

## **Pharmaceutics and Industrial Pharmacy department:**

### *PharmD system*

- **Vision :**

Department of Pharmaceutics and Industrial Pharmacy Looked to excellence and keep up with the development with regard to the examination of modern pharmaceuticals and scientific research also seeks to link the academic study, scientific research and practical applications in the pharmaceutical industry to contribute in development of that vital area.

- **Mission:**

Use different educational styles to prepare pharmacists have the basic skills to formulate and preparation and evaluation of different dosage forms and have the ability to work in the pharmaceutical industry and various pharmaceutical fields also adopts the research plan section themed variety keep pace with global research in this area

- **The department teaches the following courses:**

<b>Course Code</b>	<b>Course Name</b>
PHT 101	Pharmacy Orientation
PHT 102	Physical Pharmacy
PHT 103	Professional Ethics
PHT 204	Pharmaceutics I
PHT 205	Pharmaceutics II
PHT 306	Pharmaceutics III
PHT 307	Biopharmaceutics & Pharmacokinetics
PHT 308	Pharmaceutics IV
PHT 309	Pharmacy Legislation & Regulatory Affairs
PHT 410	Pharmaceutical Technology I
PHT 411	Entrepreneurship and Pharmacy Administration
PHT 512	Pharmaceutical Technology II
PHT 513	Quality Control & Stability of Dosage Forms
PHT 514	Advanced Drug Delivery Systems
PHT 515	Marketing & Pharmacoeconomics
PHT 516	Good Manufacturing Practice

<b>Laboratories of Pharmaceutics and Industrial Pharmacy Department</b>			
<b>Laboratory</b>	<b>Lab no.</b>	<b>Floor</b>	<b>Location</b>
<b>Preparation Room</b>	<b>2001</b>	<b>Ground</b>	<b>Saad Zaghloul Building</b>
<b>Pilot Formulation Unit</b>	<b>2008</b>		
<b>1</b>	<b>2002</b>		
<b>2</b>	<b>2003</b>		
<b>3</b>	<b>2004</b>		
<b>4</b>	<b>2005</b>		
<b>5</b>	<b>2007</b>	<b>Second</b>	
<b>6</b>	<b>2214</b>		
<b>7</b>	<b>2215</b>		
<b>8</b>	<b>1004</b>	<b>Ground</b>	<b>Al-Shahid Ahmed Hamdy Building</b>

- **Course description:**

**Level 1, Fall Semester (1):**

<b>Code</b>	<b>PHT 101</b>	<b>Credit hours</b>		
<b>Title</b>	<b>Pharmacy Orientation</b>	<b>L*</b>	<b>P/T**</b>	<b>Total</b>
<b>Pre-requisite</b>	None	2	-	2

**Course content:**

This is a course to acquaint the beginning pharmacy student with the multiple aspects of the profession of pharmacy, including the mission of pharmacy, role of pharmacist in society and pharmacy careers, classification of medications, interpretation of prescriptions and medication orders, general dispensing procedure and factors affecting drug dosage, sources of drugs, different dosage forms and various routes of administration. In addition to the history of pharmacy practice in various civilizations

**Level 1, Spring Semester (2):**

<b>Code</b>	<b>PHT 102</b>	<b>Credit hours</b>		
<b>Title</b>	<b>Physical Pharmacy</b>	<b>L*</b>	<b>P/T**</b>	<b>Total</b>
<b>Pre-requisite</b>	None	2	1	3

**Course content:**

This course provides students with knowledge of physio-chemical principles essential for the design and formulation of pharmaceutical products. Students are introduced to the fundamental concepts of states of matter, Phase equilibrium, colligative properties, isotonicity solubility, dissolution, partition coefficient, surface and interfacial phenomena, surface active agents, adsorption and its application in pharmacy and rheological behavior of dosage forms

<b>Code</b>	<b>PHT 103</b>	<b>Credit hours</b>		
<b>Title</b>	<b>Professional Ethics</b>	<b>L*</b>	<b>P/T**</b>	<b>Total</b>
<b>Pre-requisite</b>	None	1	-	1

**Course content:**

Professional ethics provides general principles and history of pharmacy ethics, general principles of medical ethics, conflicts of interests and its management pharmacists relationship with society and family, ethics in disaster, medication error, research ethics and animal ethics.

**Level 2, Fall Semester (3):**

<b>Code</b>	<b>PHT 204</b>	<b>Credit hours</b>		
<b>Title</b>	<b>Pharmaceutics I</b>	<b>L*</b>	<b>P/T**</b>	<b>Total</b>
<b>Pre-requisite</b>	Pharmacy Orientation Physical Pharmacy	2	1	3

**Course content:**

This course is a study of the system of weights, measures, mathematical expertise and pharmaceutical calculations requisite to the compounding, dispensing, and utilization of drugs in pharmacy practice. It is also concerned with all manufacturing formulations aspects, packaging, storage and stability of liquid dosage forms including solutions (aqueous and non-aqueous), suspensions, emulsions and colloids with emphasis on the technology and pharmaceutical rationale fundamental to their design and development. The incompatibilities occurring during dispensing are also considered

**Level 2, Spring Semester (4):**

<b>Code</b>	<b>PHT 205</b>	<b>Credit hours</b>		
<b>Title</b>	<b>Pharmaceutics II</b>	<b>L*</b>	<b>P/T**</b>	<b>Total</b>
<b>Pre-requisite</b>	Pharmacy Orientation Physical Pharmacy	2	1	3

**Course content:**

This course covers the structure and function of the skin, target area of treatment after topical application to skin, basic principles of diffusion through membranes and factors affecting percutaneous absorption, enhancement of skin penetration, transdermal drug delivery systems (TDDS). It also describes the principles and techniques involved in the formulation and manufacturing of traditional dermatological semisolid dosage forms (creams, ointments, gels and pastes) and cosmetic products

**Level 3, Fall Semester (5):**

<b>Code</b>	<b>PHT 306</b>	<b>Credit hours</b>		
<b>Title</b>	<b>Pharmaceutics III</b>	<b>L*</b>	<b>P/T**</b>	<b>Total</b>
<b>Pre-requisite</b>	Pharmacy Orientation Physical Pharmacy	2	1	3

**Course content:**

The course covers the following: Powders, particle size and their analysis, micromeritics, angle of repose, porosity, void, and bulk volume, particle size reduction, blending powders, medicated powders, bulk and divided powders, granules and effervescent granulated salts. In addition to an overview of capsules, hard gelatin capsules, capsule sizes, preparation, filling, developing the formulation, capsule sealing, cleaning and polishing capsules, soft gelatin capsules, their use, preparation and containers for dispensing capsules. The course comprises also tablets types, excipients, wet granulation, dry granulation, direct compression tableting and tablet coating, suppositories and pessaries, their types and methods of preparation, other solid dosage forms for oral administration and novel drug delivery systems.

**Level 3, Spring Semester (6):**

<b>Code</b>	<b>PHT 307</b>	<b>Credit hours</b>		
<b>Title</b>	<b>Biopharmaceutics &amp; Pharmacokinetics</b>	<b>L*</b>	<b>P/T**</b>	<b>Total</b>
<b>Pre-requisite</b>	Pharmaceutics I	2	1	3

**Course content:**

The course gives a general introduction to pharmacokinetics, rates and order of reactions. One compartment intravenous bolus. Two compartment body model and volume distribution terms. Clearance, elimination rate constant ( $k_e$ ), calculation using rate of excretion data and amount remaining to be excreted (ARE) data. Factors affecting validity of urine data. Drugs and route of administration. Transport across cell membranes. Absorption and factors affecting drug absorption. Drug distribution and protein binding. Drug elimination.

Code	PHT 308	Credit hours		
Title	Pharmaceutics IV	L*	P/T**	Total
Pre-requisite	Pharmaceutical Microbiology Pharmaceutics I	2	-	2

**Course content:**

This course comprises sterile dosage forms, parenteral products, ophthalmic and nasal products, adjustment of isotonicity, calculations and applications of isotonic buffer, milliequivalent, millimole and milliosmole. In addition to, radio pharmacy and radiopharmaceuticals and extended release of pharmaceutical preparations.

Code	PHT 309	Credit hours		
Title	Pharmaceutical Legislations & Regulatory Affairs	L*	P/T**	Total
Pre-requisite	None	1	-	1

**Course content:**

لائحة تقاليد المهنة، تنظيم العلاقة بين الصيدلة وأعضاء المهن الطبية الأخرى، قانون مزاول مهنة الصيدلة، المؤسسات الصيدلانية، شروط الترخيص للمؤسسات الصيدلانية، المستحضرات الصيدلانية الخاصة والدستورية، اللوائح والجدول المنظمة لتداول الجواهر المخدرة، الإشتراطات الصحية والفنية الواجب توافرها في مصانع الأدوية.

**Level 4, Fall Semester (7):**

Code	PHT 410	Credit hours		
Title	Pharmaceutical Technology I	L*	P/T**	Total
Pre-requisite	Pharmaceutics I	2	1	3

**Course content:**

The course provides students with an introduction to industrial pharmacy. It deals with the principles of various unit operations such as heat transfer, evaporation, drying, distillation, filtration, centrifugation, crystallization and extraction. It focuses on the application of these unit

operations in pharmaceutical industry with emphasis on the equipment and machines used during the production of different dosage forms.

**Level 4, Spring Semester (8):**

Code	PHT 411	Credit hours		
Title	Entrepreneurship and Pharmacy Administration	L*	P/T**	Total
Pre-requisite	Communication skills	2	–	2

**Course content:**

This course is designed to enhance a student’s knowledge in leadership, business, and financial skills in pharmacy practice while learning the traits of an entrepreneur, current topics in entrepreneurship with a specific focus on pharmacy practice and patient care programs. This course will teach the participants a comprehensive set of critical skills needed to develop a profitable business project. This course is designed to provide the students the personal and business tools including risk-taking, strategic planning, marketing, competitiveness, and social responsibility to make the transition from the academic environment to the daily practice of pharmacy now and in the future, with an emphasis on entrepreneurship.

**Level 5, Fall Semester (9):**

Code	PHT 515	Credit hours		
Title	Marketing & Pharmacoeconomics	L*	P/T**	Total
Pre-requisite	Communication skills	2	–	2

**Course content:**

The objective of this course is to introduce students to the concepts, analyses, and activities that comprise marketing management, and to provide practice in assessing and solving marketing problems. The course is also a foundation for advanced electives in Marketing as well as other business/social disciplines. Topics include marketing strategy, customer behavior, segmentation, market research, product management, pricing, promotion, sales force management and competitive analysis.

Code	PHT 512	Credit hours		
Title	Pharmaceutical Technology II	L*	P/T**	Total
Pre-requisite	Pharmaceutics III	2	1	3

This course is a continuation of the study of the various unit operations in pharmaceutical industry with emphasis on size reduction, size separation, size analysis and size enlargement involved in the process development, scale-up and manufacturing of pharmaceutical drug products in industry

(conventional / advanced nanotechnology based). In addition to the container/closure systems, some of the packaging processing methods are covered. Moreover, the vision about designing a quality product and its manufacturing process to consistently deliver the intended performance of the product to meet patient needs is discussed by applying Quality-by-Design principles.

**Level 5, Spring Semester (10):**

Code	PHT 513	Credit hours		
Title	Quality Control & Stability of Dosage Forms	L*	P/T**	Total
Pre-requisite	Pharmaceutics I, II, III	2	1	3

**Course content:**

Quality control and evaluation tests of raw materials and different dosage form (solid, semi solid, liquid ..... etc.). Also the course introduces the students to the kinetics of drug decomposition including rate and order of the reaction, determination of the half-life, expiry date and shelf-life by different methods, stability testing, and in-vitro possible drug/excipients interactions.

Code	PHT 514	Credit hours		
Title	Advanced Drug Delivery Systems	L*	P/T**	Total
Pre-requisite	Pharmaceutics I, II, III	2	1	3

**Course content:**

The course aims to provide students with insights and competencies related to the principles of pharmaceutical pre-formulation as a gateway to dosage forms design and formulation. Emphasis is placed on developing formulations based on the physical and chemical properties of the drug substance and the intended use of the drug product. The course also introduces the students to the formulation principles and applications of novel and targeted drug delivery systems by transforming proteins, genes, and other biotechnology driven compounds into therapeutic products. In addition to formulation aspects of biotechnology derived pharmaceuticals, it also covers the application of polymers and excipients to solve problems/issues concerning the optimization of absorption, selective transport, and targeting.



Code	PHT 516	Credit hours		
Title	Good Manufacturing Practice	L*	P/T**	Total
Pre-requisite	Pharmaceutical Technology I, II	1	-	1

**Course content:**

This course involves the principles of the Current Good Manufacturing Practices (cGMP). It exposes students to all aspects of validation, calibration, inspection and the requirements for manufacturing facilities. It also provides students with a review of the process engineering, technology transfer, personnel management, training and hygiene, premises and contamination control, documentation and auditing, process deviation with emphasis on risk management, complaint handling and product recall theory.

- **Elective Courses:**

Code	PHT 600	Credit hours		
Title	Cosmetics and Cosmeceutical	L*	P/T**	Total
Pre-requisite	Pharmaceutics I, II	1	1	3

**Course content:**

This course provides the student with advanced informations about a number of cosmetics and cosmeceutical products including formulation aspects, proper use and safety, in addition to minor dermatological problems and examples of OTC products. The course includes; baby care products, foot care products, fragrance and perfumes in cosmetics, decorative cosmetics, oral and dental care products, dermatological problems, feminine hygiene products and antiperspirants and deodorants.

Code	PHT 601	Credit hours		
Title	Good Pharmacy Practice and Veterinary Dosage Forms	L*	P/T**	Total
Pre-requisite	Pharmaceutics I, II	1	1	3

**Course content:**

This course includes makeup cosmetics, fragrance products, oral care cosmetics, whitening agents, hair growth promoters, skin-care agents, anti-acne agents, antiperspirants and deodorants.