PHARMACY TECHNICIAN PROGRAM

Program Information

Program Name **Diploma in Pharmacy Technician (Pharmaceutical sciences)**

Program Number or Code: 48

Instructional Level: Diploma degree

Instructional Area: Pharmacy

CDC team(s): Curriculum development committee members:
Drs. Mariam Al-Kandari, Nabeel Al-Saffar, Seham Mustafa, and Mariam Al-Husaini.

Target Population

High school graduates of science section.

Program Description

The Pharmacy Technician program is designed to help students to acquire the knowledge and skills required to perform the roles of supportive personnel for hospital and community pharmacies. The pharmacy technician perform a wide variety of non-discretionary pharmacy-related technical tasks under the direct supervision of a licensed pharmacist. These tasks include packaging, distribution, compounding, labeling and recording of drugs. By doing so, pharmacy technicians allow the pharmacist to concentrate on clinical services such as patient consultation, physician intervention, drug therapy analysis, and other clinical topics.

An important personal quality that is closely evaluated throughout the program is the student ability to work as part of a team and to interact successfully with colleagues and health-care personnel and pharmacy clients. Students will receive theoretical and practical training in the preparation and dispensing of medications. Training will also cover aseptic IV preparation, medication-order processing, inventories, packaging, compounding, dispensing computerized medication-order, and the use of computers and labeling facilities. Courses are taught by specialists holding post-graduate degrees and professional experiences in different fields of pharmaceutical sciences and practices.

Successful completion of the program qualifies the graduate for careers performing and managing the technical distributive functions in pharmacies and pharmacy-related industries.

Graduate/Job Titles

Pharmacy technician.

Department Entry Requirements

1. **High school grade average of 75% for females and 70% for males**
2. **Admission priority is given to Kuwaiti nationals.**
3. **Pass personal interview**

General Education Outcomes

A. Apply scientific concepts and terminology.
B. Demonstrate awareness and respect for self and the differences in others when communicating.
C. Describe the major role of each system of the body.
D. Apply problem solving and management skills
E. Preparation of personal and medical equipment
F. Transportation of patients from major incidence scene

External Standards

1. **USA standard.**
2. **UK standard.**
3. **Faculty of Pharmacy, Kuwait University.**
4. **Faculty of Medicine, Kuwait University.**

Program Outcome

The program graduate will be able to:

- **Obtain the knowledge and develop the skills needed to perform pharmacy-related functions and services under the supervision of a licensed pharmacist.**
- **Practice within the professional and legal parameters for the role of a Pharmacy Technician.**
- **Work effectively in a team setting.**
- **Demonstrate the ability to apply theory in a practical setting.**
- **Gain clinical experience in a variety of pharmacy and health care settings.**
- **Package and label drugs for prescription dispensing.**
- **Prepare and deliver unit dose drugs to the nursing services of hospitals or other health care facilities.**
- **Prepare parenteral admixtures under aseptic techniques and sterile conditions.**
- **Receive, monitor and inventory of pharmaceutical appliances, drugs and disposables, including expiry date monitoring.**
- **Assist in stock control and inventory.**
- **Maintain manual and computer records, including patient profiles.**
- **Create patient profiles, prescription order entry, and fill prescriptions with acceptable speed and accuracy.**
- **Compound solutions, ointments, lotions, suppositories and other medications under the supervision of a licensed pharmacist.**
- **Provide office services as needed in the pharmacy.**

Core Abilities

1. Student has to act professionally.
Individuals who act professionally recognize an obligation to conform to the technical and ethical standards of their chosen career. Among the skills and attitudes of acting professionally are

- **Taking responsibility for one's actions.**
- **Conforming to the technical standards of a profession.**
- **Conforming to the ethical standards of a profession.**
- **Practicing morally responsible behavior.**
- **Taking responsibility for staying up-to-date**
- **Maintaining confidentiality.**
- **Exhibiting respect for people and property.**
- **Exhibiting a sense of global awareness.**
- **Displaying appearance appropriate for work environment.**

2. Student has to communicate clearly.
Individuals who communicate clearly can apply appropriate writing, speaking, and listening skills to precisely convey information, ideas, and opinions. Among the skills and attitudes essential to communicating clearly are

- **Speaking clearly so others can understand.**
- **Writing with clarity so others can understand.**
- **Selecting appropriate means to convey a message.**
- **Asking questions for clarification.**
- **Participating in discussions and group presentations.**
- **Interpreting nonverbal communications.**
- **Using active listening skills.**
- **Applying standards of spelling, English/Arabic grammar, and punctuation.**

3. Student has to value learning.
Individuals who value learning maintain acquired knowledge and skills, acquire new knowledge and skills quickly, and adapt to technological and workplace changes. Among skills and attitudes essential to valuing effective learning are

- **Assuming responsibility for lifelong learning.**
- **Identifying one's learning needs.**
- **Accessing appropriate resources for learning.**
- **Applying effective learning processes.**
- **Helping others to learn effectively.**

4. Student has to work productively.
Individuals who work productively apply effective work habits and attitudes within a work setting. Among the skills and attitudes associated with working productively are

- **Attending regularly and on time.**
- **Exhibiting organizational skills.**
- **Locating resources for problem solving.**
- **Displaying productive work ethic.**
- **Maintaining necessary knowledge and skills.**
- **Using effective/efficient processes.**
- **Using appropriate tools/technology.**
- **Showing self-direction in starting tasks.**
- **Demonstrating reliability.**
- **Following directions.**
- **Completing required tasks on time.**

5. Student has to work cooperatively.
Individuals who work cooperatively can work with others to complete tasks, solve problems, resolve conflicts, provide information, and offer support. Among skills and attitudes essential to working cooperatively are

- **Demonstrating respect for self and others.**
- **Contributing in group activity with ideas, suggestions, and effort.**
- **Completing one's share of tasks necessary to finish a group project.**
- **Maintaining a safe and healthy work environment for self/group.**
- **Displaying effective interpersonal skills.**
- **Resolving conflicts in a constructive manner.**
- **Seeking help when needed.**
- **Demonstrating ability to work with a diverse population.**

6. Student has to solve Problems.
Individuals who solve problems can use all elements of problem solving strategies to generate realistic, practical, and workable solutions. Among skills and attitudes essential for solving problems are

- **Using critical/creative thinking skills.**
- **Applying problem solving steps.**
- **Demonstrating open-mindedness.**
- **Evaluating alternatives when choosing a solution.**
- **Implementing solutions appropriately.**
- **Using research to solve problems.**
- **Using appropriate mathematical calculations.**

Course Configuration

Sem./year	Course #	Course Title	Credits	Contact Hrs	Prerequisite	Category
First Semester	PHS100	Pharmaceutical Calculations	2	2+1		Mandatory
	PHS101	Introduction to Pharmacy	1	1		
	PHS102	Clinical and Pharmaceutical Terminology	2	2		
	PHS105	Pharmacy Administration & Medical Stores	2	2		
	PHS108	Pharmaceutical Care of Diseases	1	1		
	PHS109	Pharmaceutical Chemistry [1]	3	2+2		
	MS151	Anatomy and Physiology for Pharmacy	3	3		
	EL100	English Language — Enroll in one of them	2	5		
	EL101	English Language — Enroll in one of them	2	3	70% Level	
	DJ115	Kuwait and development	2	2		Electives (Only 2 credits)
	EN114	Introduction to Psychology	2	2		
	DJ123	Human Relationships	2	2		
	New	Values of Loyalty	2	2		
Total Credits for First Semester			**18**			
Second Semester	PHS103	Pharmacology and Therapeutics [1]	3	3	MS151	Mandatory
	PHS104	Pharmaceutics [1]: Introduction to Pharmaceutics	3	2+2	PHS100	
	PHS111	Computer Applications in Pharmacy	1	1+1		
	PHS121	Pharmacy Technician Practice [1]	2	2	PHS100 and PHS102	
	PHS209	Pharmaceutical Chemistry [2]	3	2+2	PHS109	
	PHS211	Pharmacognosy	2	2+1		
	EL112	English for Health Sciences	2	2+1	EL101	
Total Credits for Second Semester			**16**			

Third Semester	PHS203	Pharmacology and Therapeutics [2]	3	3+1	PHS103 and PHS108	Mandatory
	PHS204	Pharmaceutics [2]: Pharmaceutical dosage forms	3	2+2	PHS104	
	PHS218	Pharmaceutical Microbiology	3	2+2		
	PHS221	Pharmacy Technician Practice [2]	2	2+1	PHS103 PHS104 PHS121	
	PHS225	Toxicology & Safety	3	3+1	PHS103	
	PHS222	Pharmacy Technician Rotation [1]: Primary Health Care Clinics	3	12	PHS121	
Total Credits for Third Semester			**17**			

Sem./year	Course #	Course Title	Credits	Contact Hrs	Prerequisite	Category
Fourth Semester	PHS210	Communication Skills & Professionalism	1	1	PHS121	Mandatory
	PHS213	Pharmacology & Therapeutics [3]	4	4+1	PHS203	
	PHS215	Research Forum in Pharmacy	1	1+1	PHS103 and PHS104	
	PHS217	Advances in Pharmaceutical Technology	1	1+1	PHS103 and PHS104	
	PHS220	Quality Control of Pharmaceuticals	2	2	PHS204	
	PHS224	Pharmaceutics [3]: Industrial Pharmacy	3	2+2	PHS204	
	TI101	Islamic Studies	2	2		
	OA105	Principles of Human Nutrition	2	2		Electives (Only 2 credits)
	TM101	First Aid	2	2		
	ST105	Introduction to Health Statistics [1]	2	3		
	PHS107	Medicine Education	2	2		
	SB123	Preventive Public Health	2	2		
Total Credits for Fourth Semester			**16**			
Summer	PHS223	Summer Field Pharmacy Technician Rotation [2]: Hospitals	**3**	30	PHS222	
Total Credits for Summer Semester			**3**			
Degree	**Total**		**70**			Mandatory

First Semester

Course title: Introduction to Pharmacy
Course Number: PHS101
Semester/Year: 1/1
Credits: 2
Contact Hours: (2+0)
Category: Mandatory
Prerequisite: None
Course Description: The course provides background on the history of pharmacy, profession and its development as well as on the pharmacist's role and his/her duties in the society. The course discusses the role and duties of pharmacy technician's in both inpatient and outpatient settings, and an introduction to their legal responsibilities and technical activities. Sources of pharmaceuticals and introduction to drug actions, doses, dosage forms, routes of administration, response to drugs, pharmacokinetics of drug absorption, prescription and non-prescription drugs, quality control and drug toxicity are also included.

Course title: Clinical and Pharmaceutical Terminology
Course Number: PHS102
Semester/Year: 1/1
Credits: 2
Contact Hours: (2 + 0)
Category: Mandatory
Prerequisite: None
Course Description:
The course introduces students to the structure of medical and pharmaceutical terms and their constituents through the introduction of prefixes, suffixes, root words, plurals, abbreviations and symbols, surgical procedures, medical specialties, and diagnostic procedures. It also familiarizes them with the meaning of most familiar pharmaceutical abbreviations and symbols, and the use of medical Latin terminology and abbreviations in naming pharmaceutical products so as to secure proper dispensation of medicine.

Course title: Pharmaceutical Calculations
Course Number: PHS106
Semester/Year: 1/1
Credits: 2
Contact Hours: (2 + 0)
Category: Mandatory
Prerequisite: None
Course Description:
Pharmaceutical calculations including reading, interpreting, and solving calculation problems encountered in the preparation and distribution of drugs. Conversion of measurements within the apothecary, avoirdupois, and metric systems with emphasis on the metric system of weight and volume. Topics include ratio and proportion, percentage,

dilution and concentration, milliequivalent, units, intravenous flow rates, and perform basic pharmaceutical calculations.

Course title: Pharmaceutical care of diseases
Course Number: PHS108
Semester/Year: 1/1
Credits: 2
Contact Hours: (2+0)
Category: Mandatory
Prerequisite: None
Course Description:
The course discusses most of the diseases covered in pharmacology I, II and III. The pathological conditions of a part, organ, or system from various causes, such as infection, injuries, disabilities, disorders, syndromes, genetic defect, behaviors or environmental stress, and characterized by an identifiable group of signs or symptoms will be emphasized. Causes of these diseases and their transmission, prevalence, incidence, risk factors, complications will also be discussed.

Course title: Pharmaceutical Chemistry [1]
Course Number: PHS109
Semester/Year: 1/1
Credits: 3
Contact Hours: (2 + 2)
Category: Mandatory
Prerequisite: None
Course Description:
This is an introductory course concerned with the basics of organic, inorganic and general analytical and pharmaceutical chemistry, together with the physical and chemical properties of elements, compounds and mixtures. The practical part of the course aids in developing the fundamental analytical laboratory skills and techniques, in addition to learning the performance of qualitative analysis of actions and salts in water solutions; preparation of standard solutions; official buffer preparation and acid basis titration.

Course title: English
Course Number: EL101
Semester/Year: 1/1
Credits: 2
Contact Hours: (2 + 0)
Category: Mandatory
Prerequisite: None
Course Description: This course is a critical reading for special purposes and expository writing offers training in the writing process, the development and organization of

expository prose, and research techniques. The course emphasizes quality in logic and direction.

Course title: Anatomy and Physiology for Pharmacy
Course Number: MS151
Semester/Year: 1/1
Credits: 3
Contact Hours: (3 + 0)
Category: Mandatory
Course Description: This course is offered to pharmacy students. They learn about the structure and functions of different organs and systems in human body. Emphasis is placed on the musculoskeletal, nervous, circulatory, respiratory, urinary systems, etc. Endocrine glands as well as skin are also covered.

Second Semester

Course title: Pharmacology and Therapeutics [1]
Course Number: PHS103
Semester/Year: 2/1
Credits: 3
Contact Hours: (3 + 0)
Category: Mandatory
Prerequisite: MS151
Course Description:
The course presents the principles of drug action, and pharmacokinetic pharmacology including absorption, distribution, metabolism and excretion of drugs, and methods of administering therapeutic agents. It also covers anti-cancer drugs and anti-infective agents. The course explains the drug mechanism of actions, side effects and indications and contraindications of the drugs.

Course title: Pharmaceutics [1]: Introduction to pharmaceutics
Course Number: PHS104
Semester/Year: 2/1
Credits: 3
Contact Hours: (2+2)
Category: Mandatory
Prerequisite: PHS106
Course Description:
This course is concerned with introduction to pharmaceutical dosage forms; studying different methods of enhancing the stability, solubility, and bioavailability of

pharmaceutical dosage forms; and studying concepts and topics related to pharmaceutics such as surface and interfacial tension, Rheology and radio pharmaceutics.

Course title: Computer Applications in Pharmacy
Course Number: PHS111
Semester/Year: 2/1
Credits: 1
Contact Hours: 1+1
Category: Mandatory
Prerequisite: None
Course Description:
This course is designed to provide the student with knowledge about advanced computer technology and its application in the healthcare field. It will also introduce the student to technological innovations in healthcare informatics as a discipline, clinical decision-support systems, medical expert systems, telemedicine, telepharmacy and Internet health applications. The course will emphasize the use of computerized health information retrieval systems, the advanced features of the Internet information resources, patient-related programs and data manipulation software for application in profession -related tasks. The course will introduce some international and local pharmaceutical systems and their uses in storing, dispensing, inventory, medication errors monitoring and screening, and in requesting medical supplies.

Course title: Introduction to Pharmacy Technician Practice (1)
Course Number: PHS121
Semester/Year: 2/1
Credits: 2
Contact Hours: (2 + 0)
Category: Mandatory
Prerequisite: PHS102
Course Description:
The course introduces students to the field of clinical pharmacy and its significance. It comprises several pharmaceutical concepts and topics including drug-use process, and general dispensing procedures. The course review skills needed to operate effectively in a health care setting, with emphasis on receiving and controlling inventory, processing prescriptions including electronic prescribing. The course also covers main components of prescription, dispensing of prescription orders, labeling of dispensed medicines, drug stability and storage conditions, validity and expiration date, containers, and routes of administration. Basic dispensing calculation skills will be reviewed.

Course title: Pharmacognosy
Course Number: PHS211
Semester/Year: 2/1
Credits: 2
Contact Hours: (2 + 1)
Category: Mandatory
Prerequisite: None
Course Description:
This course is a study of pharmacologically active principles derived from plants. It is divided into two parts. The first part briefly deals with basic types of active substances such as alkalis and glycosides. Students learn the formula of such substances, their properties, extraction methods and sources. In the second part, students are introduced to the composition of different parts of the plants in detail including some kinds of herbs and their uses.

Course title: Pharmaceutical Chemistry [2]
Course Number: PHS213
Semester/Year: 2/1
Credits: 3
Contact Hours: (2 + 2)
Category: mandatory
Prerequisite: PHS109
Course Description:
This course introduces students to various kinds of drugs such as sedatives, allergy drugs, diabetes drugs, and drugs that act on the circulatory system. Students study drugs effects and medical uses of each kind, their natural and chemical properties, and pharmaceutical products. The practical part of the course covers analysis quantitative methods.

Course title: English for Health Sciences
Course Number: EL112
Semester/Year: 2/1
Credits: 2
Contact Hours: (2 + 1)
Category: Mandatory
Prerequisite: EL101
Course Description:
This course is intended to develop student's skills in reading, understanding and writing medical manuscripts and research papers. Precision in documentation, bibliographies, usage, punctuation, and stylistics assumed. Students have to demonstrate necessary English skills and understanding of English grammar.

Third Semester

Course title: Pharmacology and Therapeutics [2]
Course Number: PHS203
Semester/Year: 1/2
Credits: 4
Contact Hours: (3 + 2)
Category: Mandatory
Prerequisite: PHS103 and PHS108
Course Description:
The course covers drugs acting on the autonomic nervous system and the central nervous system. It includes sympathetic and parasympathetic agonists and antagonists and their receptors and their therapeutic uses. Drugs acting on the central nervous system including anxiolytics and hypnotics, analgesics, opioids, anesthetics, antiepileptics, antiparkinsonial, stimulants, antidepressants, neurolyptics, Alzheimer and manic treatments will be discussed. It also covers drugs that used in some respiratory and gastrointestinal tract disorders. Obesity treatments, non-steroidal anti-inflammatory drugs and Gout treatments will be covered. Pharmacology II course is providing the students with the aim of the therapy for each disease, the drugs of choice, their mechanism of actions, and their side effects.
Practical laboratories for some important topics will be provided. The effect of some drugs will be tested in-vitro using different animal's smooth muscles such as tracheae and GIT, and also in-vivo such as CNS drugs.

Course title: Pharmaceutics [2]: Pharmaceutical dosage forms
Course Number: PHS204
Semester/Year: 1/2
Credits: 3
Contact Hours: (2 + 2)
Category: Mandatory
Prerequisite: PHS104
Course Description:
The course is designed to explain the rational behind the need for and the development of pharmaceutical dosage forms, and the manufacture of simple pharmaceutical preparations intended for internal and external use: solutions, suspensions, powders and granules and sterile dosage forms. The course is also designed to provide an understanding of formulation, manufacture, application, and physicochemical aspects of tablets, capsules, emulsions, ointment bases, pastes, and suppository.

Course title: Communication Skills and Professionalism
Course Number: PHS210
Semester/Year: 1/2
Credits: 1
Contact Hours: (1 + 0)
Category: Mandatory
Prerequisite: PHS121
Course Description:
An introduction to the social and behavioral issues that impact health including their influence on the pharmacist-patient relationship and the ability of the pharmacist to provide patient care. It includes discussions of stress and stress coping, communication with patients and other health care professionals, cultural and religious influences on patient compliance and disease management, and required community service experiences. Emphasis is on interpersonal skills of communication such as listening, interpreting verbal and non-verbal messages, and understanding the emotions of others. Learn strategies for effective communication and conflict management in the workplace.

Course title: Pharmaceutical Microbiology
Course Number: PHS218
Semester/Year: 1/2
Credits: 3
Contact Hours: (2 + 2)
Category: mandatory
Prerequisite: None
Course Description: This course is concerned with the principles of microbiology including the microbes, immunity system, examples of diseases caused by microbes. The course also surveys the medical and pharmaceutical uses of antibiotics, disinfectants, and preservatives. Further, students are introduced to Bacterial Morphology and Physiology, Control of Microorganisms, Infection and Host Resistance, Virology, Mycology, and Methods of Sterilization.

Course title: Advanced Pharmacy Technician Practice [2]
Course Number: PHS221
Semester/Year: 1/2
Credits: 2
Contact Hours: (2 + 1)
Category: Mandatory
Prerequisite: PHS121
Course Description:
The course is constructed to introduce advanced knowledge and applications in the field of clinical pharmacy practice. Adverse drug reactions and drug interactions will be discussed. The course will also cover patients compliance, the concept of medication safety and medication errors and new technologies used to minimize medication errors. The concept of counterfeit drugs and pharmaceutical care will be explained. It will discuss hospital

organization, different departments and supporting services and will give more emphasis on the pharmacy organizations, pharmacy personnel, and different systems used for drug dispensing in hospitals. More highlighting will be given to features and risks for drug use in infants, children and elderly. Students learn pharmacy ethics and legislations, laws, and regulations that control the profession of pharmacy in the State of Kuwait.

Course title: Pharmacy Technician Rotation [1]: Primary Health Care Clinics
Course Number: PHS222
Semester/Year: 1/2
Credits: 3
Contact Hours: (0 + 12)
Category: Mandatory
Prerequisite: PHS121
Course Description:
This course provides an opportunity to work in a small-scale pharmacy settings under a pharmacist's supervision. Emphasis is placed on effective communication with personnel, developing proper employee attitude, and dispensing of medications. Student will be exposed to the practical aspects of dispensing, non-sterile compounding and inventory control at the training site in a primary health care unit of the Ministry of health. Activities will be performed by the student and evaluated by a preceptor. Upon completion, students should be able to demonstrate an understanding of pharmacy operations, utilize references, effectiveness in reading prescriptions, drug packaging and labeling, dispense medications, receiving medicines requests from central medical stores, recording, and efficiently operate computers. This practical field experience will be two times a week throughout the term.

Fourth Semester

Course title: Pharmacology and Therapeutics [3]
Course Number: PHS213
Semester/Year: 2/2
Credits: 3
Contact Hours: (3 + 0)
Category: Mandatory
Prerequisite: PHS203
Course Description:
The course covers cardiovascular drugs used for angina, arrhythmia, hypertension, congestive heart failure, blood coagulation, and hyperlipidemia. It also covers endocrine glands system and drugs that used for hypo and hyper hormonal secretions.
Pharmacology III course provides students with the aim of the therapy, the drugs of choice, their mechanism of actions, and their side effects.

Course title: Research Forum in Pharmacy
Course Number: PHS215
Semester/Year: 2/2
Credits: 1
Contact Hours: (1 + 1)
Category: mandatory
Prerequisite: PHS103 and PHS104
Course Description:
In this course, introductory lectures in thesis writing will be given prior to student's selection of one of the topics suggested by their instructor. They consult various information sources such as references and periodicals to collect data related to their topic. A report is to be submitted. Presentation is also required. Students may discuss topics such as blood pressure, ulcer drugs, diabetes and its remedy, AIDS and its hazards and prevention methods, medical herbs, and contact lenses.

Course title: Advanced Pharmaceutical Technology
Course Number: PHS217
Semester/Year: 2/2
Credits: 2
Contact Hours: (2 + 0)
Category: Mandatory
Prerequisite: PHM104
Course Description:
The course covers DNA Technology, production of medical products by recombinant DNA including definition of some terms, overview of recombinant DNA, examples of possible applications and genetically engineered products for medical therapy.
Students will be familiar with blood products. Different products of whole human blood and plasma fractionation and plasma substitutes. The course also provides students with immunobiological types of vaccines, condition of package and label of vaccines, the seed lot system of microbial and viral vaccines and immunosera quality control test. Finally the course will include trace elements and drug targeting.

Course title: Quality Control of Pharmaceuticals
Course Number: PHS220
Semester/Year: 2/2
Credits: 2
Contact Hours: (2 + 0)
Category: mandatory
Prerequisite: PHS213
Course Description:
This course covers the principles and techniques of quality control as found in the pharmaceutical industry. This course introduces students to different methods of pharmaceutics censorship including chemical and biological methods. Students are exposed to modern chemical analysis methods, such as spectrophotometry, metrics, and

chromatography. Also, students are introduced to statistical methods used for processing results and diagrammatical representation as applied in pharmaceutical control laboratories**.**

Course title: Industrial Pharmacy
Course Number: PHS224
Semester/Year: 2/2
Credits: 3
Contact Hours: (2 + 4)
Category: mandatory
Prerequisite: PHS204
Course Description:
The course covers important apparatuses used in drugs factories such as those used in mixing, combination, filtering, evaporating, drying, grinding, and pills pressing. The course also familiarizes students with medicine manufacturing steps and procedures, and problems encountered and solutions to such problems. Students are exposed to the industry of pharmaceutics where they learn the significance of quality in manufacturing pharmaceutical products.

Course title: Toxicology and Safety
Course Number: PHS225
Semester/Year: 2/2
Credits: 3
Contact Hours: (3 + 1)
Category: mandatory
Prerequisite: PHS103
Course Description:
This course provides students with the essential principles in general toxicology and poisons. It covers the effects of toxic agents on different systems, spectrum of toxic effects, margin of safety, dose-response relationship. It gives the student knowledge about the general measures for treatment of poisons, reduction in poison levels reaching tissues, main antidotes and life sustaining measures. The course also illustrates and familiarizes the student with the symptoms of the most important toxic substances and their treatment such as metals war gases, corrosives, clinical drugs, plant and animal toxicants, air pollution in addition to some household mixtures. Finally, the general way of analysis of a poison.

Fifth Semester (Summer)

Course title: Pharmacy Technician Rotation [2]: Hospitals
Course Number: PHS223
Semester/Year: 3/2
Credits: 3
Contact Hours: (0 + 30)
Category: Mandatory
Prerequisite: PHS222 and Completion of 42 credits

Course Description:
An advance course of practical pharmacy training in different aspects of dispensing, compounding and inventory control in hospital settings of the Ministry of health and under a pharmacist's supervision. Activities will be performed by the student and evaluated by a preceptor. Emphasis will be placed on effective communication with personnel, developing proper employee attitude, dispensing of medications, unit-dose dispensing, ward stock systems, automated dispensing, intravenous preparations, total parenteral nutrition, and sterile preparation. Students learn the role and duties of pharmacy technician in hospital pharmacies. Upon completion, students should obtain dispensing skills and be able to demonstrate an understanding of pharmacy operations, utilize references, ability to read and assess prescriptions, prepare patient charges, and efficiently operate computers. Skills in receiving drugs from central medical stores and recording will be reinforced. Time period of this practical field experience will be 30 hours per week for 7 weeks.

Other Supporting Courses

Course title: Pharmacology for Dentistry
Course Number: PHS116
Semester/Year:
Credits: 2
Contact Hours: (2 + 0)
Category: mandatory
Course Description:
This course provides a study of drugs with an emphasis on those drugs utilized in the practice of dentistry. The course describes the chemical and physical properties of various drugs as well as their therapeutic use and effects. It covers drugs acting on the main body organs, such as autonomic and central nervous systems and cardiovascular system. The course is mainly concentrating on the drugs that used for dental practice such as local and general anesthetics, analgesics, antibiotics antiseptics, fluoride and dental materials. Their uses, mechanism of actions, side effects and their interactions with other co-administered drugs are explained.

Course title: Pharmacy and Pharmacology for Ambulatory Course
Course Number: PHS141
Semester/Year:
Credits: 2
Contact Hours: (2 + 0)
Category: Mandatory
Prerequisite: HE3M101 and PHS102
Course Description:
The course is a basic introduction to the principles of pharmacology. It provides basic information on pharmaceutical absorption, methods of taking medicine, assimilation inside the body, side effects, prohibitions, drugs interactions, drugs that act on the central nervous system and the autonomic nervous system. The course also introduces the students to

different kinds of drugs such as those related to the circulatory system, the urinary system, blood, and contagious diseases. Further, the course covers vitamins, hormones, and digestive system drags.

Course title: Pharmacology for Records Course
Course Number: PHS146
Semester/Year:
Credits: 1
Contact Hours: (1 + 0)
Category: Mandatory
Prerequisite: MS156
Course Description:
This course introduces pharmacology to Medical Records students at the college. It provides them with essential and useful information on commonly circulated pharmaceutics: classification, benefits, and side effects. Special attention is attached to pharmaceutical generic name. Classes of drugs by body systems including antibiotics, antivirals, cardiac medications, analgesics, hormones, vaccines, immunizations and chemotherapy agents are examples of the drugs covered.

Course title: Medicinal Chemistry
Course Number: PHS235
Semester/Year:
Credits: 1
Contact Hours: (0 + 2)
Category: Mandatory
Prerequisite: NSC114
Course Description: This is an introductory course to pharmaceutical chemistry where the relation between drugs' chemical composition and their biological effects is discussed. The course covers different pharmaceutical groups such as vitamins, hormones, and drugs that affect the digestive system, the reparatory system, and the nervous system. Drugs side effects, interaction between drugs and food, and methods of medicine doses are also studied.