total</b>					<b>67</b>	<b>78</b>

### Social, Behavioral and Clinical Sciences

SN	Course Code	Name of the Course	Lectures (Theory)	Practical	Credit Hrs	Contact Hrs
1	CPH - 241	Pharmacy Orientation	2	0	2	2
2.	CPH - 442	Therapeutics I	4	1	5	7
3.	CPH - 452	Therapeutics II	4	1	5	7
4.	CPH - 553	Therapeutics III	4	1	5	7
5.	CPH - 554	Therapeutics IV	4	1	5	7
6.	CPH - 454	Clinical Pharmacokinetics	2	1	3	4
7.	CPH - 555	Pharmacoepidemiology & Research Methodology	3	0	3	3
8.	CPH - 548	Evidence Based Practice (Drug Information & Literature Evaluation)	2	1	3	4
9.	CPH - 450	Pharmacy Management (Hospital Pharmacy, Pharmacy)	3	0	3	3

		Administration & Pharmacoeconomics)				
10.	CPH - 560	PharmD Seminar	0	1	1	3
11.	CPH - 556	Self-Care & Nonprescription Drugs	2	0	2	2
12.	CPH - 559	First Aid & Emergency Medicine	0	1	1	3
13.	CPH - 348	Professional Pharmacy Practice Laboratory I	1	1	2	4
14.	CPH - 451	Professional Pharmacy Practice Laboratory II	2	1	3	5
15.	CPH - 558	Professional Pharmacy Practice Laboratory III	2	1	3	5
16.	CPH - 557	Pharmacy Regulation & Ethics	1	0	1	1
17.	CPH - 360	Introductory Pharmacy Practice Experiences I	0	2	2	4
18.	CPH - 460	Introductory Pharmacy Practice Experiences II	0	2	2	4
19.	CPH - 651	Advanced Pharmacy Practice Experiences I	0	4	4	8
20.	CPH - 652	Advanced Pharmacy Practice Experiences II	0	4	4	8
21.	CPH - 653	Advanced Pharmacy Practice Experiences III	0	4	4	8
22.	CPH - 654	Advanced Pharmacy Practice Experiences IV	0	4	4	8
23.	CPH - 655	Advanced Pharmacy Practice Experiences V	0	4	4	8
24.	CPH - 656	Advanced Pharmacy Practice Experiences VI	0	4	4	8
25.	CPH - 657	Advanced Pharmacy Practice Experiences VII	0	4	4	8
26.	CPH - 658	Advanced Pharmacy Practice Experiences VIII	0	4	4	8
<b>Total</b>					<b>83</b>	<b>139</b>

**6. Course Details by Departments**

Department of Pharmaceutical Chemistry							
Course Code	Course Title	Level/ Semester	Units				Pre-requisite
			Lectures (Theory)	Practical	Credit Hrs	Contact Hrs	
PCH - 201	Pharmaceutical Organic Chemistry	3	3	1	4	5	CHEM - 110
PCH - 202	Pharmaceutical Analytical Chemistry	4	2	1	3	4	PCH - 201
PCH - 303	Medicinal Chemistry I	5	3	0	3	3	PCH - 201
PCH - 304	Medicinal Chemistry II	6	3	1	4	5	PCH - 303
PCH - 405	Medicinal Chemistry III	7	3	0	3	3	PCH - 304
PCH - 406 (Elective)	Drug Discovery	8	2	0	2	2	PCH - 405

Department of Pharmacognosy							
Course Code	Course Title	Level/ Semester	Units				Pre-requisite
			Lectures (Theory)	Practical	Credit Hrs	Contact Hrs	
PHG - 310	Basics of Natural Products	6	2	1	3	4	PCH - 201 PCH - 202
PHG - 411	Complementary & Alternative Medicine	7	2	0	2	2	PHG - 310 PHL - 331
PHG - 513	Nutraceuticals & Dietary Supplements	10	3	0	3	3	PHL - 435 CPH - 556
PHG - 514	Pharmaceutical Biotechnology	10	2	0	2	2	MBC - 228

Department of Pharmacology							
Course Code	Course Title	Level/ Semester	Units				Pre-requisite
			Lectures (Theory)	Practical	Credit Hrs	Contact Hrs	
PHL - 331	Pharmacology I	5	3	0	3	3	PSL - 215
PHL - 333	Pharmacology II	6	3	1	4	5	PHL - 331
PHL - 435	Pharmacology III	7	2	1	3	4	PHL - 333
PHL - 436	Pharmacology IV	8	2	0	2	2	PHL - 435
PHL - 537	Toxicology	9	2	0	2	2	PHL - 436
PHL - 538	Pharmacogenomics	10	2	0	2	2	PHL - 537 PHL - 436

Department of Pharmaceutics							
Course Code	Course Title	Level/ Semester	Units				Pre-requisite
			Lectures (Theory)	Practical	Credit Hrs	Contact Hrs	
PHT - 220	Fundamentals of Pharmaceutics	3	2	1	3	4	
PHT - 222	Physical Pharmacy	4	2	1	3	4	PHT - 220
PHT - 223	Microbiology	4	2	1	3	4	
PHT - 321	Immunology	5	2	0	2	2	PHT - 223
PHT - 320	Pharmaceutics I	5	3	1	4	5	PHT - 222
PHT - 323	Pharmaceutics II	6	3	1	4	5	PHT - 222 PHT - 320
PHT - 421	Biopharmaceutics & Pharmacokinetics	7	3	0	3	3	PHT - 320 PHT - 323
PHT - 422	Industrial Pharmacy	8	2	0	2	2	PHT - 320 PHT - 323
PHT - 521	Modern Pharmaceutical Technology	10	2	0	2	2	PHT - 320 PHT - 323



Department of Clinical Pharmacy							
Course Code	Course Title	Level/ Semester	Units				Pre-requisite
			Lectures (Theory)	Practical	Credit Hrs	Contact Hrs	
CPH - 241	Pharmacy Orientation	3	2	0	2	2	
CPH - 442	Therapeutics I	7	4	1	5	7	PHL - 331 PHL - 333 PCH - 303 PCH - 304 PSL - 331
CPH - 452	Therapeutics II	8	4	1	5	7	CPH - 442 PCH - 405 PHL - 435
CPH - 553	Therapeutics III	9	4	1	5	7	CPH - 452 PHL - 436
CPH - 554	Therapeutics IV	10	4	1	5	7	CPH - 553 PHT - 223 PHT - 321
CPH - 454	Clinical Pharmacokinetics	8	2	1	3	4	PHT - 421 CPH - 442
CPH - 555	Pharmacoepidemiology & Research Methodology	9	3	0	3	3	CPH - 452 CPH - 450
CPH - 548	Evidence Based Practice (Drug Information & Literature Evaluation)	9	2	1	3	4	CPH - 452
CPH - 450	Pharmacy Management	8	3	0	3	3	CPH - 348 CPH - 360
CPH 560	PharmD Seminar	10	0	1	1	3	CPH - 553

							CPH - 555 CPH - 451
CPH - 556	Self-Care & Nonprescription Drugs	9	2	0	2	2	PHL - 436 CPH - 442
CPH - 559	First Aid & Emergency Medicine	10	0	1	1	3	PSL - 331 CPH - 452
CPH - 348	Professional Pharmacy Practice Laboratory I	6	1	1	2	4	CPH - 241 PHL - 331
CPH - 451	Professional Pharmacy Practice Laboratory II	8	2	1	3	5	CPH - 442 CPH - 348 CPH - 360
CPH - 558	Professional Pharmacy Practice Laboratory III	10	2	1	3	5	CPH - 553 CPH - 451
CPH - 557	Pharmacy Regulation & Ethics	9	1	0	1	1	CPH - 450
CPH - 360	Introductory Pharmacy Practice Experiences I	SUMMER 6	0	2	2	4	CPH - 348
CPH - 460	Introductory Pharmacy Practice Experiences II	SUMMER 8	0	2	2	4	CPH - 450 CPH - 451 CPH - 360
CPH - 651	Advanced Pharmacy Practice Experiences I	SUMMER 10	0	4	4	8	All Courses
CPH - 652	Advanced Pharmacy Practice Experiences II	SUMMER 10	0	4	4	8	
CPH - 653	Advanced Pharmacy Practice Experiences III	11	0	4	4	8	
CPH - 654	Advanced Pharmacy Practice Experiences IV	11	0	4	4	8	
CPH - 655	Advanced Pharmacy Practice Experiences V	11	0	4	4	8	
CPH - 656	Advanced Pharmacy Practice Experiences VI	12	0	4	4	8	
CPH - 657	Advanced Pharmacy Practice Experiences VII	12	0	4	4	8	

## 7. Academic Plan of PharmD Program

Year	Level	Course Code	Course Title	Credit Hours	Required Course	Total Hours
1 <sup>st</sup>	1	ENG - 019	Intensive English Program	6 (6+0)		10
		ICI-111	The Entrance to the Islamic Culture	2 (2+0)		
		ARAB - 201	Arabic Language Skills	2 (2+0)		
	2	PHYS - 102	General Physics for Health Sciences	4 (3+1)		14
		ZOOL - 105	Zoology for Health Sciences	4 (3+1)		
		CHEM - 110	General Chemistry for Health Sciences	2 (1+1)		
		CHEM - 111	Organic Chemistry for Health Sciences	3 (2+1)		
		COMM - 141	Basic Biostatistics	1 (1+0)		
2 <sup>nd</sup>	3	PHT - 220	Fundamentals of Pharmaceutics	3 (2+1)		18
		PCH - 201	Pharmaceutical Organic Chemistry	4 (3+1)	CHEM - 110	
		PSL - 214	Structure & Function of Human Body I	4 (4+0)	ZOOL - 105	
		MBC - 223	Biochemistry I	3 (2+1)	CHEM - 110	
		CPH - 241	Pharmacy Orientation	2 (2+0)		
		ICI - 112	Islamic Culture II	2 (2+0)	ICI - 111	
	4	PHT - 222	Physical Pharmacy	3 (2+1)	PHT - 220	18
		PCH - 202	Pharmaceutical Analytical Chemistry	3 (2+1)	PCH - 201	
		MBC - 228	Biochemistry II	3 (2+1)	MBC - 223	
		PSL - 215	Structure & Function of Human Body II	4 (4+0)	PSL - 214	
		PHT - 223	Microbiology	3 (2+1)		
		ARAB - 202	Arabic Editing	2 (2+0)	ARAB - 201	
3 <sup>rd</sup>	5	PSL - 331	Pathophysiology	3 (3+0)	PSL - 215	17
		PCH - 303	Medicinal Chemistry I	3 (3+0)	PCH - 201	
		PHL - 331	Pharmacology I	3 (3+0)	PSL - 215	
		PHT - 321	Immunology	2 (2+0)	PHT - 223	
		PHT - 320	Pharmaceutics I	4 (3+1)	PHT - 222	
		ICI - 113	Islamic Culture III	2 (2+0)	ICI - 112	
	6	PCH - 304	Medicinal Chemistry II	4 (3+1)	PCH - 303	19
		PHL - 333	Pharmacology II	4 (3+1)	PHL - 331	
		PHT - 323	Pharmaceutics II	4 (3+1)	PHT - 222 PHT - 320	
		PHG - 310	Basics of Natural Products	3 (2+1)	PCH - 201 PCH - 202	
		CPH - 348	Professional Pharmacy Practice Laboratory I	2 (1+1)	CPH - 241 PHL - 331	
		CPH - 360	Introductory Pharmacy Practice Experiences I ( <b>Summer Training</b> )	2 (0+2)	CPH - 348	

4 <sup>th</sup>	7	PCH - 405	Medicinal Chemistry III	3 (3+0)	PCH - 304	16		
		PHL - 435	Pharmacology III	3 (2+1)	PHL - 333			
		CPH - 442	Therapeutics I	5 (4+1)	PHL - 331 PHL - 333 PCH - 303 PCH - 304 PSL - 331			
		PHT - 421	Biopharmaceutics & Pharmacokinetics	3 (3+0)	PHT - 320 PHT - 323			
		PHG - 411	Complementary & Alternative Medicine	2 (2+0)	PHG - 310 PHL - 331			
	8	PHL - 436	Pharmacology IV	2 (2+0)	PHL - 435	20		
		CPH - 452	Therapeutics II	5 (4+1)	CPH - 442 PCH - 405 PHL - 435			
		CPH - 454	Clinical Pharmacokinetics	3 (2+1)	PHT - 421 CPH - 442			
		CPH - 450	Pharmacy Management	3 (3+0)	CPH - 348 CPH - 360			
		CPH - 451	Professional Pharmacy Practice Laboratory II	3 (2+1)	CPH - 442 CPH - 348 CPH - 360			
		PHT - 422	Elective course I - Industrial Pharmacy	2 (2+0)	PHT - 320 PHT - 323			
		<b>OR</b>						
		PCH - 406	Elective course I - Drug Discovery	2 (2+0)	PCH - 405			
	CPH - 460	Introductory Pharmacy Practice Experiences II ( <b>Summer Training</b> )	2 (0+2)	CPH - 450 CPH - 451 CPH - 360				
5 <sup>th</sup>	9	PHL - 537	Toxicology	2 (2+0)	PHL - 436	18		
		CPH - 553	Therapeutics III	5 (4+1)	CPH - 452 PHL - 436			
		CPH - 557	Pharmacy Regulations & Ethics	1 (1+0)	CPH - 450			
		CPH - 555	Pharmacoepidemiology & Research Methodology	3 (3+0)	CPH - 452 CPH - 450			
		CPH - 556	Self-care & Nonprescription Drugs	2 (2+0)	PHL - 436 CPH - 442			
		ICI - 114	Islamic Culture IV	2 (2+0)	ICI - 113			
		CPH - 548	Evidence Based Practice	3 (2+1)	CPH - 452			
	10	CPH - 554	Therapeutics IV	5 (4+1)	CPH - 553	17		

					PHT - 223 PHT - 321		
		CPH - 558	Professional Pharmacy Practice Laboratory III	3 (2+1)	CPH - 553 CPH - 451		
		CPH - 559	First Aid & Emergency Medicine	1 (0+1)	PSL - 331 CPH - 452		
		CPH - 560	PharmD Seminar	1 (0+1)	CPH - 553 CPH - 555 CPH - 451		
		PHT - 521	Modern Pharmaceutical Technology	2 (2+0)	PHT - 320 PHT - 323		
		PHG - 513	Nutraceuticals & Dietary Supplements	3 (3+0)	PHL - 435 CPH - 556		
		PHL - 538	Elective course II - Pharmacogenomics	2 (2+0)	PHL - 537 PHL - 436		
		<b>OR</b>					
		PHG - 514	Elective course II - Pharmaceutical Biotechnology)	2 (2+0)	MBC-228		
<b>6<sup>th</sup></b>	<b>11</b>	CPH - 651	Advanced Pharmacy Practice Experience I ( <b>Summer Training</b> )	4 (0+4)	All Courses	<b>32</b>	
		CPH - 652	Advanced Pharmacy Practice Experience II ( <b>Summer Training</b> )	4 (0+4)			
		CPH - 653	Advanced Pharmacy Practice Experience III	4 (0+4)	All Courses		
		CPH - 654	Advanced Pharmacy Practice Experience IV	4 (0+4)			
		CPH - 655	Advanced Pharmacy Practice Experience V	4 (0+4)			
	<b>12</b>	CPH - 656	Advanced Pharmacy Practice Experience VI	4 (0+4)			
		CPH - 657	Advanced Pharmacy Practice Experience VII	4 (0+4)			
		CPH - 658	Advanced Pharmacy Practice Experience VIII	4 (0+4)			
<b>Total Credit Hours for The Program</b>						<b>199</b>	

## 8. Courses Overview – Department of Pharmaceutical Chemistry

### Course Information

**Code:** PCH-201

**Title:** Pharmaceutical Organic Chemistry

**Cr hr:** 3+1

**Level:** 3

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CHEM-110

### Course Description

The course provides the general introduction of organic chemistry, different functional groups, IUPAC nomenclatures and different classes of organic compounds covering their preparations, properties and reactions. The focus will be on the mechanism of reactions and stereochemical aspects of organic molecules. The chemistry and applications of heterocyclic compounds will be dealt in detail. The laboratory classes will involve the identification of different functionalities in organic compounds.

### Topics

- Introduction to organic chemistry
- Structure of organic molecules
- Classification and nomenclature of organic compounds
- Organic reactions and their mechanisms
- Review of aliphatic compounds
- Aromatic compounds: benzene and its derivatives
- Aromatic aldehydes and ketones
- Aromatic carboxylic acids
- Derivatives of carboxylic acids
- Phenols
- Aromatic amines
- Polynuclear aromatic compounds
- Heterocyclic compounds
- Stereo-chemistry

### Course Information

**Code:** PCH-202

**Title:** Pharmaceutical Analytical Chemistry

**Cr hr:** 2+1

**Level:** 4

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-201

### Course Description

The course provides the general ideas of analytical techniques and their applications in the field of pharmaceutical sciences – including volumetric methods of analysis (acid-base titrations, redox titrations, precipitation titrations, and complexometric titrations). The course will focus on Chromatography (TLC, LC, HPLC, and GC) and spectroscopy including UV-Vis spectrometry, infrared spectrometry, nuclear magnetic resonance spectroscopy and mass spectrometry.

### Topics

- Introduction to pharmaceutical analytical chemistry
- Analytical titrations
- Chromatography
- Gas chromatography
- High performance liquid chromatography
- Uv-visible spectroscopy
- Spectrofluorometry
- Infra-red spectroscopy
- Mass spectrometry
- Nuclear magnetic spectroscopy

### Course Information

**Code:** PCH-303

**Title:** Medicinal Chemistry I

**Cr hr:** 3+0

**Level:** 5

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-201

### Course Description

The course provides an understanding of the fundamental principles of medicinal chemistry. The student will be introduced to primary drug targets, physicochemical properties in relation to biological action, drug metabolism, role of stereochemistry in drug action and drug transporters. It also covers the development of drugs acting on autonomic nervous system, non-steroidal anti-inflammatory drugs, opioid analgesics, antihistamines and antiulcer drugs with emphasis on structure activity relationship. The students will also be introduced to the biotechnology drugs.

### Topics

- Introduction to medicinal chemistry
- Drugs and drug targets
- Physicochemical properties in relation to biological action
- Stereochemistry and drug action
- Drug metabolism
- Membrane drug transporters
- Adrenergic drugs
- Non-steroidal anti-inflammatory drugs
- Opioid analgesics
- Antihistaminic drugs
- Gastrointestinal drugs



### Course Information

**Code:** PCH-304

**Title:** Medicinal Chemistry II

**Cr hr:** 3+1

**Level:** 6

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-303

### Course Description

This course is designed to provide the knowledge to the students on physicochemical properties in relation to biological action, drug metabolism, role of stereochemistry in drug action and drug transporters. It covers the development of drugs acting on central nervous system, cardiovascular system, local anesthetics and diuretics with emphasis on structural features of drug molecules that are responsible for their activity (structure-activity relationships; SARs). The synthesis of some biologically important drugs will be introduced in this course. The purpose of practical section of this course is to expose the student to some synthetic and purification techniques in medicinal chemistry with some selected drugs.

### Topics

- General anesthetics
- Sedatives and hypnotics
- Antianxiety agents
- Antipsychotics
- Anti-epileptics (anticonvulsants)
- Antiparkinsonian drugs
- CNS stimulants
- Antidepressants
- Drugs affecting serotonergic neurotransmission
- Local anesthetics
- Cardiovascular drugs:
  - Anti-anginal drugs
  - Anti-arrhythmic drugs
  - Antihypertensive drugs
  - Antihyperlipidemic drugs
- Antithrombotics
- Diuretics

### Course Information

**Code:** PCH-405

**Title:** Medicinal Chemistry III

**Cr hr:** 3+0

**Level:** 7

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-304

### Course Description

This course is designed to provide the knowledge to the students on physicochemical properties in relation to biological action, drug metabolism, role of stereochemistry in drug action and drug transporters. It covers the development of chemotherapeutic agents such as anticancer, antibacterial, antimycobacterial, antiviral, antifungal and antiparasitic agents with emphasis on structural features of drug molecules that are responsible for their activity (structure-activity relationships; SARs).

### Topics

- Introduction
- Synthetic antibacterial agents
- Antibiotics
- Antimycobacterial drugs
- Antiparasitic drugs
- Antifungal agents
- Antiviral agents
- Anticancer agents
- Steroidal and other hormonal agents

### Course Information

**Code:** PCH-406

**Title:** Drug Discovery

**Cr hr:** 2+0

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-405

### Course Description

Drug discovery course aims to provide students with an understanding of the process of drug discovery and development from the identification of novel drug targets to the introduction of new drugs into clinical practice. It covers the basic principles of how new drugs are discovered with emphasis on lead identification, lead optimization, classification and kinetics of molecules targeting enzymes and receptors, prodrug design and applications, as well as structure-based drug design methods. Recent advances in the use of computational and combinatorial chemistry in drug design will also be presented.

### Topics

- Introduction to drug design and discovery
- Sources of drugs and lead compounds
- Rationale approaches to lead optimization
- Enzymes as targets of drug design
- Receptors as targets of drug design
- Prodrug design and applications
- Combinatorial chemistry
- Computer-aided drug design

## 9. Courses Overview – Department of Pharmacognosy

### Course Information

**Code:** PHG-310

**Title:** Basics of Natural Products

**Cr hr:** 2+1

**Level:** 6

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-201, PCH-202

### Course Description

This course introduces the importance of pharmacognosy as an applied branch of science. It shows the steps required for drug discovery from natural products as well as its quality control. It gives a detailed study of primary and secondary metabolites present in the plants, such as; carbohydrates, lipids, tannins, alkaloids, glycosides, and essential oils. Emphasis is given to the chemistry and uses of certain selected compounds from these classes and their biological sources.

### Topics

- Introduction and history of pharmacognosy
- Drug discovery from natural products
- Extraction of phytoconstituents
- Introduction to primary and secondary metabolites
- Carbohydrates
- Tannins
- Glycosides
- Alkaloids
- Volatile oils
- Quality control of natural products

### Course Information

**Code:** PHG-411

**Title:** Complementary and Alternative Medicine

**Cr hr:** 2+0

**Level:** 7

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHG-310, PHL-331

### Course Description

This course provides an overview of complementary and alternative medicine (CAM) practices utilized by number of health-care practitioners. It introduces the philosophies, techniques, and evidence of the efficacy of CAM therapeutics currently in use, including homeopathy, naturopathy, aromatherapy, acupuncture, chiropracty and herbal medicine. The history and development of these selected CAM practices, how they work, and their relationship to conventional allopathic medicine are discussed. The course also covers herbal medicine as one of the complementary practices where the students get acquainted with the use of herbal drugs for the prevention and treatment of some of the common diseases.

### Topics

- Introduction to complementary and alternative medicine
- Homeopathy
- Aromatherapy
- Acupuncture
- Chiropracty
- Naturopathy
- Herbal medicine

### Course Information

**Code:** PHG-513

**Title:** Nutraceuticals and Dietary Supplements

**Cr hr:** 3+0

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-435, CPH-556

### Course Description

This course is intended to give basic knowledge about the nutraceuticals and dietary supplements, including their history, scope and future prospective. It gives detailed knowledge about various nutraceuticals available in the market which are reported to have therapeutic effect in many ailments affecting different systems in the human body such as the cardiovascular, the central nervous, and the respiratory systems. The course also describes the different nutraceuticals and dietary supplements available for bone, eye and oral health, as well as weight management and cancer prevention.

### Topics

- Introduction
- Joint Health
- Cardiovascular Health
- Cancer prevention
- Women's health
- Weight management
- Mental health
- Respiratory Health
- Oral Health
- Miscellaneous nutraceuticals

### Course Information

**Code:** PHG-514

**Title:** Pharmaceutical Biotechnology

**Cr hr:** 2+0

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** MBC-228

### Course Description

The course will serve as an introductory course on biotechnological approaches that are used in the production of clinically useful biopharmaceuticals. The course will review topics like cell structure and organization, protein synthesis (transcription and translation) and structure of protein. The course will introduce students to biotechnological concepts recombinant DNA technology, monoclonal antibodies, gene therapy, vaccines, stem cells and fermentation. The course will also deal with analytical techniques like gel electrophoresis, southern, northern and western blotting, dot-blot hybridization, DNA sequencing, polymerase chain reaction and Enzyme linked immunosorbent assay.

### Topics

- Introduction to pharmaceutical biotechnology
- Cell structure and organization
- Amino acids and proteins
- Nucleic acids and protein synthesis
- Recombinant DNA technology
- Analytical techniques
- Monoclonal antibodies
- Gene therapy
- Vaccines
- Stem cell technology
- Transgenic and knockout mice
- Fermentation technology

## 10. Courses Overview – Department of Pharmaceutics

### Course Information

**Code:** PHT-220

**Title:** Fundamentals of Pharmaceutics

**Cr hr:** 2+1

**Level:** 3

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** None

### Course Description

This course is designed to impart a fundamental understanding of the pharmaceutical basics relevant to dosage forms, development and production. This course covers parts of prescription, abbreviation, model prescription, labeling, weighing and measuring for compounding extemporaneous preparation and related incompatibilities. In addition, calculations needed in prescription and compounding of pharmaceutical preparations are covered.

### Topics

- Introduction
- Pharmaceutical dosage forms
- Pharmaceutical routes of administration
- Basics of ADME algebra and graphs
- Prescription
- Labelling techniques
- Units and systems
- Concentration and dilution
- Dose calculations
- Isotonic and buffer solutions
- Compounding specialized formulas
- Incompatibilities



### Course Information

**Code:** PHT-222

**Title:** Physical Pharmacy

**Cr hr:** 2+1

**Level:** 4

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-220

### Course Description

This course deals with basic physicochemical properties influencing pharmaceutical dosage form design and efficiency. This course helps pharmacy student to understand the concepts of different liquid dosage forms and their applications. The following key topics will cover: molecular forces, different types of solutions, buffered and isotonic solutions, surface and interfacial phenomena, complexation, colloids, and rheology.

### Topics

- Intermolecular binding forces
- States of matter
- Phase equilibria and the phase rule
- Buffers
- Solutions of non-electrolytes
- Solutions of electrolytes
- Rheology
- Surface and interfacial phenomena
- Colloids
- Concept of complexation

### Course Information

**Code:** PHT-223

**Title:** Microbiology

**Cr hr:** 2+1

**Level:** 4

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** None

### Course Description

This is an introductory study of microbiology. This course provides basic theoretical and practical knowledge of structures and functions of bacteria, viruses, fungi and parasites to students. The course covers basic physiology of microbes, it also deals with the mechanism of infection, pathogenesis, transmission and control of several different microbes as well as introduces the basic concept of disinfectants. Metabolic engineering and microbial biotransformation are also part of the curriculum.

### Topics

- Introduction to Microbiology
- Prokaryotic Microbes: Bacteria
- Eukaryotic Microbes: Fungi
- Eukaryotic Microbes: Parasites
- Virology
- Disinfectants
- Metabolic engineering and microbial biotransformation

### Course Information

**Code:** PHT-320

**Title:** Pharmaceutics I

**Cr hr:** 3+1

**Level:** 5

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-222

### Course Description

The course addresses the design principles of pharmaceutical formulation, dosage forms and current manufacturing practices for solid and semi-solid dosage forms. Three main parts are covered in the course: fundamentals of designing solid dosage forms, fundamentals of designing semi-solid dosage forms and dosage form in percutaneous drug delivery. The student should be able to select the correct dosage forms for a given drug and to design a manufacturing process for the selected dosage form upon successful completion of the course.

### Topics

- Powders and granules
- Tablets
- Capsules
- Topical Preparations
- Transdermal drug delivery systems (TDDS)

### Course Information

**Code:** PHT-321

**Title:** Immunology

**Cr hr:** 2+0

**Level:** 5

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-223

### Course Description

This course familiarizes students on how the human body defense system protects the body against pathogenic agents (foreign or self) responsible for causing diseases as well as the molecular and cellular factors involved in preventing and controlling those diseases. The key topics in the course are: basic concepts of immunity, immune responses and regulations, autoimmunity, immunodeficiency diseases and pharmaceutical immunological products and their roles in prophylaxis, transplantation and diagnostics.

### Topics

- Basic concept of immunity and immune systems
- The innate immune system
- Vaccines
- Clinical aspects of immunity
- Immunoassays and immunodiagnostics

### Course Information

**Code:** PHT-323

**Title:** Pharmaceutics II

**Cr hr:** 3+1

**Level:** 6

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-222, PHT-320

### Course Description

This course designed to help pharmacy student to understand the concepts of liquid dosage forms, types of these dosages (pharmaceutical solutions, pharmaceutical suspensions, and pharmaceutical emulsions), preparation methods, rationale of clinical uses, applications, their benefits over other oral dosage forms and common stability issues. In addition, this course deals with the principles and techniques involved in the formulation of sterile and ophthalmic dosage forms. Moreover, the following main topics are going to be covered: methods of sterilization, sterile preparation facilities, handling and administration, small and large-scale preparations, IV admixture incompatibility and ophthalmic preparations and their packaging.

### Topics

- Pharmaceutical solutions
- Coarse dispersions (suspensions)
- Emulsions
- Introduction to sterile dosage forms
- Formulation of parenteral products
- Aseptically dispensed solutions
- Calculations associated with parenteral formulations
- Biologics
- Ophthalmic preparations
- Otic and Nasal preparations
- Introduction to sterilization
- Clean room
- Packaging and stability of sterile dosage form

### Course Information

**Code:** PHT-421

**Title:** Biopharmaceutics and Pharmacokinetics

**Cr hr:** 3+0

**Level:** 7

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-320, PHT-323

### Course Description

This course acquaints students with the fundamental concepts that determine the time course of drug concentrations in the body. A comprehensive understanding of the drug journey (absorption, distribution, metabolism and elimination) within human body will be explained and interrelated to the basic pharmacokinetics of a drug. In addition, this course introduces basic principles and concepts of pharmacokinetics parameters and modeling.

### Topics

- Pharmacokinetics: basic consideration
- Absorption of drugs
- Distribution of drugs
- Protein binding of drugs
- Biotransformation of drugs
- Excretion of drugs
- Bioavailability and bioequivalence
- Basics of pharmacokinetics

### Course Information

**Code:** PHT-422

**Title:** Industrial Pharmacy

**Cr hr:** 2+0

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-320, PHT-323

### Course Description

The course deals with the main operations that take place in industrial pharmacy and the equipment carrying out such operations. These operations include: size reduction, particle size analysis and mixing, filtration, heat flow, drying process, freeze drying, spray drying, evaporation, crystallization, tablets, tablet coating. Students are able to understand the common knowledge of other industrial aspects such as good manufacturing practice (GMP) and quality assurance are also included in this course. Emphasis will be given to pharmaceutical machines.

### Topics

- Introduction to industrial Pharmacy
- Mixing
- Size reduction
- Particle-size analysis
- Filtration
- Centrifugation drying
- Heat flow
- Evaporation
- Good manufacturing practice (GMP)
- Crystallization
- Industrial hazards and plant safety

### Course Information

**Code:** PHT-521

**Title:** Modern Pharmaceutical Technology

**Cr hr:** 2+0

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-320, PHT-323

### Course Description

Principles and techniques involved in this course are dealt with the latest advances in pharmaceutical drug delivery and targeting system. The purposes of this course are the study at the advanced level of the physical and biological strategies which apply to the design, development, and evaluation of modern drug delivery systems.

### Topics

- Introduction to modern pharmaceutical technology
- Controlled drug delivery systems
- Targeted drug delivery systems
- Microtechnology drug delivery systems
- Nanotechnology and nanomedicines for drug delivery ocular drug delivery systems
- Nasal and pulmonary drug delivery systems
- Drug delivery through blood –brain barrier
- Oral protein and peptide delivery
- Biosimilar medicines
- Pharmaceutical gene delivery systems
- Recent advances in cancer therapy



## 11. Courses Overview – Department of Pharmacology

### Course Information

**Code:** PHL-331

**Title:** Pharmacology I

**Cr hr:** 3+0

**Level:** 5

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PSL-215

### Course Description

This course is designed to develop an understanding of the theoretical concepts surrounding pharmacology, such as the pharmacokinetics and pharmacodynamics of drugs, and the concepts surrounding pharmacotherapy. It gives specific information concerning the drugs which are acting on the peripheral nervous system, gastrointestinal system and respiratory system. For every class of drugs, the mode of action, the clinical effects and the side effects will be emphasized.

### Topics

- Introduction
- Drug receptors and pharmacodynamics
- Pharmacokinetics and pharmacodynamics
- Drug biotransformation
- Introduction to autonomic pharmacology
- Cholinoceptor-activating and cholinesterase-inhibiting drugs
- Cholinoceptor-blocking drugs
- Skeletal muscle relaxants
- Adrenoceptor agonists sympathomimetic drugs
- Adrenoceptor antagonist drugs
- Agents used in cytopenias and hematopoietic growth factors
- Histamine, serotonin, and ergot alkaloids
- Eicosanoids: prostaglandins, thromboxanes, leukotrienes, and related compounds
- Drugs used in asthma
- Drugs used to treat chronic obstructive pulmonary disease, allergic rhinitis, and cough
- Drugs used in the treatment of gastrointestinal diseases

### Course Information

**Code:** PHL-333

**Title:** Pharmacology II

**Cr hr:** 3+1

**Level:** 6

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-331

### Course Description

This course introduces the student to central nervous system and cardiovascular pharmacology. Students will be taught disorders related to central nervous system and cardiovascular system along with classification, pharmacological actions, mechanisms of action, drug interaction, and clinical applications of drugs used in central nervous system and cardiovascular system and nonsteroidal anti-inflammatory drugs. The practical part of the course deals with the verification of the actions of drugs studied in the theoretical part of the course using appropriate practical demonstrations.

### Topics

- Antihypertensive agents
- Vasodilators and the treatment of angina pectoris
- Agents used in heart failure
- Agents used in cardiac arrhythmias
- Diuretics
- Agents used in dyslipidemia
- Drugs used in disorders of coagulation
- Introduction to the pharmacology of central nervous system drugs
- Sedative-hypnotic drugs
- Antiseizure drugs
- General anesthetics
- Local anesthetics
- Pharmacologic management of parkinsonism and other movement disorders
- Antipsychotic agents and lithium
- Antidepressants
- Nonsteroidal anti-inflammatory drugs, disease modifying antirheumatic drugs, nonopioid analgesics and drugs used in gout
- Opioid analgesics and antagonists
- Drugs of abuse

### Course Information

**Code:** PHL-435

**Title:** Pharmacology III

**Cr hr:** 2+1

**Level:** 7

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-333

### Course Description

This course introduces the student to endocrine pharmacology and antimicrobial drugs. Students will be taught pharmacokinetics, classification, pharmacological actions, mechanism of action, therapeutic uses, drug interactions, and adverse drug reactions of drugs involved in endocrine pharmacology and antimicrobial drugs. The practical part of the course deals with the application to the uses of drugs studied in the theoretical part of the course and drug-interaction using case studies and presentations.

### Topics

- Pancreatic hormones and antidiabetic drugs
- Hypothalamic pituitary hormones
- Thyroid and antithyroid drugs
- Adrenocorticosteroids and adrenocortical antagonists
- The gonadal hormones and inhibitors
- Drug interactions
- Introduction to antibiotics
- Beta lactams and other cell-wall and membrane-active antibiotics
- Protein synthesis inhibitors
- Folic acid synthesis and inhibitors
- DNA gyrase inhibitors

### Course Information

**Code:** PHL-436

**Title:** Pharmacology IV

**Cr hr:** 2+0

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-435

### Course Description

The course aims to develop the student's ability to implement individualized pharmaceutical care for people receiving chemotherapy including immunotherapy and to identify and manage common side effects and drug-drug interactions, using current evidence-based practices. This course will provide an introduction to the principles of chemotherapy and to examine the mechanisms by which drugs may have anticancer effects and immunomodulating effects. This course also focused to develop pharmacological knowledge on drugs commonly used in pediatrics, geriatrics and pregnant patients.

### Topics

- Anti-mycobacterial drugs
- Dermatological pharmacology
- Anthelmintic drugs
- Antiprotozoal drugs
- Antiviral agents
- Cancer chemotherapy
- Immunopharmacology
- Development and regulation of drugs
- Drugs used in pregnancy
- Drugs used in pediatric and geriatric pharmacology

### Course Information

**Code:** PHL-537

**Title:** Toxicology

**Cr hr:** 2+0

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-436

### Course Description

This course is designed to provide the knowledge about various kinds of pharmaceutical drugs and other common toxicants and their relation to toxicokinetics and toxicodynamics principles. This course, which is based on written modules, is structured to comprehensively provide the student with the fundamental concepts of clinical toxicology. Particularly, basic management methods, procedures and specific antidotes commonly employed in clinical toxicology are introduced and explained as well as the concept of clinical toxicology within the field of pharmaceutical healthcare. It aims to supplement this information with frequent case studies, detailed module objectives, and critical thinking exercises, using active learning methods and assignments. Special toxicity of commonly used pesticides, mushroom poisoning, and animal bites will also be covered in this course.

### Topics

- Definitions and general principles of toxicology
- General management methods or procedures of the drug poisoned or overdosed patient
- Drugs toxicity
- Important organ specific drug-induced toxicities
- Hypervitaminosis, pesticides, animal bites, and mushroom poisoning
- Antidotal therapy
- Environmental toxicology
- Poison and drug information center practice

### Course Information

**Code:** PHL-538

**Title:** Pharmacogenomics

**Cr hr:** 2+0

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-436, PHL-537

### Course Description

This advanced course is about the study of how genes affect an individual response to drugs. Students will get the knowledge of combining pharmacology (the science of drugs) and genomics (the study of genes and their functions) to develop effective, safe medications and doses that will be tailored to a person's genetic makeup. As knowledge of the genetic basis of disease increases, so does the opportunities for drug targeting and patient specific-treatments. This course uses cognitive and technical skills to understand the molecular basis of altered health states and the drug response towards personalized medicine.

### Topics

- Introduction
- Molecular biology review
- Overview of human genomics
- Making precision medicine a reality through genomics
- Examples of gene-drug interactions
- The influence of pharmacogenetics on pharmacokinetics and pharmacodynamics
- Pharmacogenetics of phase II drug-metabolizing enzymes
- Ethical, social, legal, and economic issues

## 12. Courses Overview – Department of clinical pharmacy

### Course Information

**Code:** CPH-241

**Title:** Pharmacy Orientation

**Cr hr:** 2+0

**Level:** 3

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** None

### Course Description

This course aims to introduce pharmacy as a profession to the newly admitted pharmacy students. The students will learn the historical background and the modern development of the pharmacy profession. It also covers other aspects, such as university and college resources, professionalism, and pharmacy scope. This course is also primarily designed to prepare students to understand and learn basic medical language in written and oral form to properly communicate with the other healthcare team members.

### Topics

- History of pharmacy
- PharmD program at KKU
- Available academic and learning resources
- Professionalism
- Pharmaceutical organizations
- Basic word structure
- Prefixes
- Suffixes
- Organization of body
- Medical specialists and case reports

### Course Information

**Code:** CPH-348

**Title:** Professional Pharmacy Practice Laboratory I

**Cr hr:** 1+1

**Level:** 6

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CPH-241, PHL-331

### Course Description

This course is the first one in a series of three professional pharmacy practice laboratories to enable the students incorporate knowledge and skills to practical situations required for providing pharmaceutical care. The first course focuses on community pharmacy services and the needed communication skills, such as patient interviewing, history taking and counseling the patient regarding over-the-counter medications.

### Topics

- Introduction
- Communication
- Medication history
- Professionalism
- Community pharmacy
- Pharmaceutical care services
- Immunizations
- Patient counseling for over-the-counter drugs and prescriptions
- Polypharmacy and adherence
- Pharmacotherapy planning and documentation
- Formal case presentation
- Health insurance



### Course Information

**Code:** CPH-442

**Title:** Therapeutics I

**Cr hr:** 4+1

**Level:** 7

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-303, PCH-304,  
PSL-331, PHL-331,  
PHL-333

### Course Description

This is an introductory course for the basics of therapeutics. It is the first in a series of four courses scheduled sequentially from level seven to level ten. It is designed to provide students with fundamental knowledge in a variety of areas including gastrointestinal, renal, and hepatic diseases.

### Topics

- Orientation and introduction & clinical pharmacy terminology
- Lab interpretation
- Gastrointestinal diseases
- Renal diseases
- Hepatic diseases
- Anaphylaxis and drug allergies

### Course Information

**Code:** CPH-450

**Title:** Pharmacy Management

**Cr hr:** 3+0

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CPH-348, CPH-360

### Course Description

Course is designed to teach students the requisite skills needed to perform managerial functions in the hospital, community and institutional pharmacy. Includes planning and integrating professional services, budgeting, inventory control, and human resource management topics and also describes the complexities of pharmacoeconomics in various pharmacy practice settings.

### Topics

- Principles and characteristics of effective pharmacy management
- Managing people
- Managing pharmacy (hospital pharmacy) operations
- Managing clinical services
- Managing pharmacy automation and informatics
- Managing risk
- Preventing and managing medication errors: the pharmacist's role
- Quality management system for pharmacy practice
- Purchasing and inventory management
- Integrating pharmacoeconomics principles and pharmacy management
- Marketing the pharmacy
- Budgeting and accounting
- Effective communication
- Leadership
- Audits and reviews

### Course Information

**Code:** CPH-451

**Title:** Professional Pharmacy Practice Laboratory II

**Cr hr:** 2+1

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CPH-348, CPH-360,  
CPH-442

### Course Description

This course is the second in a series of three professional pharmacy practice laboratories to enable the students incorporate knowledge and skills to practical situations required for providing pharmaceutical care. It will focus on the hospital pharmacy structure and operations. It is designed to learn the role of pharmacists in pharmacy and therapeutic committee, formulary management, and ambulatory care setting. Another important aspect covered by this course are practice of physical assessment skills and discharge counseling services.

### Topics

- Hospital pharmacy
- Clinical pharmacy discharge counseling services
- Pharmacy and therapeutics committee
- Formulary management
- Pharmacist-managed dosage form conversion services
- General risk assessment tools
- Vital signs
- Acquisition and practice of physical assessment skills
- Ambulatory care pharmacy
- Providing support for clinical reasoning

### Course Information

**Code:** CPH-452

**Title:** Therapeutics II

**Cr hr:** 4+1

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PCH-405, PHL-435,  
CPH-442

### Course Description

This course is designed to provide students with a fundamental knowledge of neurological, psychiatric, and pulmonary diseases, as well as considerations and precautions in selections, dosing and monitoring of drugs used to treat commonly encountered pharmacotherapeutic problems.

### Topics

- Neurological diseases
- Anemias
- Psychiatric diseases
- Pulmonary diseases

### Course Information

**Code:** CPH-454

**Title:** Clinical Pharmacokinetics

**Cr hr:** 2+1

**Level:** 8

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-421, CPH-442

### Course Description

The course illustrates how pharmacokinetics relates to the clinical practice in term of therapeutic dosage regimen design and interpretation. The course includes reviewing the basic pharmacokinetic parameters and pharmacodynamics backgrounds that assist student to evaluate and assess the used route of administrations and use of appropriate therapeutic drug monitoring for certain drugs that need utmost attention. Also, pharmacokinetic models will relate the exposure and effect of the drug that is needed to evaluate drug progression and in clinical trial simulations.

### Topics

- Pharmacokinetics review
- Antibiotics
- Cardiovascular agents
- Anticonvulsants
- Immunosuppressants
- Other drugs
- Pharmacogenetics drug interactions

### Course Information

**Code:** CPH-548

**Title:** Evidence Based Practice

**Cr hr:** 2+1

**Level:** 9

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CPH-452

### Course Description

This course is designed to provide the student with advanced research and professional skills required to practice scientific literature review and drug information services. On completion of the course, the student will develop a lifelong ability to understand how evidence is generated, retrieved, synthesized, critically appraised and employed in specific areas of health care setting.

### Topics

- Biomedical literature and drug information
- Resource use and management
- Evaluation and appraisal of literature
- Evidence-based practice
- Evidence-based medicine
- Advanced evidence-based medicine skills
- Evaluation and application of evidence to policy and practice

### Course Information

**Code:** CPH-553

**Title:** Therapeutics III

**Cr hr:** 4+1

**Level:** 9

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-436, CPH-452

### Course Description

This course is designed to provide the pharmacy students with fundamental knowledge in therapeutics and treatment protocols that should provide better patient care. This course will focus on cardiovascular diseases, coagulation disorders, oncology, and women's health.

### Topics

- Cardiovascular diseases
- Coagulation disorders
- Oncology
- Women's health

### Course Information

**Code:** CPH-554

**Title:** Therapeutics IV

**Cr hr:** 4+1

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHT-223, PHT-321,  
CPH-553

### Course Description

This course is a continuation of Therapeutics I, II and III courses and is designed to provide students with a fundamental knowledge of common endocrine, immunologic and infectious diseases, as well as considerations and precautions in selections, dosing and monitoring of drugs used to treat commonly encountered pharmacotherapeutic problems.

### Topics

- Endocrine diseases
- Immunologic diseases
- Infectious diseases
- Antimicrobial stewardship



## Course Information

**Code:** CPH-555

**Title:** Pharmacoepidemiology & Research  
Methodology

**Cr hr:** 3+0

**Level:** 9

**Program:** PharmD

**Co-requisites:** CPH-548

**Prerequisites:** CPH-450, CPH-452

## Course Description

Pharmacoepidemiology is the study of the uses and effects of drugs in patient populations. The science of pharmacoepidemiology borrows from pharmacology and epidemiology. This course will introduce students to the field of pharmacoepidemiology including study methodology, relevant statistics, data sources, measurement of treatments and outcomes, sources of bias and control of confounding, techniques to reduce bias and confounding, survival analysis and regression techniques, interpretation of results, and drug safety surveillance and risk management.

## Topics

- Introduction and the concepts of pharmacoepidemiology
- Outcome measurements in pharmacoepidemiology
- Study designs
- Drug safety & spontaneous adverse drug reaction or adverse drug event reporting system
- Drug utilization review
- Source of data and databases in pharmacoepidemiology
- Introduction to research
- Introduction to qualitative and quantitative research
- Survey design and the use of questionnaires
- Data collection
- Ethical requirement in research
- Statistical analysis
- Graphic methods
- Inferential statistics
- Basics of hypothesis testing
- Introduction and basics of statistical software

### Course Information

**Code:** CPH-556

**Title:** Self-Care and Nonprescription Drugs

**Cr hr:** 2+0

**Level:** 9

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PHL-436, CPH-442

### Course Description

This course is designed to build and enhance student knowledge and skills necessary for contemporary and future pharmacy practice in the area of self-care and minor ailments. This course will familiarize pharmacy students with available nonprescription drug products with a comprehensive understanding of nonprescription and prescription therapeutics as they relate to patient self-medication and minor ailments. Emphasis will be placed on the role and responsibility of the student pharmacist in accurately assessing and triaging patients, determining the appropriate use of nonprescription and prescription drugs, by determining when to follow-up, refer, and how to document the patient's care.

### Topics

- Orientation and introduction to self-care and nonprescription pharmacotherapy
- Patient assessment and consultation & legal and regulatory issues in self-care pharmacy practice
- Headache
- Musculoskeletal injuries and disorders
- Colds, allergy, and cough
- Heartburn, dyspepsia, constipation, and diarrhea
- Overweight and obesity
- Smoking cessations
- Insomnia
- Skin problems
- Hair loss
- Women's health
- Anorectal disorders
- Oral pain and discomfort
- Natural products and common complementary and alternative medicine health system

### Course Information

**Code:** CPH-557

**Title:** Pharmacy Regulations and Ethics

**Cr hr:** 1+0

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CPH-450

### Course Description

This course is designed to build student knowledge and skills necessary for contemporary and future pharmacy practice in the area of governmental laws, regulations, detailed laws that govern and affect the practice of pharmacy such as drugs, narcotics and medical devices.

### Topics

- Requirements for opening a pharmacy
- Regulations of pharmaceutical manufacturing companies and their scientific offices  
registration of pharmaceutical companies and their products
- List of poisonous and controlled and psychiatric substances
- Ministry of interior declaration
- Emergency medicines list
- Drugs and herbs allowed in supermarkets, perfume shops and spice dealers
- Retribution regulations
- Professional ethics
- Observance of professional standards
- Guidelines for advertising in pharmacy practice
- Guide to good dispensing practice
- Pricing prescription
- Unsatisfactory conduct
- Ethics of pharmacy practice in Islamic history

### Course Information

**Code:** CPH-558

**Title:** Professional Pharmacy Practice Laboratory III

**Cr hr:** 2+1

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CPH-451, CPH-553

### Course Description

This course is the third in a series of three professional pharmacy practice laboratories to enable the students incorporate knowledge and skills to practical situations required for providing pharmaceutical care. It aims to teach the needed pharmacist skills such as history taking, documentation, pharmaceutical care planning, and communication with patients and health care professionals, and patient interviewing and counseling. It also focuses on skills such as retrieving data from patient records and interpreting laboratory investigations. Additional important aspects covered in this course are care given to special populations and how to plan and initiate a clinical pharmacy service in a hospital. Furthermore, it highlights the concept of medication reconciliation, medication safety and pharmacovigilance.

### Topics

- Patient data retrieval
- History taking
- Lab investigations interpretation
- Pharmaceutical devices
- Pharmaceutical care: women's health
- Pharmaceutical care: pediatrics and geriatric patients
- Long-term care
- Palliative care
- Initiating clinical pharmacy service
- Pharmacovigilance
- Medication safety
- Medication reconciliation
- Drug information centers
- International pharmacy practice
- Healthcare systems

### Course Information

**Code:** CPH-559

**Title:** First Aid and Emergency Medicine

**Cr hr:** 0+1

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** PSL-331, CPH-452

### Course Description

This course is designed to teach and train the students the basics of first aid skills necessary to become a responder in pharmaceutical care environment for emergencies, such as adult CPR with AED, choking, and shock.

### Topics

- Referral skills and medication history taking
- Wound dressings
- Spinal injury and head injuries
- Management of patient in coma
- Management of bleeding
- Drowning
- Animal bites and insect stings
- Burns
- Cardiopulmonary resuscitation
- General concepts in triage management
- Management of shock, allergies, and anaphylaxis

### Course Information

**Code:** CPH-560

**Title:** PharmD Seminar

**Cr hr:** 0+1

**Level:** 10

**Program:** PharmD

**Co-requisites:** None

**Prerequisites:** CPH-451, CPH-553,  
CPH-555

### Course Description

This course will prepare students for professional pharmacy practice through studying how to deliver a good oral presentation when delivering a scientific speech or presenting a poster or a paper in conferences. The importance of good writing skills in the profession and the techniques required to overcome the common interviewing and presentation mistakes are also discussed in this course. It will also give practical experience on participating in journal club, writing of scientific proposals and theses defense.

### Topics

- Introduction
- Pharmacy practice profession requirements
- National and international boards of pharmacy
- Types of presentations
- Publication and peer-review articles
- Presentation skills
- Journal club
- Student self-assessment and peer assessment
- Student presentations