

Pharos University in Alexandria
Faculty of Pharmacy & Drug
Manufacturing



Academic Bylaws

(((2008)))

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Article 1: Statement of Mission and Objectives

Mission

The mission of the Faculty of Pharmacy and Drug Manufacturing is to achieve the following:

- Provide high quality educational opportunities to students from all segments of Egyptian Society as well as from other countries.
- Maintain high standards of academic achievement, professional behavior, and ethical conduct.
- Encourage the free exchange of ideas and promote open and on-going interaction with scholarly institutions throughout Egypt and other parts of the world.
- Foster student's appreciation of their own culture and heritage of their responsibilities to society.

Objectives

The objectives of the faculty are to accomplish the following:

- Perform international standard in the offered education program.
- Introduce pharmacist, able to challenge in promotion of pharmacy multidisciplinary including research.
- Provide practice experience to pharmacists in solving different problems related to patient health care and drug availability in the market.
- Intensify the use of drug information and new technology.

Article 2: Faculty Education System

- The Faculty offers Bachelor degree in Pharmaceutical Sciences and Drug Manufacturing (**B.Ph.Sc.**), based on credit-hour program. Generally one credit hour is equal to one hour lecture or 2 hrs laboratory, unless otherwise specified.
- The academic year is divided into three semesters (fall, spring, and summer). The fall and spring semesters are fifteen weeks each, while the summer semester is only six weeks. The summer semesters in the first four years are devoted to practical training.
- Summer training is a degree requirement of the Faculty. The student has to practice 12-credit hours (~ 350 hrs) training in a variety of pharmaceutical settings, approved by the faculty. These include community pharmacies, hospitals, pharmaceutical companies, and other organizations. Such training provides the students expert in dealing with drug therapy, determining dosage forms and schedules, preparing appropriate medication and counseling patient on rational drug usage. Student's performance is evaluated at the end of the training period by the organization where training is undergone and by the faculty coordination.
- Selected courses by the faculty may be offered in the summer semester in which students can register in not more than two courses, according to the regulations of the faculty, and without contradiction with their summer training.
- The flexibility of the system, however, allows students to increase or decrease his/her work program i.e. credit hours may extend from a minimum of 12 hours to a maximum of 20 hours.

Article 3: Admission Requirements

Admission requirements include the following:

- Students must hold the Egyptian high school certificate, Science Section or an equivalent certificate accepted by the Supreme Council of Egyptian Universities.
- Students are nominated for admission to the faculty according to the rules of the Supreme Council of Private Universities.
- Foreign students are nominated for admission to the faculty according to the general regulations of the Ministry of Higher Education.
- Students must fulfill all requirements and comply with the rules of the Faculty.
- Full-time study is required by all students.

Article 4: Academic Advising

The Faculty assigns to each student a faculty staff member as **academic advisor** to help with registration procedures and provide guidance concerning the student's program of study.

In order to track student progress toward completion of degree requirement, faculty academic advisors should:

- Provide students with necessary information about services available on campus.
- Introduce students to Pharos University academic rules & regulations.
- Offer students proper academic suggestions and help them become self-directed.
- Review each student study plan prior to registration.
- Sign various forms concerning study plan, drop/add courses, or withdrawal from a semester before submission to student affairs office.
- Follow up student grades and achievements regularly.
- Meet students confronting academic difficulty more frequently to provide them with appropriate advice.

Article 5: Registration Procedure

1. Normal Registration

Students are required to register at the beginning of each semester during the assigned registration period. Students select courses with the consultation of the academic advisor who must approve their workload before registration. The registration department issues a regulation bulletin as well as the procedures to be followed.

2- Late registration

Students are allowed to register one week after the registration deadline, with the approval of the faculty dean

3- Adding and dropping courses

Students may add or drop a course during the period announced on the time-table of each semester as long as his/her work load remains within the permitted load limits.

4- Withdrawal

Students have the right to withdraw from an academic semester within the withdrawal period announced on the academic calendar of the semester.

5- Attendance

If the absence of the student exceeds 25% of the total classes in any course throughout the semester (with or without excuse) he/she should drop the course altogether. Otherwise, he/she will receive (F) grade in the course evaluation.

6- Work sheets

Curriculum requirements leading to graduation are recorded on a worksheet kept in the student's folder. Worksheets are available in the registration office.

Article 6: Examinations & Grading System

A. Examinations:

1. The final grade awarded to student in a course is usually based on the grades for the two examinations held during the semester in the 6th and 11th weeks added to the grade from the final examination at the end of each semester. These grades are distributed as follows:
 - 20% for the two mid-semester evaluation
 - 30% for practical, 10% for oral, 40% for the final examination (2 hr times).
2. Each credit hour is allotted a total of 100 points.
3. For courses not including practical, the grades are:
 - 50% for the mid-semester assessment and 50% for the final examination.

B. Grading System:

Grade		Numerical Average	Grade points
Excellent	A+	$X \geq 95$	4.0
Excellent	A	$90 \leq X < 95$	4.0
Excellent	A-	$85 \leq X < 90$	3.7
Very Good	B+	$80 \leq X < 85$	3.3
Very Good	B	$75 \leq X < 80$	3.0
Good	B-	$70 \leq X < 75$	2.7
Good	C+	$65 \leq X < 70$	2.3
Pass	C	$60 \leq X < 65$	2.0
Pass Conditional	C-	$56 \leq X < 60$	1.7
Pass Conditional	D+	$53 \leq X < 56$	1.3
Pass Conditional	D	$50 \leq X < 53$	1.0
Fail	F	$X < 50$	0.0

X = Percentage Grade.

Grades not included in the GPA:

(I) incomplete, (W) withdrew, (AU) audit, (E) absent with excuse, (NE) absent with non-excuse.

Student gets an (E) or (NE) grade in a course if he/she does not attend the final examination in that course.

The current GPA is an average determined by calculating each grade awarded during one semester study and cumulative GPA is the GPA for the 10 semesters.

$$\text{Cumulative GPA} = \frac{\sum \text{Grade points} \times \text{N}^\circ \text{ Cr. Hrs}}{\sum \text{Cr. Hrs}}$$

C- Graduation Grade:

A candidate's graduation grade is based on the cumulative GPA, which might be not less than 60%.

Article 7: Graduation Requirements

In order to complete the requirements for B.Ph.Sc. degree, the student should pass successfully a total of at least 195 credit hours, through a minimum of 5 years study (10 semesters). The total credit hours are distributed for the different courses as follows:

I. General Courses	16 Cr.
II. Basic Science Courses	44 Cr.
III. Pharmaceutical Sciences Courses	123 Cr.
IV. Summer Training	12 Cr. (~350 hrs)

(See Rule "11" for **Faculty Curriculum**).

Article 8: Students Conduct & Correction

The faculty through the University reserves the right to suspend or send down a student whose conduct is not in compliance with the standards and traditions of academic life.

Article 9: Faculty Departments

Faculty departments include the following; between brackets are the corresponding digits for coding:

1. Department of Drug Industries (0)
2. Department of Pharmaceutics (1)
3. Department of Analytical and Pharmaceutical Chemistry (2/3)
4. Department of Pharmacognosy and Medicinal Plants (4)
5. Department of Microbiology and Immunology (5/6)
6. Department of Pharmacology and Toxicology (7/8)

Article 10: Course Coding System

The course coding system is classified as follows:

1. Courses offered by a department

The course code starts by the abbreviation of the faculty (PHR) followed by a 3-digit number. First digit refers to level, second digit refers to course specialization and third digit refers to serial number.

2. Courses of special codes

These are Mathematics (MAT), General (GEN), English (ENG) and Computer (COM).

3. The degree project (B.Ph.Sc.)

The code starts by the abbreviation of the faculty followed by the number 600 (PHR 600).

Article 11: Faculty Curriculum

I-General Courses:

Courses are divided into the following sections:

[A] Required General Courses:

No.	Course title	Course code	Cr.	Pre-requisite
1	English Language (I)	ENG 101	2	-
2	English Language (II)	ENG 102	2	ENG 101
3	Ethics and History of pharmacy practice	PHR 110	2	-
4	Computer Fundamentals	COM 101	2	-
5	Pharmaceutical Management	GEN 103	2	-

Total

10 Cr

[B] Elective General Courses:

In addition to the required general courses, student should select 3 courses (6 cr.) of the following:

No.	Course title	Course code	Cr.	Pre-requisite
1	Legislation and Health Policies	GEN 104	2	-
2	Professional Communication	GEN 105	2	-
3	Taxes	GEN 106	2	-
4	Political Sciences	GEN 107	2	-
5	Environment and Society	GEN 108	2	-
6	Cultural Studies	GEN 109	2	-
7	Principles of Sales and Marketing	GEN 110	2	-
8	Sophomore Rhetoric	ENG 500	2	ENG 102

Required

6 Cr

II- Basic Science Courses:

The following are required Basic Science courses:

No.	Course title	Course code	Cr.	Pre-requisite
1	Mathematics	MAT 105	2	-
2	Basic Statistics	MAT 208	1	-
3	Physical Chemistry	PHR 121	2	-
4	General Chemistry	PHR 122	3	-
5	Basic Inorganic Chemistry	PHR 125	3	PHR 122
6	Basic Organic Chemistry	PHR 131	3	-
7	Botany and Medicinal Plants	PHR 141	3	-
8	Cell and Molecular Biology	PHR 171	3	-
9	Biophysics	PHR 177	3	-
10	Anatomy and Histology	PHR 178	3	PHR 171
11	Analytical Chemistry (I)	PHR 223	3	PHR 121, 125
12	Analytical Chemistry (II)	PHR 224	3	PHR 223
13	Organic Chemistry (I)	PHR 232	4	PHR 131
14	Organic Chemistry (II)	PHR 233	4	PHR 232
15	Physiology (I)	PHR 272	2	PHR 178
16	Physiology (II)	PHR 273	2	PHR 272

Total**44 Cr**

III- Pharmaceutical Sciences Courses:

[A] Required Pharmaceutical Sciences Courses

No.	Course title	Course code	Cr.	Pre-requisite
1	Orientation to Pharmacy	PHR 101	1	-
2	Pharmaceutical Terminology	PHR 102	1	-
3	Physical Pharmacy	PHR 211	3	PHR 121
4	Drug Dosage Forms (I)	PHR 212	2	PHR 211
5	Pharmacognosy (I)	PHR 242	3	PHR 141
6	Pharmacognosy (II)	PHR 243	3	PHR 242
7	Microbiology (I)	PHR 251	3	PHR 171
8	Microbiology (II)	PHR 252	3	PHR 251
9	Drug Dosage Forms (II)	PHR 312	2	PHR 211
10	Biopharmaceutics	PHR 314	3	PHR 312
11	Pharmaceutical Analysis	PHR 326	3	PHR 224
12	Medicinal Chemistry (I)	PHR 327	4	PHR 233, 326
13	Phytochemistry	PHR 343	3	PHR 224,233,243
14	Evaluation of Crude Drugs	PHR 344	3	PHR 224,233,243
15	Biochemistry (I)	PHR 374	3	PHR 171,122,233
16	Biochemistry (II)	PHR 375	3	PHR 374
17	Pharmacology (I)	PHR 380	3	PHR 273
18	Pharmacology (II)	PHR 481	3	PHR 380
19	Library and Drug Information	PHR 403	2	-
20	Pharmaceutical Technology	PHR 404	3	PHR 212,312,413
21	Sterile Pharmaceutical Preparations	PHR 413	2	PHR 212
22	Hospital Pharmacy	PHR 415	2	GEN 103
23	Principles and Kinetics of Drug Stability	PHR 416	3	PHR 212, 312
24	Pharmacokinetics	PHR 417	2	PHR 314, 416
25	Community Pharmacy	PHR 418	3	PHR 212, 312
26	Medicinal Chemistry (II)	PHR 428	4	PHR 327
27	Forensic Pharmacognosy	PHR 446	3	PHR 243, 428
28	Pathogenesis and Etiology of Infectious Diseases	PHR 453	2	PHR 252
29	Pharmacogenetics and Pharmacoimmunology	PHR 461	2	PHR 252
30	Forensic Chemistry	PHR 476	3	PHR 428,481

No.	Course title	Course code	Cr.	Pre-requisite
31	Industrial Quality Control and GMP	PHR 505	3	PHR 404
32	Pharmaceutical Manufacturing Processes	PHR 506	2	PHR 404
33	Unit Operation	PHR 508	2	PHR 404
34	Clinical Pharmacy	PHR 511	3	PHR 417
35	Cosmetics	PHR 513	2	PHR 212
36	Analytical Quality Control	PHR 525	3	PHR 428
37	Drug-Biotechnology	PHR 554	2	PHR 461
38	Applied Industrial Hygiene	PHR 555	2	PHR 252
39	Pharmacoepidemiology	PHR 556	2	PHR 252
40	First Aid	PHR 570	1	PHR 481
41	Bioevaluation and Drug Screening	PHR 582	3	PHR 481
42	Pharmacotherapeutics	PHR 583	2	PHR 481
43	Pharmacy Seminar (project)	PHR 600	2	*

Total

109 cr.

* Consent of academic advisor

In addition to the required pharmaceutical sciences courses, student should select 7 elective courses (14 cr.) among the following:

[B] Elective Pharmaceutical Sciences Courses:

No.	Course title	Course code	Cr.	Pre-requisite
1	Applied Statistics	MAT 505	2	MAT 208
2	Design and Formulation of Drug Dosage Forms	PHR 507	2	PHR 417
3	Advanced Pharmaceutics	PHR 512	2	PHR 312,413
4	Advanced Drug Delivery System	PHR 514	2	PHR 511
5	Home Health Care	PHR 515	2	PHR 511
6	Advanced Instrumental Analysis	PHR 520	2	PHR 326
7	Advanced Pharmaceutical Chemistry	PHR 529	2	PHR 428
8	Applied Pharmacognosy	PHR 546	2	PHR 242,326,343
9	Advanced Microbiology	PHR 558	2	PHR 252
10	Mycology	PHR 562	2	PHR 252
11	Virology	PHR 563	2	PHR 252
12	Parasitology	PHR 564	2	PHR 171
13	Immunopharmaceutics	PHR 565	2	PHR 461
14	Hematology	PHR 571	2	PHR 380,481
15	Radiation Pharmacy	PHR 572	2	PHR 121,171
16	Fundamentals of Clinical Chemistry	PHR 573	2	PHR 375
17	Nutrition	PHR 574	2	PHR 380,481
18	Molecular Therapeutics	PHR 585	2	PHR 380,481
19	Geriatric Pharmacy	PHR 586	2	PHR 380,481
20	Pediatric Drug Therapy	PHR 587	2	PHR 380,481
21	Complementary/Alternative Therapeutics	PHR 589	2	PHR 380,481

Required

14 Cr

Article 12: Courses vs. Departments

Department of Drug Industries: (Dept. code: 0)

The department teaches and supervises the following courses:

I. Required courses:

N°	Course code	Course title	Cr.
1	PHR 101	Orientation to Pharmacy	1 [1-1-0]
2	PHR 102	Pharmaceutical Terminology	1 [1-0-0]
3	GEN 103	Pharmaceutical Management	2 [2-0-0]
4	PHR 403	Library & Drug information	2 [2-1-0]
5	PHR 404	Pharmaceutical Technology	3 [2-0-2]
6	PHR 505	Industrial Quality control & GMP	3 [2-1-2]
7	PHR 506	Pharm. Manufacturing processes	2 [2-1-0]
8	PHR 508	Unit operation	2 [2-1-0]

II. Elective courses:

N°	Course code	Course title	Cr.
1	GEN 104	Legislation & Health policies	2
2	GEN 105	Professional Communication	2
3	GEN 106	Taxes	2
4	GEN 110	Principles of Sales and Marketing	2
5	PHR 507	Design & Formulation of drug d.f.	2

Department of Pharmaceutics: (Dept. code: 1)

The department teaches and supervises the following courses:

I. Required courses:

N°	Course code	Course title	Cr.
1	PHR 110	Ethics & History of Pharm. Practice	2 [2-0-0]
2	PHR 211	Physical Pharmacy	3 [2-0-2]
3	PHR 212	Drug dosage forms I	2 [1-1-2]
4	PHR 312	Drug dosage forms II	2 [1-1-2]
5	PHR 314	Biopharmaceutics	3 [2-1-2]
6	PHR 415	Hospital Pharmacy	2 [2-1-0]
7	PHR 416	Principles & kinetics of drug stab.	3 [2-0-2]
8	PHR 413	Sterile pharm. preparations	2 [1-0-2]
9	PHR 417	Pharmacokinetics	2 [2-1-0]
10	PHR 418	Community Pharmacy	3 [2-0-2]
11	PHR 511	Clinical Pharmacy	3 [2-1-2]
12	PHR 513	Cosmetics	2 [2-1-0]

II. Elective courses:

N°	Course code	Course title	Cr.
1	PHR 512	Advanced Pharmaceutics	2
2	PHR 514	Advanced drug delivery system	2
3	PHR 515	Home health care	2

Department of Analytical & Pharm. Chemistry: (Dept. code: 2/3)

The department teaches and supervises the following courses:

I. Required courses:

N°	Course code	Course title	Cr.
1	PHR 121	Physical Chemistry	2 [2-1-0]
2	PHR 122	General Chemistry	3 [2-0-2]
3	PHR 125	Basic Inorganic Chemistry	3 [2-1-2]
4	PHR 131	Basic Organic Chemistry	3 [2-0-2]
5	MAT 105	Mathematics	2 [2-2-0]
6	COM 101	Computer Fundamentals	2 [1-1-2]
7	PHR 223	Analytical Chemistry I	3 [2-1-2]
8	PHR 224	Analytical Chemistry II	3 [2-1-2]
9	PHR 232	Organic Chemistry I	4 [3-0-2]
10	PHR 233	Organic Chemistry II	4 [3-1-2]
11	PHR 326	Pharmaceutical Analysis	3 [2-1-2]
12	PHR 327	Medicinal chemistry I	4 [3-1-2]
13	PHR 428	Medicinal Chemistry II	4 [3-1-2]
14	PHR 525	Analytical Quality Control	3 [2-1-2]

II. Elective courses:

N°	Course code	Course title	Cr.
1	PHR 520	Advanced Instrumental analysis	2
2	PHR 529	Advanced Pharm. Chemistry	2

Department of Pharmacognosy & Medicinal plants: (Dept. code: 4)

The department teaches and supervises the following courses:

I. Required courses:

N°	Course code	Course title	Cr.
1	PHR 141	Botany & Medicinal plants	3 [2-0-2]
2	ENG 101	English language I	2 [1-0-2]
3	ENG 102	English language II	2 [1-0-2]
4	PHR 242	Pharmacognosy I	3 [2-1-2]
5	PHR 243	Pharmacognosy II	3 [2-1-2]
6	PHR 343	Phytochemistry	3 [2-1-2]
7	PHR 344	Evaluation of crude drugs	3 [2-0-2]
8	PHR 446	Forensic Pharmacognosy	3 [2-0-2]

II. Elective courses:

N°	Course code	Course title	Cr.
1	GEN 107	Political Sciences	2
2	GEN 109	Cultural studies	2
3	ENG 500	Sophomore Rhetoric	2
4	PHR 546	Applied Pharmacognosy	2

Department of Microbiology & Immunology: (Dept. code: 5/6)

The department teaches and supervises the following courses:

I. Required courses:

N°	Course code	Course title	Cr.
1	PHR 251	Microbiology I	3 [2-0-2]
2	PHR 252	Microbiology II	3 [2-0-2]
3	PHR 461	Pharmacogen. & Pharmacoimmun.	2 [2-1-0]
4	PHR 453	Pathogenesis & etiology of Inf. Dis.	2 [2-1-0]
5	PHR 554	Drug Biotechnology	2 [2-1-0]
6	PHR 555	Applied Industrial Hygiene	2 [2-1-0]
7	PHR 556	Pharmacoepidemiology	2 [2-1-0]

II. Elective courses:

N°	Course code	Course title	Cr.
1	GEN 108	Environment and Society	2
2	PHR 558	Advanced Microbiology	2
3	PHR 562	Mycology	2
4	PHR 563	Virology	2
5	PHR 564	Parasitology	2
6	PHR 565	Immunopharmaceutics	2

Department Pharmacology & Toxicology: (Dept. code: 7/8)

The department teaches and supervises the following courses:

I. Required courses:

N°	Course code	Course title	Cr.
1	PHR 171	Cell & Molecular Biology	3 [2-0-2]
2	PHR 177	Biophysics	3 [2-1-2]
3	PHR 178	Anatomy & Histology	3 [2-1-2]
4	PHR 272	Physiology I	2 [2-1-0]
5	PHR 273	Physiology II	2 [2-1-0]
6	MAT 208	Basic Statistics	1 [1-1-0]
7	PHR 374	Biochemistry I	3 [2-0-2]
8	PHR 375	Biochemistry II	3 [2-1-2]
9	PHR 380	Pharmacology I	3 [2-0-2]
10	PHR 481	Pharmacology II	3 [2-0-2]
11	PHR 476	Forensic Chemistry	3 [2-0-2]
12	PHR 570	First Aid	1 [1-1-0]
13	PHR 582	Bioevaluation & Drug Screening	3 [2-0-2]
14	PHR 583	Pharmacotherapeutics	2 [2-1-0]

II. Elective courses:

N°	Course code	Course title	Cr.
1	MAT 505	Applied Statistics	2
2	PHR 571	Hematology	2
3	PHR 572	Radiation Pharmacy	2
4	PHR 573	Fundamentals of Clin. Chemistry	2
5	PHR 574	Nutrition	2
6	PHR 585	Molecular Therapeutics	2
7	PHR 586	Geriatric Pharmacy	2
8	PHR 587	Pediatric Drug Therapy	2
9	PHR 589	Complementary/Alternative therap.	2

Article 13: Faculty Program

The following table describes different levels (years) program of total 183 Cr. Hrs Teaching and 12 Cr. Summer Training.

Year	Semester	Course Code	Course Title	Credit Hours	L	T	P	
I	1	ENG 101	English Language (I)	2	1	0	2	
		PHR 177	Biophysics	3	2	1	2	
		PHR 121	Physical Chemistry	2	2	1	0	
		PHR 122	General Chemistry	3	2	0	2	
		PHR 171	Cell and Mol. Biology	3	2	0	2	
		MAT 105	Mathematics	2	2	2	0	
		PHR 101	Orientation to Pharmacy	1	1	1	0	
	PHR 102	Pharm. Terminology	1	1	0	0		
	Semester Credit Hours				17			
	2	ENG 102	English Language II	2	1	0	2	
		PHR 125	Basic Inorganic Chem.	3	2	1	2	
		PHR 131	Basic Organic Chem.	3	2	0	2	
		PHR 141	Botany and Med. Plants	3	2	0	2	
		PHR 178	Anatomy and Histology	3	2	1	2	
COM 101		Computer Fundamentals	2	1	1	2		
PHR 110		Ethics and History of Pharmacy Practice	2	2	0	0		
Semester Credit Hours				18				

Year	Semester	Course Code	Course Title	Credit Hours	L	T	P	
II	3	PHR 242	Pharmacognosy I	3	2	1	2	
		PHR 211	Physical Pharmacy	3	2	0	2	
		PHR 272	Physiology I	2	2	1	0	
		PHR 223	Analytical Chemistry I	3	2	1	2	
		PHR 232	Organic Chemistry I	4	3	0	2	
		PHR 251	Microbiology I	3	2	0	2	
			Elective*	2				
	Semester Credit Hours				20			
	4	MAT 208	Basic Statistics	1	1	1	0	
		PHR 212	Drug Dosage Forms I	2	1	1	2	
		PHR 273	Physiology II	2	2	1	0	
		PHR 224	Analytical Chem. II	3	2	1	2	
		PHR 233	Organic Chem. II	4	3	1	2	
PHR 243		Pharmacognosy II	3	2	1	2		
PHR 252	Microbiology II	3	2	0	2			
Semester Credit Hours				18				

* GEN 107, GEN 108, GEN 109, PHR 564, PHR 572.

Year	Semester	Course Code	Course Title	Credit Hours	L	T	P	
III	5	PHR 374	Biochemistry I	3	2	0	2	
		PHR 312	Drug Dosage Forms II	2	1	1	2	
		PHR 326	Pharm. Analysis	3	2	1	2	
		GEN 103	Pharm Management	2	2	0	0	
		PHR 343	Phytochemistry	3	2	1	2	
			Elective*	4				
	Semester Credit Hours				17			
	6	PHR 375	Biochemistry II	3	2	1	2	
		PHR 344	Evaluation of Crude drugs	3	2	0	2	
		PHR 314	Biopharmaceutics	3	2	1	2	
		PHR 380	Pharmacology I	3	2	0	2	
		PHR 327	Medicinal Chemistry I	4	3	1	2	
			Elective*	2				
Semester Credit Hours				18				

* GEN 104, GEN 105, GEN 110, PHR 573, PHR 520, PHR 546, PHR 558, PHR 562, PHR 563.

- 6 Cr. Summer Training

Year	Semester	Course Code	Course Title	Credit Hours	L	T	P	
IV	7	PHR 428	Medicinal Chemistry II	4	3	1	2	
		PHR 461	Pharmacogenetic and Pharmacoinmunology	2	2	1	0	
		PHR 403	Library and Drug Information	2	2	1	0	
		PHR 481	Pharmacology II	3	2	0	2	
		PHR 415	Hospital Pharmacy	2	2	1	0	
		PHR 416	Principles and Kinetics of Drug Stability	3	2	0	2	
		PHR 413	Sterile Pharmaceutical Preparations	2	1	0	2	
			Elective*	2				
	Semester Credit Hours				20			
	8	PHR 404	Pharm. Technology	3	2	0	2	
		PHR 446	Forensic Pharmacognosy	3	2	0	2	
		PHR 417	Pharmacokinetics	2	2	1	0	
		PHR 418	Community Pharmacy	3	2	0	2	
		PHR 476	Forensic Chemistry	3	2	0	2	
		PHR 453	Pathogenesis and Etiology of Infectious Diseases	2	2	1	0	
		Elective*	2					
Semester Credit Hours				18				

* GEN 106, ENG 500, MAT 505, PHR 512, PHR 529, PHR 571.

- 6 Cr. Summer Training

Year	Semester	Course Code	Course Title	Credit Hours	L	T	P	
V	9	PHR 525	Analytical Quality Control	3	2	1	2	
		PHR 505	Industrial Quality Control and GMP	3	2	1	2	
		PHR 582	Bioevaluation and Drug Screening	3	2	0	2	
		PHR 511	Clinical Pharmacy	3	2	1	2	
		PHR 513	Cosmetics	2	2	1	0	
		PHR 570	First Aid	1	1	1	0	
			Elective*	4				
	Semester Credit Hours				19			
	10	PHR 554	Drug Biotechnology	2	2	1	0	
		PHR 555	Applied Industrial Hygiene	2	2	1	0	
		PHR 506	Pharm. Manufacturing Processes	2	2	1	0	
		PHR 508	Unit Operation	2	2	1	0	
		PHR 583	Pharmacotherapeutics	2	2	1	0	
		PHR 556	Pharmacoepidemiology	2	2	1	0	
		PHR 600	Seminar or Project	2	2	0	0	
			Elective*	4				
	Semester Credit Hours				18			

* PHR 507, PHR 514, PHR 515, PHR 585, PHR 586, PHR 587, PHR 589, PHR 574, PHR 565.

Article 14: Course Description

Courses offered or supervised by the Department of Drug Industries:

I. Required Courses:

- **PHR 101 Orientation to Pharmacy** **1 Cr. [1-1-0]**

The course involves a survey of professional pharmacy, dealing with the mission of pharmacy and role of pharmacist in society, educational requirements, pharmacy or pharmaceutical calculations encountered with practice of pharmacy organization, main routes of drug administration and dosage forms. Fundamental concepts are also discussed. Students self learning and effective team skills are developed through presentation and group discussion on the main topics of the course.

- **PHR 102 Pharmaceutical Terminology** **1 Cr. [1-0-0]**

The course will introduce students to different definition of pharmacy terms including prescription terminology. It also includes medical terms used in diagnoses and drug description.

- **GEN 103 Pharmaceutical Management** **2 Cr. [2-0-0]**

Management in a variety of health care settings, including hospitals and integrated systems, managed care organizations and in pharmacy services. Decision making and planning, team work and communication process.

- **PHR 403 Library and Drug Information** **2 Cr. [2-1-0]**

Spectrum, types, handling of questions, information resources, literature evaluation, establishment of DIPC, sources, computerized drug information retrieval systems, internet, references, medical letters, study designs and clinical trails, professional literature.

- **PHR 404 Pharmaceutical Technology** **3 Cr. [2-0-2]**

Micromeritics, preformulation, formulation manufacturing of tablets, capsules, suppositories, micro encapsulation, atron, liposome and also sustained release dosage forms.

Pre-requisite: PHR 212, 312, 413

- **PHR 505 Industrial Quality Control and Good Manufacturing Practice (GMP)** **3 Cr. [2-1-2]**

Organization structure and personal qualifications; investigation; receiving materials; sampling; material handling and uses; buildings and facilities; equipment; validation; documentation; computer validation; quality assurance.

Pre-requisite: PHR 404.

- **PHR 506 Pharmaceutical Manufacture Processes** 2 Cr. [2-1-0]
Problems encountered during manufacture of various pharmaceutical dosage forms and their treatments. Modern challenges in pharmaceutical industry in different areas, design and scaling up problems.
Pre-requisite: PHR 404

- **PHR 508 Unit Operation** 2 Cr. [2-1-0]
Heat transfer, evaporation, drying, crystallization, filtration, centrifugation, distillation, refrigeration, mixing, size reduction & etc...
Pre-requisite: PHR 404

II. Elective Courses:

- **GEN 104 Legislation and Health Policies** 2 Cr. [2-0-0]
Introductory pharmacy laws, background and ethical principles in pharmacy practice. Essential drug list, Rational drug use, Therapeutic guidelines, National drug policy. Introduction to drug/product registration. Ethical issues in product promotion.
- **GEN 105 Professional Communication** 2 Cr. [2-1-0]
Provides practice experience through active learning exercises and stimulated interactions with patients and health care providers. Emphasis on the use of correct and effective language and organization skills in preparing, delivering and evaluating different types of oral presentation. Analysis of sample live or videotaped speeches.
- **GEN 106 Taxes** 2 Cr. [2-1-0]
Explanation of the concept of taxes, their importance, and their several types in the local regime, such as sales, income taxes. The course refers to the laws that govern the relationship between the suppliers tax-payers and the tax authority.
- **GEN 110 Principles of Sales and Marketing** 2 Cr. [2-0-0]
Understanding the environment of marketing in pharmacy, strategic planning for markets winning, analyzing marketing opportunities, analyzing customer behavior and customer satisfaction, developing new products, product life cycle and managing life-cycle strategies.
- **PHR 507 Design and Formulation of Drug Dosage Forms** 2 Cr. [2-0-0]
Principle of design and formulation problems encountered with different types of dosage forms, principles of controlled drug release from polymer system.
Pre-requisite: PHR 417.

Courses offered or supervised by the department of Pharmaceutics:

I. Required Courses:

• **PHR 110 Ethics and History of Pharmacy practice** 2 Cr. [2-0-0]

This course will provide students with a study of the development of the profession of pharmacy, emphasizing the historical background and ethical principles upon which the profession rests. The nature and place of pharmaceutical services in society as well as the moral standards and professional conduct required for pharmacists are emphasized.

• **PHR 211 Physical Pharmacy** 3 Cr. [2-0-2]

The course is concerned with the fundamental principles of interfacial phenomena, rheology, colloids, suspensions and emulsions.

Pre-requisite: PHR 121.

• **PHR 212 Drug Dosage Forms (I)** 2 Cr. [1-1-2]

The course deals with the principles and techniques involved in the design, formulation and quality control testing of liquid dosage forms (syrups, mixtures, elixirs, tinctures, lotions and others) and semisolid dosage forms (ointments, creams, gels and pastes).

Pre-requisite: PHR 211.

• **PHR 312 Drug Dosage Forms (II)** 2 Cr. [1-1-2]

The course deals with principles of formulation, preparation, quality control and manufacturing problems of solid dosage forms (tablets, capsules and suppositories).

Pre-requisite: PHR 211.

• **PHR 314 Biopharmaceutics** 3 Cr. [2-1-2]

Physicochemical properties of drugs and biological factors affecting therapeutic response. Mathematical characterization of the processes of absorption, distribution and metabolism. Drug interactions and drug delivery system. Bioequivalence testing, methodology, guidelines, assay validation methods, and statistical analysis of bioequivalence data. Theory to dosage regimen adjustment and products selection.

Pre-requisite: PHR 312.

• **PHR 415 Hospital Pharmacy** 2 Cr. [2-1-0]

This course is designed to introduce the student to the physical examination process. This process is a valuable tool in monitoring the efficacy of patients' medical therapies. Presentations detailing the physical examination associated with selected organ systems are followed by laboratory sessions whereby students practice learned techniques. Students also experience exposure to unit-dose monitoring, and pharmacy management. Drug weight / volume concentrations, dilution & additive volumes are calculated in compounding of parenteral products in various patient-care setting using aseptic techniques.

Pre-requisite: GEN 103.

• **PHR 416 Principles and Kinetics of Drug Stability** **3 Cr. [2-0-2]**

Routes of drug degradation, principles and kinetics of chemical degradation, stress stability testing. Means of prolonging shelf life of pharmaceutical products.

Pre-requisite: PHR 212, 312.

• **PHR 413 Sterile Pharmaceutical Preparations** **2 Cr. [1-0-2]**

The course includes formulation and quality control testing of parenteral and ophthalmic preparations. sterile pharmaceutical products that may be prepared and/or dispensed by a hospital pharmacy department will also be discussed. Principles of sterile products manipulation for the purpose of intravenous admixture of drug doses and products are emphasized

Pre-requisite: PHR 212.

• **PHR 417 Pharmacokinetics** **2 Cr. [2-1-0]**

Basic pharmacokinetics, drug kinetics in renal impairment, hepatic dysfunction and cardiac diseases. Drug dose monitoring and application to selected drugs. Digoxin and phenytoin are examples.

Pre-requisite: PHR 314, PHR 416.

• **PHR 418 Community Pharmacy** **3 Cr. [2-0-2]**

Pharmaceutical care principles applied to the community pharmacy environment. Participation in the development, implementation and outcome evaluation of patient care services. Special emphases on psychiatric pharmacy practice, women's health, pediatric drug therapy, pain management, geriatric pharmacy.

Pre-requisite: PHR 212, PHR 312.

• **PHR 511 Clinical Pharmacy** **3 Cr. [2-1-2]**

Pharmaceutical care, application, interpretation of clinical data, information resources, side effects, drug-induced diseases, drug interactions. Clinical PCK and application with aminoglycosides, digoxin, theophylline.

Pre-requisite: PHR 417.

• **PHR 513 Cosmetics** **2 Cr. [2-1-0]**

The course is designed to provide modern knowledge of the skin care products (sunscreen, suntan, antiacne, skin depigmenting products, emollients, moisturizers, antiperspirants, facial masks and others) and the hair care products (hair dyes, shampoos, conditioners, hair straightening products and others). Skin care in relation to skin anatomy, physiology and functions are discussed.

Pre-requisite: PHR 212.

II. Elective Courses:

• **PHR 512 Advanced Pharmaceutics** **2 Cr. [2-0-0]**

Drug targeting, novel drug delivery system, pharmaceutical biotechnology, radiopharmaceutics.

Pre-requisite: PHR 312, 413.

• **PHR 514 Advanced Drug Delivery System** **2 Cr. [2-1-0]**

Design and application of polymers, liposomes, micro / nano particles, prodrugs, and macromolecules for parenteral, oral, transdermal, respiratory and CNS drug delivery.

Pre-requisite: PHR 511

• **PHR 515 Home Health Care** **2 Cr. [2-1-0]**

Practical experience in the provision of comprehensive home intravenous and nutritional support services, including fluid and electrolyte therapy, chemotherapy, antibiotics, pain control and nutrition support.

Pre-requisite: PHR 511

Courses offered or supervised by the Department of Analytical & Pharmaceutical Chemistry:

I. Required Courses:

• **PHR 121 Physical Chemistry** **2 Cr. [2-1-0]**

States of matter and definition of states. Gases, properties and kinetic molecular theory of gases. Thermochemistry and thermodynamics; first, second and third law, thermodynamic parameters and relations. Liquids; phase transition, vapor pressure and the Clausius Clapeyron equation, phase diagram, introduction to the phase rule for one and two-component system, eutectic mixture, properties of liquids and intermolecular forces. Solids; types and properties of solids, crystal lattice and unit cell, calculations involving unit cell dimension, introduction to X-ray diffraction. Solutions, type and properties, solubility, effect of temperature and pressure, Henry's law, conversion of concentration units, colligative properties for non-electrolyte solutions and Raoult's law, electrical conductivity of solution, colligative properties for electrolyte solutions, activity and activity coefficients. Colloids.

• **PHR 122 General Chemistry** **3 Cr. [2-0-2]**

A study of physical measurements in chemistry, atomic structure, the periodic table and bonding, chemical calculations and stoichiometry, chemical reactions and chemical equilibrium.

• **PHR 125 Basic Inorganic Chemistry** **3 Cr. [2-1-2]**

Overview of the theoretical basis of qualitative analysis. Systematic analysis of anions. Systematic analysis of cations of group I (Ag group) through group V (alkali group). Systematic analysis of cations mixtures. Mixtures of pharmaceutical interest including difficulties.

Pre-requisite: PHR 122.

• **PHR 131 Basic Organic Chemistry** **3 Cr. [2-0-2]**

Introduction to the basic concepts of organic chemistry with an emphasis on the relation between structure and properties, chemistry of aliphatic hydrocarbons and stereochemistry. Alkenes and conjugated dienes, alkylhalides, aliphatic alcohols, ethers and epoxides.

• **MAT 105 Mathematics** **2 Cr. [2-2-0]**
Functions and graphing. Limits, derivatives of 1st and higher order, differentiation. Inverse functions, integration and application to finding area, volume and average values.

• **COM 101 Computer fundamentals** **2 Cr. [1-1-2]**
This course will enable students to use computers for professional, educational and business problem-solving. It will also introduce students to computer terminology, on-line information resources, hardware peripherals, CD-ROM databases, programs and multimedia computing systems that pharmacists can use in their practice.

• **PHR 223 Analytical Chemistry (I)** **3 Cr. [2-1-2]**
Fundamentals of qualitative and quantitative chemical analysis, concentrations and stoichiometric calculations. Errors and uncertainties in quantitative analysis. Volumetric analysis; acid-base titration in aqueous and non-aqueous media, precipitation titration and solubility of precipitates in water, overview of complex formation equilibrium and complexometric titration, Gravimetry, homogenous precipitation & contamination. Errors and data analysis.
Pre-requisite: PHR 121, 125.

• **PHR 224 Analytical Chemistry (II)** **3 Cr. [2-1-2]**
Electron transfer reactions, nernst equation, standard electrode potential, application of redox titrations. Electroanalytical techniques; potentiometry, conductometry & voltammetry. Application in water analysis, cations, anions and dissolved gases. Lipid analysis, physical and chemical examination of adulterants.
Pre-requisite: PHR 223.

• **PHR 232 Organic Chemistry (I)** **4 Cr. [3-0-2]**
A comprehensive study of substitution and elimination reactions and a study of the chemistry of the aromatic compounds, alcohols, ethers, carboxylic acids. Phenols and quinones, aromatic sulphonic acids and their derivatives.
Pre-requisite: PHR 131.

• **PHR 233 Organic Chemistry (II)** **4 Cr. [3-1-2]**
Nitrogenous compounds, arylhalides, alicyclic compounds, carbohydrates, polynuclear compounds, hetero-cyclic compounds, spectroscopy applications.
Pre-requisite: PHR 232.

• **PHR 326 Pharmaceutical Analysis** **3 Cr. [2-1-2]**
Absorption and emission spectroscopy; molecular ultraviolet and visible spectroscopy, infrared spectroscopy, introduction to flow injection analysis (FIA). Atomic spectroscopy; atomic absorption spectroscopy, flame emission spectroscopy, atomic fluorescence spectroscopy. Refractometry and polarimetry. Selection of qualitative and quantitative applications in drug analysis and pharmaceutical products.
Pre-requisite: PHR 224.

- **PHR 327 Medicinal Chemistry (I)** **4 Cr. [3-1-2]**
Fundamentals of medicinal chemistry and an introduction to the physico-chemical properties of drugs relative to their biological effects. Chemical and biochemical aspects of certain drug categories including: anti-infective agents, antineoplastics, antiviral drugs and diagnostic agents, antihistamines.
Pre-requisite: PHR 233, 326.

- **PHR 428 Medicinal Chemistry (II)** **4 Cr. [3-1-2]**
Chemical and biological aspects of certain drugs including: steroids, cardiovascular drugs, gastrointestinal drugs, respiratory drugs, diuretics, hypoglycemics, prostaglandins and vitamins, drugs acting on autonomic and central nervous system, analgesics.
Pre-requisite: PHR 327

- **PHR 525 Analytical Quality Control** **3 Cr. [2-1-2]**
Analytical quality control of drugs; sample preparation and sample analysis in different matrices, drug mixtures, products of DNA technology. The use of automated instrumental analysis in drugs and pharmaceutical products control covering QA and QC laboratory procedures; SOP, detection limits and LOQ. Microbiological quality control of pharmaceutical products. *Pre-requisite: PHR 428.*

II. Elective Courses:

- **PHR 520 Advanced Instrumental Analysis** **2 Cr. [1-1-2]**
Atomic emission spectroscopy with plasma and electrical discharge, ICP atomic fluorescence spectroscopy. Mass spectra and related techniques of GC-MS. Thermal analysis. X-ray spectroscopy, X-ray fluorescence method – qualitative and quantitative analysis. Automated methods of analysis with flow injection methods in separation, electro migration and spectroscopic techniques.
Pre-requisite: PHR 326.

- **PHR 529 Advanced Pharmaceutical Chemistry** **2 Cr. [2-0-0]**
Advanced study of the various classes of medicinal compounds, with particular emphasis on biological activity, mechanism of action, biotransformation, and the structural and physical properties governing absorption, distribution, and excretion.
Pre-requisite: PHR 428.

Courses offered or supervised by the department of Pharmacognosy & Medicinal Plants:

I. Required Courses:

- **PHR 141 Botany and Medicinal Plants** **3 Cr. [2-0-2]**
Taxonomy of important families and their macroscopic and microscopic characteristics. Plant cells differentiation and cell contents (primary and secondary metabolites, chemical tests). Macroscopical and microscopical characteristics of different organs (leaves, flowers, seeds, fruits, stems, subterranean organs: roots and rhizomes).
- **ENG 101 English (I)** **2 Cr. [1-0-2]**
A course is designed to establish effective reading, writing, oral/aural, and study skills. Emphasis on essay writing. Academic style and task-based work are stressed.
- **ENG 102 English (II)** **2 Cr. [1-0-2]**
A required course designed to establish advanced reading and writing skills. Emphasis on essay writing as well as research techniques. The major project is an expository research paper. Academic styles are emphasized.
Pre-requisite: ENG 101.
- **PHR 242 Pharmacognosy (I)** **3 Cr. [2-1-2]**
Study of the important medicinal drugs from leaves, herbs, barks & wood. It also includes active constituents, medicinal uses and chemical tests.
Pre-requisite: PHR 141.
- **PHR 243 Pharmacognosy (II)** **3 Cr. [2-1-2]**
This is a continuation of PHR 242. It includes diagnostic macro & microscopical characteristics of flowers, seeds, fruits, and subterranean organs. It also includes unorganized drugs.
Pre-requisite: PHR 242.
- **PHR 343 Phytochemistry** **3 Cr. [2-1-2]**
Different classes of bioactive constituents of crude drugs, emphasizing the definition, classification, preparation, molecular structures, physical and chemical characteristics, action, SAR, methods of quantitation. Carbohydrates, glycosides, essential oils, bitter principles, alkaloids, miscellaneous natural products.
Pre-requisite: PHR 224, 233, 243.

- **PHR 344 Evaluation of Crude Drug** **3 Cr. [2-0-2]**
Concept and methods of crude drug evaluation, microscopical, physico-chemical, chromatographic and spectroscopic methods, General biosynthetic pathways of secondary metabolites. Methods of production of drugs from medicinal plant products.
Pre-requisite: PHR 224, 233, 243

- **PHR 446 Forensic Pharmacognosy** **3 Cr. [2-0-2]**
Plants and natural products that constitute potential health hazards. Drug dependence, narcotics, analgesics, psychoenergetics and hallucinogens of plant origin. Mycotoxin as a serious threat to general health and safety of community.
Pre-requisite: PHR 243, 428.

II. Elective Courses:

- **GEN 107 Political Sciences** **2 Cr. [2-1-0]**
Politics as social sciences, basic concept in political science power, authority, leadership, decision making. Relevant political ideologies, contemporary political system, their modes and functions.
- **GEN 109 Cultural Studies** **2 Cr. [2-1-0]**
A general humanities course covering ancient Near East, Greece, Judaism, Christianity, Islam and Medieval Europe.
Some aspects of 19th century thoughts including Marx, Darwin and Islamic Response.
- **ENG 500 Sophomore Rhetoric** **2 Cr. [2-1-0]**
Required for practice in reading, evaluating, formulating and presenting opinions in writing based on the best available evidence using the methods of formal argument. Both academic and literary styles are emphasized. The major project is a persuasive and/or critical research paper.
Pre-requisite: ENG 102.
- **PHR 546 Applied Pharmacognosy** **2 Cr. [2-1-0]**
Identification of natural products using physicochemical methods. production of medicinal plants, evaluation of crude medicinal plants. Use of recent chromatographic methods for quality control of crude drugs production
Pre-requisite: PHR 242, 343, 326.

Courses offered or supervised by the Department of Microbiology & Immunology:

I. Required Courses:

- **PHR 251 Microbiology (I)** **3 Cr. [2-0-2]**
Introduction, classification of Bacteria, Viruses and Fungi related to human diseases. Etiology, pathogenesis and management of common microbial infections.
Pre-requisite: PHR 171.
- **PHR 252 Microbiology (II)** **3 Cr. [2-0-2]**
Chemotherapeutic agents and mechanism of microbial resistance, Disinfectants, preservatives, and antiseptics; Industrial microbiology. hazards of microbial contamination of pharmaceuticals.
Pre-requisite: PHR 251.
- **PHR 461 Pharmacogenetics and Pharmacoimmunology** **2 Cr. [2-1-0]**
Basis of molecular genetics dealing with principles governing the hereditary variation, DNA technology and cloning. Monoclonal antibodies technology and vaccine products, antimicrobial identification.
Pre-requisite: PHR 252.
- **PHR 453 Pathogenesis and etiology of infectious diseases** **2 Cr [2-1-0]**
Introduction to general pathology, inflammation, cell injury, circulatory disturbance, infectious diseases and neoplasia with special emphasis on cancer etiology.
Pre-requisite: PHR 252.
- **PHR 554 Drug Biotechnology** **2 Cr. [2-1-0]**
An overview of biotechnology in health care, recombinant DNA technology and regulatory issues; monoclonal antibody technology and manufacturing diagnostic products, therapeutic agents, vaccines, gene therapy. Future of biotechnology in antimicrobial identification.
Pre-requisite: PHR 461.
- **PHR 555 Applied Industrial Hygiene** **2 Cr. [2-1-0]**
Methods of sterilization (heat, UV, ionizing radiation filtration, gaseous). Sterility testing, environmental control, good manufacture practice regulations. Quality assurance organization. Total quality control and documentation.
Pre-requisite: PHR 252.
- **PHR 556 Pharmacoepidemiology** **2 Cr. [2-1-0]**
Health policy, pharmaceutical care concept, drug utilization study, management and regulations, post-marketing surveillance, case analysis and presentation.
Pre-requisite: PHR 252.

II. Elective Courses:

- **GEN 108 Environment and Society** **2 Cr. [2-0-0]**
Explanation of environment and its interaction with human beings' life. Environment Hazards, problems and management.

- **PHR 558 Advanced Microbiology** **2 Cr. [2-0-0]**
Pharmaceuticals produced by microorganisms, microbial control of pests and plant diseases, products of therapeutic useful substances by recombinant DNA technology.
Pre-requisite: PHR 252.

- **PHR 562 Mycology** **2 Cr. [2-1-0]**
Classification of fungi and mycoses. Keratomycoses, dermatomycoses, candidiasis and deep (systemic) mycoses. antifungal against common dermatophytes yeasts and various other fungi. Fungi with antibacterial activity against Gram positive bacilli and cocci.
Pre-requisite: PHR 252.

- **PHR 563 Virology** **2 Cr. [2-1-0]**
Introduction to viral diseases, laboratory diagnosis, DNA viruses, RNA viruses, retroviruses, hepatitis viruses, oncogenic viruses and role of viruses in diseases, prions.
Pre-requisite: PHR 252.

- **PHR 564 Parasitology** **2 Cr. [2-1-0]**
An introduction to parasitology structure and biology and life cycles of different phyla: Protozoa, coelentera, platyhelminths, achelmyntes, Arthropod.
Pre-requisite: PHR 171.

- **PHR 565 Immunopharmaceutics** **2 Cr. [2-0-0]**
Lectures and discussion session on pharmaceutics-related immunology, including drugs affecting the immune system, antibodies and cytokines as drugs and new development in immunobiotechnology.
Emphasizes pre and post transplantation therapy designed to minimize organ rejection, prevent infection and improve survival
Pre-requisite: PHR 461

Courses offered or supervised by the department of Pharmacology & Toxicology:

I. Required Courses:

- **PHR 171 Cell and Molecular Biology** **3 Cr. [2-0-2]**
The course involves the following topics: Cellular organization, cellular metabolism, membrane structure and dynamics, membrane pumps, carriers and channels, reception and transduction of environmental information, cell cycle, cancer, DNA biology and technology, genetic counseling and defense against disease.

• **PHR 177 Biophysics**

3 Cr. [2-1-2]

Heat and laws governing it, geometrical optics, physical optics, and types of dispersing system. Electricity, electric & magnetic flux. Modern physics. X-ray, laser, wave duality. Properties of matter.

• **PHR 178 Anatomy and Histology**

3 Cr. [2-1-2]

General anatomy and embryology, skeleton and joints, cardiovascular system, respiratory system, digestive system, urogenital system, CNS and proper endocrine system.

The cell, the epithelium, the connective tissue, blood, cartilage, muscular tissue, nervous tissue, the cardiovascular system, lymphatic system and the digestive tract.

Pre-requisite: PHR 171.

• **PHR 272 Physiology (I)**

2 Cr. [2-1-0]

Introduction to physiology. Blood constituents, Autonomic nervous system, Excitable tissues (nerve and muscle). Renal system, Acid-base balance, Electrolyte and Water balance. Central nervous system.

Pre-requisite: PHR 178.

• **MAT 208 Basic Statistics**

1 Cr. [1-1-0]

Introduction, data collection, graphical and mathematical presentation of data. Emphasis on statistical concepts and their application to critical appraisal of clinical and experimental data. Interpretation of results.

• **PHR 273 Physiology (II)**

2 Cr. [2-1-0]

Cardiovascular system, gastrointestinal system, endocrine system, Reproductive system and Respiratory system.

Pre-requisite: PHR 272.

• **PHR 374 Biochemistry (I)**

3 Cr. [2-0-2]

This course deals with the structure and function of the major biomolecules: carbohydrates, lipids, proteins and nucleic acids. It also covers the catalytic function of enzymes, enzyme kinetics, specificity and allosteric regulation, vitamins and coenzymes.

Pre-requisite: PHR 171, 122, 233.

• **PHR 375 Biochemistry (II)**

3 Cr. [2-1-2]

This course covers metabolic processes involving carbohydrates, lipids proteins, porphyrins. It also deals with some metabolic disorders e.g. diabetes mellitus, PKU, jaundice, etc. It also focuses on enzymes of clinical importance, medical biotechnology and gene therapy.

Pre-requisite: PHR 374.

• **PHR 380 Pharmacology (I)** **3 Cr. [2-0-2]**

General Principles, drugs acting at the synaptic and neuroeffector transmission, autacoids including histamine, kinins, eicosanoids, angiogenesis, serotonin, peptides and others, local anesthetics, drugs acting on the blood and blood forming agents.

Pre-requisite: PHR 273.

• **PHR 481 Pharmacology (II)** **3 Cr. [2-0-2]**

Drugs affecting renal function, cardiovascular pharmacology, Drugs acting on the central nervous system, NSAIDS, drugs in bronchial asthma, drugs in allergic disorders, drugs affecting gastrointestinal tract, cancer chemotherapy and chemotherapeutic agents.

Pre-requisite: PHR 380.

• **PHR 476 Forensic Chemistry** **3 Cr. [2-0-2]**

Basic principles of toxicology and biochemical mechanisms of toxicity in mammalian species and man. Correlation between morphological and functional changes caused by toxicants in different organs of the body. Case study of acute poisoning. Teratogenicity and genetic toxicology. Chemical carcinogenesis, environmental and industrial radiations.

Pre-requisite: PHR 428, 481.

• **PHR 570 First Aid** **1 Cr. [1-1-0]**

Surgical first aid, wounds, hemorrhage shock, burns, fractures, bandaging, acute emergencies, syringes, uses and practical applications, CPR (cardio-pulmonary resuscitation) applications.

Pre-requisite: PHR 481.

• **PHR 582 Bioevaluation and Drug Screening** **3 Cr. [2-0-2]**

Organization of blind screening, screening of cholinomimetics, anti-muscarinic drugs, adrenomimetics and antagonists, NSAID, skeletal muscle relaxant, CNS drugs, cardiovascular drugs, hormones and their antagonists.

Pre-requisite: PHR 481.

• **PHR 583 Pharmacotherapeutics** **2 Cr. [2-1-0]**

Pathophysiology and therapeutics of various diseases. Drug selection and dose monitoring, recognition of clinically significant, efficacious and/or toxic drug interaction. Management of different diseases (GIT, cardiovascular, respiratory, CNS, endocrine and malignancy). Case study and problem solving.

Pre-requisite: PHR 481.

II. Elective Courses:

• **MAT 505 Applied statistics** **2 Cr. [2-1-0]**

Statistical design and analysis techniques needed to perform pharmaceutical research and evaluate clinical data. It includes designing, epidemiologic and clinical studies; evaluating diagnostic testing procedures, interpreting the use of statistical data in pharmacy

literature. Emphasis on statistical concepts and their application to critical appraisal of clinical and experimental data.

Pre-requisite: MAT 208.

• **PHR 571 Hematology** **2 Cr. [2-1-0]**

Structure and function of blood components, blood sampling, techniques used in blood analysis, sedimentation rate, erythrocyte counting, differential count, different indices.

Pre-requisite: PHR 380, 481.

• **PHR 572 Radiation Pharmacy** **2 Cr. [2-0-0]**

A survey of the clinical diagnostic and therapeutic use of radioactive pharmaceuticals. Included are a review of nuclear physics, radiation biology, radiation chemistry, regulatory issues, and foundation safety. These areas are related to the synthesis, formulation, dispensing, and administration of radio-pharmaceuticals.

Pre-requisite: PHR 121, 171.

• **PHR 573 Fundamentals of Clinical Chemistry** **2 Cr. [2-1-0]**

Sampling, glucose tolerance; plasma protein fractions and significance; kidney function tests, electrolytes, NPN, acid-base balance, liver function tests, endocrine function, gastric and intestinal function.

Pre-requisite: PHR 375

• **PHR 574 Nutrition** **2 Cr. [2-1-0]**

Biomedical knowledge related to clinical case-management problems to understand the interrelationship between nutrition and health in both hospitalized and healthy persons. Health care policy and financing. Monitoring parameters in chronic diseased persons.

Pre-requisite: PHR 380, 481

• **PHR 585 Molecular Therapeutics** **2 Cr. [2-1-0]**

Principles of molecular therapeutics against signaling pathways; emphasis on biological mechanisms underlying hormone, growth factor, and neurotransmitters – mediated gene regulation, proliferation and cell death.

Pre-requisite: PHR 380, 481

• **PHR 586 Geriatric Pharmacy** **2 Cr. [2-1-0]**

Specialized knowledge and skills in gerontology and geriatric pharmacy including the pathophysiology of selected cardiovascular endocrine, genito- urinary, gastrointestinal disorders, osteoarthritis and osteoporosis. Specialized knowledge and unique functions of health care team providing care to the elderly patient.

Pre-requisite: PHR 380, 481

• **PHR 587 Pediatric Drug Therapy** **2 Cr. [2-1-0]**

Clinical therapeutics and pharmacokinetic concepts applied to the pediatric patient. Unique aspects of pediatric clinical pharmacology emphasized in treating a variety of organ system diseases.

Pre-requisite: PHR 380, 481

- **PHR 589 Complementary / Alternative Therapeutics** **2 Cr. [2-1-0]**
Examines the therapeutic use of complementary / alternative medicines, such as herbal medicines, homeopathic drugs, vitamins with other nutritional supplements, neural therapy and hydrotherapy.
Pre-requisite: PHR 380, 481

The degree project (B.Ph.Sc.):

- **PHR 600 Pharmacy Seminar** **2 Cr. [2-0-0]**
This involves case presentation followed by questions and general discussion of the material. The series will provide in-depth exploration of therapeutics of common diseases encountered in clinical practice.
Pre-requisite: Consent of instructor.

- **PHR 600 Pharmacy Project** **2 Cr. [2-0-0]**
Introduction to the concept of the project. Both the conceptual and practical issues of the project including question development, selection of the appropriate methods, data sources and analytic approach to address the project question.
Pre-requisite: Consent of instructor.