

Republic of Iraq
Ministry of Higher Education & Scientific Research
Northren Technical University
Institute of Medical Technology-Al – Dor
Department: Pharmacy Techniques

مفردات المقررات للتخصصات الطبية
قسم تقنيات الصيدلة
المعهد التقني الدور
المستوى الثاني



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تسمية القسم :

باللغة العربية : قسم تقنيات الصيدلة

باللغة الانكليزية : Department: Pharmacy Techniques

تسمية الخريج :

باللغة العربية : تقني صيدلي

باللغة الانكليزية : Pharmaceutical Technician

تسمية الشهادة :

باللغة العربية : دبلوم فني في الصيدلة

باللغة الانكليزية : Technical Diploma in Pharmacy

الطبية	التخصصات
تقنيات الصيدلة	القسم

الهدف

تهيئة كوادر تقنية مؤهلة تعمل في مجال الصيدلة السريرية والدوائية تحت اشراف الصيدلي وفي مجال الصناعات الصيدلانية والكيمياوية تحت إشراف الصيدلي او الكيماوي .

توصيف عمل الخريج

أن يكون الخريج قادرا على العمل في :-

1. الصيدليات المختلفة ويكون قادرا على قراءة الوصفات الطبية وتحضير وصرف الدواء وكذلك تصنيفه وترتيبه في الصيدلية تحت اشراف الصيدلي .
2. معامل الادوية حيث يساعد الصيدلي او الكيماوي في تحضير الادوية والاشراف والمتابعة والمراقبة في الخطوط الانتاجية وتطبيق طرق السيطرة النوعية اثناء انتاج الادوية واجراء التحضيرات المختبرية الخاصة بالفحص او التحليل .
3. مصانع المستحضرات الطبية والكيمياوية ومستحضرات التجميل والمحاقن باشراف الصيدلي او الكيماوي .
4. مخازن ومستوصفات الادوية وفي المعامل ومخازن الادوية حيث يكون قادرا على اجراء جميع مراحل التخزين والتصنيف والترتيب .
5. يقوم بتشغيل وإدامة الاجهزة الصيدلانية .

specialties	Medical
Department	Department: Pharmacy Techniques

Target

Preparing qualified technical staff working in the field of clinical and pharmaceutical pharmacy under the supervision of the pharmacist and in the field of the pharmaceutical and chemical industries under the supervision of the pharmacist or chemical.

Description of the work of graduate

1. The graduate can read prescriptions and dispense medications, as well as classifying and arranging them in the pharmacy under the supervision of the pharmacist.
2. In medication laboratories, he/she assists the pharmacist or chemist in preparing medicines, supervising, monitoring, and controlling production lines, applying quality control methods during drug production, and making laboratory preparations for examination or analysis.

3. The graduate can work in Factories of medical and chemical formulations and cosmetics, under the supervision of a pharmacist or chemist.
4. The graduate can work in drug stores, dispensaries, and laboratories where carry out all stages of storage, classification, and arrangement.
5. The graduate can operate pharmaceutical equipment such as pill grinding, pressing, pulverizing devices, and pill hardening devices.

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الخطة الدراسية للمستوى الثاني للعام الدراسي 2023 - 2024									
قسم تقنيات الصيدلة / المعهد التقني / الدور									
الرمز	نوع المادة	مادة كورس	المعهد ان وجد	عدد الوحدات	عدد الساعات العملية	عدد الساعات النظرية	اسم المادة		نوع المتطلب
							باللغة الانكليزية	باللغة العربية	
NTU 200	عامة	الاول		2	0	2	English language 2	اللغة الانكليزية 2	اجباري
NTU 201	عامة	الثاني		2	0	2	Professional Ethics	اخلاقيات المهنة	اجباري
				4	0	4			المجموع
TID 202	مساعدة	الأول		2	0	2	Statistics	الإحصاء	اجباري
				2	0	2			المجموع
PHT 203	تخصصية	الاول		4	2	2	Pharmaceutics	صيدلانيات	اجباري
PHT 204	تخصصية	الاول		4	2	2	Industrial Principles	المبادئ الصناعية	اجباري
PHT 205	تخصصية	الاول		4	2	2	Principles of Pharmaceutical chemistry	مبادئ الكيمياء الصيدلانية	اجباري
PHT 206	تخصصية	الاول		4	2	2	Principles of Drugs	مبادئ الدواء	اجباري
PHT 207	تخصصية	الاول		3	2	1	Medicinal plants and Nutural Products	النباتات الطبية و النواتج الطبيعية	اجباري
PHT 208	تخصصية	الاول		4	2	2	Basics of Theraputics Application	اساسيات التطبيقات العلاجية	اجباري
PHT 209	تخصصية	الاول		2	0	2	Toxicology	سموم	اجباري
PHT 211	تخصصية	الثاني		4	2	2	Pharmaceutical Formulation	مستحضرات صيدلانية	اجباري
PHT 212	تخصصية	الثاني		4	2	2	Industrial Pharmacy	صيدلة صناعية	اجباري
PHT 213	تخصصية	الثاني		4	2	2	Pharmaceutical chemistry	كيمياء صيدلانية	اجباري
PHT 214	تخصصية	الثاني		4	2	2	Pharmacology	علم الادوية	اجباري
PHT 210	تخصصية	الثاني		2	2	0	Proposal	مشروع بحث	اجباري
PHT 215	تخصصية	الثاني		3	2	1	Theraputics Application	تطبيقات علاجية	اجباري
PHT 216	تخصصية	الثاني		3	2	1	Pharmacognacy	عقاقير	اجباري
PHT 217	مساعدة	الثاني	يتم اختيار مقرر واحد	1	0	1	Community Health	صحة مجتمع	اختياري
PHT 218				1	0	1	Commucation Skills	مهارات تواصل	اختياري
				50	26	24			المجموع
				56				مجموع الوحدات للمستوى الثاني	

1- Basic of Applied therapeutic

اساسيات التطبيقات العلاجية

Subject Name	Arabic language	Studied year	No. of hour/week			
	English language		Theory	Practical	Total	No. of units
Teaching language	English	Second	1	2	3	3

Aims of subject:

Enable the students to correlate between the basic and scientific principles and practical applications in hospitals, factories, and private pharmacy. Understanding usage of drugs according to the trade name, methods of dispensing and registering, ordering, storage conditions, expire date, dealing with the expired drugs and how to write the information about dispensing drugs.

Theoretical subjects

Week	Theoretical subjects
1 - 2	Drugs affecting the gastrointestinal tracts Acid controlling drugs Anti-diarrheal drugs Laxative and lubricants Anti-emetics
3 - 4	Diuretic Drugs
5 - 6	Drugs affecting Cardio-vascular system Hypertensive drugs Anti-angina drugs Vasodilators Drugs used in myocardial infarction Cardio tonics
7 - 8	Drugs affecting the respiratory system Bronchodilators Anti-asthmatic drugs Anti-tussive drugs
9	Antibiotics
10 - 11	Antiseptic and disinfectants.
12 - 13	Analgesics Non- narcotic analgesics

Republic of Iraq
Ministry of Higher Education& Scientific Research
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Department: Pharmacy Techniques

	Narcotic analgesics
14 - 15	Drugs affecting the central nervous system Sedatives and hypnotics Anti-depressants Anti-epileptics Anesthetics

Practical subjects

Week	Practical subjects
1 - 2	Drugs affecting the gastrointestinal tracts Acid controlling drugs Anti-diarrheal drugs Laxative and lubricants Anti-emetics Report and discussion by the students
3 - 4	Diuretic Drugs Report and discussion by the students
5 - 7	Drugs affecting Cardio-vascular system Hypertensive drugs Anti-angina drugs Vasodilators Drugs used in myocardial infarction Cardio tonics Report and discussion by the students
8 - 9	Drugs affecting the respiratory system Bronchodilators Anti-asthmatic drugs Anti-tussive drugs Report and discussion by the students
10	Antibiotics Report and discussion by the students
11 - 12	Antiseptic and disinfectants. Report and discussion by the students
13	Analgesics Non- narcotic analgesics Narcotic analgesics Report and discussion by the students
14 - 15	Drugs affecting the central nervous system

	Sedatives and hypnotics Anti-depressants Anti-epileptics Anesthetics Report and discussion by the students
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2- Pharmaceuticals

الصيدلانيات

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Pharmaceuticals</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	2	4
<i>Teaching language</i>	<i>English</i>			

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1	Introduction , Medical prescription Definition , parts of prescription
2	Solutions , definition , benefit of solutions Dissolution , Stability , Coloring and flavoring
3 & 4	Ointments and GEL, definition , using , benefit, Methods of preparation , types , classification according to the method of preparation
5	Eye ointment , types with examples
6	Suppositories , definition , using , benefit , examples

Republic of Iraq
Ministry of Higher Education& Scientific Research
Northren Technical University
Institute of Medical Technology-Al – Dor
Department: Pharmacy Techniques

7 & 8	<i>Suppository bases , types , displacement value , examples with Calculation</i>
9	<i>Classification of Suppositories , types , uses , Method of preparation , Lubrication of the mould</i>
10 & 11	<i>Capsules , definition , types , therapeutic uses</i>
12 & 13	<i>Medical tablets , types , Methods of preparation , granulation & granulating agent , Binders , disintegrating agent Colouring & flavoring agents , examples</i>
14	<i>Standardization of Medical tablets</i>
15	<i>Tinctures , definition , uses , classification with examples</i>

Practical Subjects

Week	Subject
1	<i>Weights & Volumes used in the pharmacy Lab . the measuring containers used in the lab</i>
2	<i>Isotonic Solution of Sodium chloride glucose Saline Solution</i>
3	<i>Strong Solution of Iodine Weak Solution of Iodine Aqueous Iodine Solution Solution of Balsam of tolu</i>
4	<i>Simple ointment Paraffin ointment</i>
5	<i>Ointment of wool Alcohol , hydrous ointment</i>
6	<i>Zinc & castor oil ointment , Salicylic acid ointment</i>
7	<i>Boric acid ointment , hydrocortison ointment Rose water ointment</i>
8	<i>Hydro cortisone eye ointment , Sulfa – Cetamide eye ointment</i>
9	<i>Suppositories , (Tannic acid , Resorcinol & Zinc oxide) Suppository</i>
10	<i>Chloral hydrate Suppository , phenol supp.</i>
11	<i>Glycerine Suppository B.P , gelato – glycerine Supp. BP</i>
12	<i>Capsules , parts of capsules , Method of preparation , (Demonstration)</i>

13	<i>Medical tablets , Method of preparation of pot. Bromide , Aspirin , flavoured Sod. Bicarbonate as Lozenges</i>
14	<i>Tinctures , Belladonna tincture , concentrated camphor tincture</i>
15	<i>Examination</i>

3- Toxicology علم السموم

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Toxicology</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	-	2
<i>Teaching language</i>	<i>English</i>			

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1 - 3	<i>Introduction: general consideration; host factor, environmental factors of toxic effects.</i>
4 - 6	<i>Carcinogenesis.</i>
7	<i>Mutagenesis</i>
8 - 10	<i>Target organs and systemic toxicology; Respiratory system, Liver, Kidney, Skin, Nervous system, cardiovascular system, Blood.</i>
11 - 12	<i>Toxic substances: Food additive and contaminants, Pesticides, Metals, Radiation and radio active materials, plants, Solvents,</i>
13 - 15	<i>Environmental toxicology: Air pollution, water and soil pollutants, Gases (Tear gas, Pepper spray), CO, Cyanide(H₂S).</i>

4 - Industrial Principles

المبادئ الصناعية

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
		<i>Theory</i>	<i>Practical</i>	<i>Total</i>
<i>Industrial Principles</i>	<i>Second</i>	2	2	2
<i>Teaching language</i>	<i>English</i>			

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1 - 2	<i>Principles of pharmaceutical processing; mixing; fluid mixing; flow characteristics; mechanisms of mixing; mixing equipment's ; batch and continuous mixing; mixer selection; solid mixing theory and particulate solid variables; forces and mechanisms</i>
3 - 5	<i>Milling; pharmaceutical application; size measurement methods; theory and energy of comminution ; types of mills; factors influencing milling; selection of mill techniques; specialized drying methods.</i>
6 - 8	<i>Clarification and filtration: Theory; filter media; filter aids; selection of drying method; non-sterile and sterile operations; integrity testing; equipment's and systems (commercial and laboratory).</i>
9 - 11	<i>Sterilization; validation of methods; microbial death kinetics; methods of sterilization (thermal and non-thermal); mechanisms; evaluation.</i>
12 - 15	<i>Pharmaceutical dosage form design; pre-formulation; preliminary evaluation; bulk characterization; solubility and stability analysis.</i>

Practical Subjects

<i>Week</i>	<i>Subject</i>
1	Introduction in industrial pharmacy and pre-formulation.
2	Effervescent granules: Preparation and characterization.
2	Flow properties and rheology of granules.
2	Tablet dosage form: Preparation and characterization.
2	Evaluation of tablets.
2	Preparation of children aspirin by wet granulation method.
2	Sustained release dosage forms: Preparation and characterization.
2	Coating techniques of tablets.

5 - *Principle of Drugs*

مبادئ الدواء

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Principle of Drugs</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	2	2
<i>Teaching language</i>	<i>English</i>			

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1	General introduction to drugs
2	Pharmacokinetics
3	Drug Receptor interaction and Pharmacodynamics.
4	The autonomic nervous system (ANS).
5	Cholinergic system
6	Adrenergic system.
7	Principal of antimicrobial therapy.

Republic of Iraq
Ministry of Higher Education& Scientific Research
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Institute of Medical Technology-Al – Dor
Department: Pharmacy Techniques

8	β - lactam and other cell wall synthesis inhibitor antibiotics
9	Protien synthesis inhibitors
10	Quinolones, Folate antagonists, and urinary tract antiseptics.
11	Antimycobacterium drugs
12	Antifungal drugs.
13	Antiprotozoal drugs.
14	Anthelmintic drugs.
15	Antiviral drugs

Practical Subjects

<i>Week</i>	<i>Subject</i>
1	Pharmacokinetics.
2	Drug Receptor interaction and Pharmacodynamics.
3	The autonomic nervous system (ANS).
4 – 5	Cholinergic system.
6	Adrenergic system.
7	Principal of antimicrobial therapy
8	β - lactam and other cell wall synthesis inhibitor antibiotics
9	Protien synthesis inhibitors
10	Quinolones, Folate antagonists, and urinary tract antiseptics
11	Antimycobacterium drugs
12	Antifungal drugs.
13	Antiprotozoal drugs.
14	Anthelmintic drugs.
15	Antiviral drugs.

6 - Principle of pharmaceutical chemistry مبدئ الكيمياء الصيدلانية

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Principle of pharmaceutical chemistry</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	2	2
<i>Teaching language</i>	<i>English</i>			

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1	Drug distribution.
2	Acid –base properties
3	Statistical prediction of pharmacological activity..
4 – 5	QSAR models.
6	Molecular modeling (Computer aided drug design).
7	Drug receptor interaction: force involved.
8	Steric features of drugs.
9	Optical isomerism and biological activity.
10	Calculated conformation.
11	Three- dimensional quantitative structure activity relationships and databases.
12	Isosterism.
13	Drug-receptor interaction and subsequent events.
14	General pathways of drug metabolism: Sites of drug biotransformation; Role of cytochrome P450 mono-oxygenases in oxidative biotransformation; Oxidative reactions; Reductive reactions; Hydrolytic reactions; Phase II reactions.
15	Factors affecting drug metabolism

Practical Subjects

<i>Week</i>	<i>Subject</i>
1	Partition coefficient of succinic acid
2	domethacin of A
3	Assay of aspirin by direct titration
4 – 5	Assay of aspirin by indirect titration
6	Adrenergic system.
7	Principal of antimicrobial therapy
8	β - lactam and other cell wall synthesis inhibitor antibiotics
9	Protein synthesis inhibitors
10	Quinolones, Folate antagonists, and urinary tract antiseptics
11	Antimycobacterium drugs
12	Antifungal drugs.
13	Antiprotozoal drugs.
14	Anthelmintic drugs.
15	Antiviral drugs.

7 - Medicinal plants and natural products النباتات الطبية و النواتج الطبيعية

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Medicinal plants and natural products</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	2	2
<i>Teaching language</i>	<i>English</i>			

Objectives :

- 1 Practice their knowledge in techniques of extraction of constituents isolated from natural sources and medicinal plants.

- 2 Practice techniques of separation and identification of secondary active compounds isolated from natural sources, using microscopic, chemical, and chromatographic methods.
- 3 Correlating the chemical property of active compounds isolated from natural product with different extractive and chromatographic techniques.

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1	Introduction to the diagnosis of plants
2 - 3	phytochemistry
4	Effective compounds
5	Extraction methods
6 - 7	Separation and analysis of active compounds
8	Carbohydrates and natural products
9	Lignans and coumarins
10	Flavonoids
11	Glycosides
12	Tannins
13	Lipids
14 - 15	Chromatographic and chemical identification of flavonoid glycosides

Practical Subjects

<i>Week</i>	<i>Subject</i>
1	The diagnosis of plants methods
2 - 3	Phytochemical profiling of medicinal plants
4	Effective compounds
5 – 6	Extraction methods
7	Separation and analysis of active compounds
8	Carbohydrates and natural products
9	Lignans and coumarins
11	Flavonoids
12	Glycosides
13	Tannins

14	Lipids
15	Chromatographic and chemical identification of flavonoid glycosides

Pharmacognosy by teyler - الكتب المقررة المطلوبة
Pharmacognosy by trease and evince- - المراجع الرئيسية (المصادر)

8 – الإحصاء Statistics

عدد الوحدات	الساعات الاسبوعية	المستوى	رمز المقرر	اسم المقرر
2	مج 2	ع 2	ن 2	الإحصاء

الاسبوع	المفردات النظرية
الاسبوع	تفاصيل المفردات
الاول	تعريف علم الإحصاء. طرائق جمع البيانات
الثاني	عرض البيانات الإحصائية ووصفها ,إعداد استمارة (البيانات غير المبوبة) الاستبيان .
الثالث	تمثيل التوزيعات التكرارية "البيانات المبوبة " العرض الجدولي "جداول التوزيعات التكرارية " العرض البياني –المدرج التكراري ,المنحني التكراري , المضلع التكراري .
الرابع	مقاييس النزعة المركزية -الوسط الحسابي .الوسيط .المنوال .
الخامس	مقدمة في نظرية العينات " معناها واسباب اختيارها ."
السادس	الاحصاءات الحياتية , النسبة والمعدل ,احصاءات الوفيات .
السابع	احصاءات الخصوبة .
الثامن	احصاءات الامراض جداول الحياة .
التاسع	تعريف الاحصاء الصحي ومصادره .
العاشر	الحقول التي يعالجها الاحصاء الصحي .
الحادي عشر	احصاء اسباب الوفيات (الشهادة الطبية , السبب , الوفاة , شهادة الوفاة) .
الثاني عشر	احصاء المؤسسات الصحية .

المعدلات وانسب الخاصة بالمستشفيات والمرضى .ايام العلاج . فترة المكوث (متوسط ايام الإقامة)	الثالث عشر
معدل انشغال الاسرة . معدل الدخول .	الرابع عشر
تعريف علم الإحصاء. طرائق جمع البيانات	الخامس عشر

المصادر والمراجع:

1- W. Dixon and F. Massey – Introduction to statistical Analysis .
الكتب المساعدة :-

Banderrfort Hill , Fundament in Biostistics . 1-

Professional Ethics

9 – اخلاقيات المهنة

عدد الوحدات	الساعات الاسبوعية	المستوى	رمز المقرر	اسم المقرر
2	مج 2	ع 2	الثانية	NTU201
				اخلاقيات المهنة

المفردات النظرية	الاسبوع
تفاصيل المفردات	
المهنة تعريفها	الاول
الجدور التاريخية لآداب المهنة	الثاني
مبادئ وآداب المهنة عند العرب	الثالث
مبادئ وآداب المهنة في القران الكريم والسنة النبوية	الرابع
السلوك انواعه	الخامس
العوامل التي تؤثر في السلوك	السادس
انواع الاتصال والعوامل التي تؤثر فيها	السابع
كيفية انتقال القيم	الثامن
العادات تعريفها	التاسع
وسائل تقويم العادات	العاشر
امتحان	الحادي عشر
الشخصية انواعها	الثاني عشر
مواصفات ممارس المهنة وكيفية التعامل مع المرضى	الثالث عشر

دساتير المهنة	الرابع عشر
امتحان	الخامس عشر

10 - Pharmaceutical Formulation

المستحضرات الصيدلانية

Subject	Class	Hours		
		Theory	Practical	Total
Pharmaceutical Formulation	Second	2	2	2
Teaching language	English			

Objectives :

The course deals with the physical and chemical properties of drug substance, dosage form and the biological effectiveness of the drug or drug product upon administration, including drug availability in the human or animal body from a given dosage form. The pharmacokinetic part of the course deals with the time-course of the drug in the biological system, and quantification of drug concentration pattern in normal subjects and in certain disease states.

Theoretical subjects

Week	Subject
1	Introduction to biopharmaceutics.
2 - 3	Biopharmaceutic aspects of products; drug absorption; mechanisms of absorption; physicochemical factors; dissolution rate; effects of excipients; type of dosage forms.
4	One compartment open model.
5	Multicompartment models.
6 - 7	Pharmacokinetics of drug absorption.

Republic of Iraq
Ministry of Higher Education& Scientific Research
Northren Technical University
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8	<i>Bioavailability and bioequivalence.</i>
9	<i>Clearance of drugs from the biological systems.</i>
10	<i>Hepatic elimination of drugs.</i>
11	<i>Protein binding of drugs.</i>
12	<i>Intravenous infusion</i>
13	<i>Multiple dosage regimens.</i>
14	<i>Non-linear pharmacokinetics.</i>
15	<i>Dosage adjustment in renal diseases.</i>

Practical Subjects

Week	Subject
1	<i>Communication with physician and patient counseling.</i>
2	<i>Drugs for anemia and related disorders.</i>
3	<i>Cardiovascular drugs in practice part I.</i>
4	<i>Cardiovascular drugs in practice part II.</i>
5	<i>Cardiovascular drug in practice part III.</i>
6	<i>Drugs for asthma and COPD in practice.</i>
7	<i>Antimicrobial drugs in practice part I.</i>
8	<i>Antimicrobial drugs in practice part II.</i>
9	<i>Antimicrobial drugs in practice part III.</i>
11	<i>Collective practice number I.</i>
12	<i>Drugs acting on CNS part I.</i>
13	<i>Drugs for musculoskeletal and joints diseases.</i>
14	<i>Drugs for endocrine system part I (Diabetes Mellitus).</i>
15	<i>Drugs for endocrine system part II (other endocrine drugs).</i>

Reference text: Shargel L, Yu AB, (Eds.), Applied Biopharmaceutics and Pharmacokinetics.

11 - Industrial Pharmacy

صيدلة صناعية

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Industrial Pharmacy</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	2	2
<i>Teaching language</i>	<i>English</i>			

Objectives :

The course enable technical setup for coordination of standards for formulation of typical dosage forms and the principles needed to learn mass production of different pharmaceutical dosage forms. The syllabus includes different dosage forms like tablets, capsules, aerosols, emulsion, etc, besides the advanced techniques like enteric coating and micro-encapsulation.

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1 - 2	<i>Pharmaceutical dosage forms: Tablets; role in therapy; advantages and disadvantages; formulation; properties; evaluation; machines used in tableting; quality control; problems; granulation, and methods of production; excipients, and types of tablets.</i>
3	<i>Tablet coating; principles; properties; equipments; processing; types of coating (sugar and film); quality control, and problems.</i>
4	<i>Capsules: Hard gelatin capsules; materials; production; filling equipments; formulation; special techniques.</i>
5	<i>Soft gelatin capsules: Manufacturing methods; nature of capsule shell and content; processing and control; stability.</i>
6 - 7	<i>Micro-encapsulation; core and coating materials; stability; equipments and methodology.</i>

8	<i>Modified (sustained release) dosage forms; theory and concepts; evaluation and testing; formulation.</i>
9	<i>Liquids: Formulation; stability and equipments.</i>
10	<i>Suspensions: Theory; formulation and evaluation.</i>
11	<i>Emulsions: Theory and application; types; formulation; equipments and quality control.</i>
12	<i>Semisolids: Percutaneous absorption; formulation; types of bases (vehicles) preservation; processing and evaluation.</i>
13	<i>Suppositories: Rectal absorption; uses of suppositories; types of bases; manufacturing processes; problems and evaluation.</i>
14	<i>Pharmaceutical aerosols: Propellants; containers; formulation; types and selection of components; stability; manufacturing; quality control and testing.</i>
15	<i>Pharmaceutical dosage forms: Tablets; role in therapy; advantages and disadvantages; formulation; properties; evaluation; machines used in tableting; quality control; problems; granulation, and methods of production; excipients, and types of tablets.</i>

Practical Subjects

<i>Week</i>	<i>Subject</i>
1- 3	<i>Direct compression method for preparation of tablets.</i>
4 - 6	<i>Wet granulation method for preparation of tablets.</i>
7 – 9	<i>Dry granulation method for preparation of tablets.</i>
10 – 11	<i>Evaluation of tablets.</i>
12 - 13	<i>Capsules dosage form: Preparation and evaluation.</i>
14 - 15	<i>Parenteral dosage forms.</i>

Reference text: *The Theory and Practice of Industrial Pharmacy* by Leon Lachman et al.

12 - Pharmaceutical chemistry

كيمياء صيدلانية

Subject	Class	Hours		
		Theory	Practical	Total
Pharmaceutical chemistry	Second	2	2	2
Teaching language	English			

Objectives :

The course is devoted to the discovery and development of new agents for treating diseases, and enables translating the drug structural formula into therapeutic effect. Additionally, it focuses on the methods of preparation for some pharmaceutical agents .

Theoretical subjects

Week	Subject
1	Cholinergic agents, cholinergic receptors and their subtypes.
2	Cholinergic agonists; stereochemistry and structure-activity relationships (SAR); products; cholinesterase inhibitors.
3 - 4	Cholinergic blocking agent; structure-activity relationships (SAR); Solanaceous alkaloid and analogues; synthetic cholinergic blocking agents and products; ganglionic blocking agents (neuromuscular blocking agents).
5 - 6	Analgesic agents (SAR of morphine, SAR of meperidine type molecules; SAR of methadone type compounds; N-methylbezomorphans, antagonist type analgesics in benzomorphans).

6 - 7	<i>Analgesic receptors, endogenous opioids; Products; Antitusive agents; Anti-inflammatory analgesics.</i>
8 - 9	<i>Adrenergic agents (Adrenergic neurotransmitters); Adrenergic receptors; Drugs affecting Adrenergic neurotransmission; Sympathomimetic agents; Adrenergic receptor antagonists.</i>
10 - 12	<i>CNS depressant; Benzodiazepines and related compounds; Barbiturates; CNS depressant with skeletal muscle relaxant properties; Antipsychotics; Anticonvulsants.</i>
13 - 14	<i>CNS Stimulants</i>
15	<i>Steroidal & nonsteroidal hormones</i>

Practical Subjects

<i>Week</i>	<i>Subject</i>
1	<i>Preparation of salicylic acid.</i>
2	<i>Re-crystallization of salicylic acid.</i>
3	<i>Synthesis of aspirin.</i>
4	<i>Re-crystallization of aspirin.</i>
5	<i>Assay of aspirin (known sample).</i>
6	<i>Assay of aspirin (unknown sample).</i>
7	<i>Preparation of nitrobenzene.</i>
8	<i>Preparation of aniline.</i>
9	<i>Preparation of acetanilide.</i>
10	<i>Re-crystallization of acetanilide.</i>
11	<i>Chlorosulfonation of acetanilide.</i>
12	<i>Amination of p-chlorobenzene sulfonyl chloride.</i>
13	<i>Hydrolysis of p-chlorobenzene sulfonyl chloride to sulfanilamide.</i>
14	<i>Assay of sulfa drugs (known sample).</i>
15	<i>Assay of sulfa drugs (unknown sample).</i>

Reference text: Wilson and Gisvold Textbook of Organic Medicinal and Pharmaceutical Chemistry; Delgado JN, Remers WA, (Eds.); 10th ed., 2004.

13 - Pharmacology

علم الادوية

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Pharmacology</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	2	2
<i>Teaching language</i>	<i>English</i>			

Objectives :

To introduce the pharmacy students to the general pharmacology of the central nervous system and to the various drug groups used in the treatment of CNS diseases or drugs altering its function. The student will be introduced to the various drugs used in the management of cardiovascular diseases. Moreover the course will cover the drugs affecting the gastrointestinal and respiratory systems.

Theoretical subjects

<i>Week</i>	<i>Subject</i>
1	<i>Introduction to CNS pharmacology.</i>
2	<i>CNS stimulants.</i>
3	<i>Anxiolytic and Hypnotic drugs.</i>
4	<i>General and Local Anesthetics.</i>
5	<i>Antidepressant drugs.</i>
6	<i>Antipsychotic (neuroleptic) drugs.</i>
7	<i>Opioid analgesics and antagonists.</i>
8	<i>Treatment of neurodegenerative diseases.</i>
9	<i>Antiepileptic Drugs.</i>
10	<i>Diuretics.</i>
11	<i>The treatment of heart failure (HF).</i>

12	<i>Antiarrhythmic drugs. Antianginal Drugs.</i>
13	<i>Drugs acting on the respiratory system</i>
14	<i>Antihypertensive drugs. Drugs affecting the blood.</i>
15	<i>Antihyperlipidemic drugs , Gastrointestinal and antiemetic drugs.</i>

Practical Subjects

<i>Week</i>	<i>Subject</i>
1 – 2	<i>Routs of drug administration</i>
3	<i>Onset and duration of drugs (Barbiturates)</i>
4	<i>Absorption and excretion of drugs</i>
5	<i>Effect of parasympathomimetics on gland secretions</i>
6 - 7	<i>Drugs and human eye.</i>
8	<i>The effects of drugs on IOP rabbits</i>
9	<i>Evaluation of opioid analgesics</i>
10 - 11	<i>Evaluation of NSAIDS</i>
12	<i>Evaluation of anti-parkinsonian drugs</i>
13	<i>Evaluation of anti- convulsant drugs</i>
14	<i>The effects of drugs and their antagonists on isolated rats ileum</i>
15	<i>The effects of drugs and their antagonists on isolated rabbits ileum</i>

Reference text: Lipincott Pharmacology 3rd Edition, 2006

14 - Therapeutics Application

تطبيقات علاجية

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
		<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		<i>1</i>	<i>2</i>	<i>3</i>
<i>Therapeutics Application</i>	<i>Second</i>			
<i>Teaching language</i>	<i>English</i>			

Objectives :

The course is devoted to the discovery and development of new agents for treating diseases, and enables translating the drug structural formula into therapeutic effect. Additionally, it focuses on the methods of preparation for some pharmaceutical agents .

Theoretical subjects

<i>Week</i>	<i>Subject</i>
<i>1</i>	Thyroid and parathyroid disorders
<i>2</i>	Contraception
<i>3</i>	Endometriosis
<i>4</i>	Menstruation related disorders
<i>5</i>	Hormonal replacement therapy (HRT)
<i>6</i>	Cancer treatment and chemotherapy
<i>7</i>	Leukemias
<i>8</i>	Lymphomas and Multiple myeloma
<i>9</i>	HSCT(Hematop. Stem- cell- Transplantation).
<i>10</i>	Breast and prostate cancers
<i>11</i>	Adverse effects of chemotherapy
<i>12</i>	Human immunodeficiency viruse

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13	Multiple seclerosis
14	Adrenal gland disorders
15	Pituitary gland disorders

Practical Subjects

<i>Week</i>	<i>Subject</i>
1 – 2	<i>Drugs affecting Cardio-vascular system</i> <i>Hypertensive drugs</i> <i>Anti-angina drugs</i> <i>Vasodilators</i>
3	<i>Drugs used in myocardial infarction</i> <i>Cardio tonics</i> <i>Report and discussion by the students</i>
4	<i>Drugs affecting the respiratory system</i>
5	<i>Bronchodilators</i> <i>Anti-asthmatic drugs</i>
6 - 7	<i>Anti-tussive drugs</i> <i>Report and discussion by the students</i>
8	<i>Antibiotics</i> <i>Report and discussion by the students</i>
9	<i>Antiseptic and disinfectants.</i> <i>Report and discussion by the students</i>
10 - 11	<i>Analgesics</i> <i>Non- narcotic analgesics</i>
12	<i>Narcotic analgesics</i> <i>Report and discussion by the students</i>
13	<i>Drugs affecting the central nervous system</i> <i>Sedatives and hypnotics</i>
14	<i>Anti-depressants</i> <i>Anti-epileptics</i> <i>Anesthetics</i>
15	<i>Report and discussion by the students</i>

Reference Text: Roger Walker, Clive Edwards (eds), Clinical Pharmacy & Therapeutics.

Barbara G.Wells & Joseph T. Diriro, Pharmacotherapy hand book 7th Edittion

15 - Pharmacognacy

عقاقير

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
		<i>Theory</i>	<i>Practical</i>	<i>Total</i>
<i>Therapeutics Application</i>	<i>Second</i>	<i>1</i>	<i>2</i>	<i>3</i>
<i>Teaching language</i>	<i>English</i>			

Theoretical subjects

<i>Week</i>	<i>Subject</i>
<i>1</i>	<i>Introduction: General biosynthesis pathways of secondary metabolites.</i>
<i>2</i>	<i>Carbohydrates.</i>
<i>3</i>	<i>Glycosides: Biosynthesis, physical and chemical properties; cardiac glycosides; saponin glycosides; anthraquinone glycosides; flavonoid glycosides; cyanophore lycosides.</i>
<i>4</i>	<i>Glycosides: Isothiocyanate glycosides; aldehyde glycosides; alcoholic glycosides; phenolic glycosides; lactone glycosides; coumarins and chromones.</i>
<i>5</i>	<i>Resins and resin combination; tannins.</i>
<i>6</i>	<i>Lipids: fixed oils and waxes.</i>
<i>7</i>	<i>Volatile oils: Introduction; chemistry of volatile oils; biosynthesis of volatile oils; hydrocarbons as volatile oils; alcohols as volatile oils; aldehydes as volatile oils.</i>
<i>8</i>	<i>Ketones as volatile oils; Phenols as volatile oils; Oxides as volatile oils; Ester as volatile oils; Phenolic ethers as volatile oils.</i>
<i>9</i>	<i>Non- medicinal toxic plants.</i>

10	Vitamins and Amino acids.
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Practical Subjects

<i>Week</i>	<i>Subject</i>
1 – 3	Cardio-active glycosides
4 - 6	Anthraquinone glycosides.
7 – 9	Saponin glycosides.
10 -11	Tannins.
12 - 13	Volatile oils
14 - 15	Flavonoid glycoside

Reference text: Robbers JE, Speedie MK, Tyler VE (Eds.); Pharmacognosy and Pharmacobiotechnology; the latest edition.

16 - Community Health

صحة مجتمع

<i>Subject</i>	<i>Class</i>	<i>Hours</i>		
<i>Community Health</i>	<i>Second</i>	<i>Theory</i>	<i>Practical</i>	<i>Total</i>
		2	0	2
<i>Teaching language</i>	<i>English</i>			

Objectives: This course enables the students to understand the principles of public health and the art of preventing disease, promoting health and prolonging life, through organized effort of society.

Theoretical subjects

<i>Week</i>	<i>Subject</i>
<i>1</i>	<i>General items &ICD10</i>
<i>2</i>	<i>Predisposing factors of infectious diseases</i>
<i>3</i>	<i>Cardiovascular diseases</i>
<i>4</i>	<i>Gastrointestinal diseases</i>
<i>5</i>	<i>Skin diseases</i>
<i>6</i>	<i>-Sexually transmitted diseases</i>
<i>7</i>	<i>Oncogenic diseases</i>
<i>8</i>	<i>Respiratory infections</i>
<i>9</i>	<i>Familyplaninig include maternal infections, vaccination</i>
<i>10</i>	<i>-Immunology , General introduction</i>
<i>11</i>	<i>innate &adaptive immunity-antigen characteristics</i>
<i>12</i>	<i>B&Tcells , complements</i>
<i>13</i>	<i>Hypersensitivity types</i>
<i>14</i>	<i>Oncogenic immunity</i>
<i>15</i>	<i>-Auto immune diseases , Immune deficiency diseases</i>

Reference text: Lucas AO, Gilles HM, (Eds), Short Textbook of Public Health Medicine for the Tropic, (4th Ed), 2003.